Computer Science Clinic 2019–2020

Student Team Handbook

The Mathematics Clinic Handbook: http://bit.ly/mathclinichandbook

HMC CS Clinic Program: 2019–2020 current as of March 26, 2020

Sep. 2 Mon.	**7pm-7:30pm** Project managers' meeting (only PMs and Clinic Director need attend) (Fall semester begins the following morning.)
Sep. 3 Tue.	**11am-12:00pm** Full-clinic meeting in Galileo Pryne (students and clinic director)
Sep. 5 Thu.	**11am-1pm** **LAUNCH DAY** Team/Liaison/Advisor (face-to-face team meeting with liaisons)
Sep. 6 Fri.	**by 4pm** All start-up clinic forms are due to DruAnn Thomas in Olin 1257
Sep. 10 Tue.	**11am-12:15pm** Professional development in Galileo McAlister (professionalism + pitching)
Sep. 11 Wed.	Career Fair (Software engineering focus) in the LAC from 11am-2pm
Sep. 17 Tue.	**11am-12:15pm** Professional development in Galileo McAlister (project ethics)
Sep. 24 Tue.	**11am-12:15pm** Professional development in Galileo McAlister (team dynamics + feedback)
Sep. 30 Mon.	**by 10am** **Draft statement of work due to advisor** (cc'ing Clinic Director and D. Thomas) ~ deadline extensions must be pre-approved by *both* clinic director and fac. advisor
Oct. 1 Tue.	**11am-12:15pm** Project-pairs-feedback, part 1 (elaborating / pitching statements-of-work)
Oct. 7 Mon.	**by 10am** **Faculty Advisor approved statement of work due to DruAnn Thomas** + mail a copy to the Clinic Director and DruAnn Thomas + the team pitches and negotiates Liaison approval (the timing is per-project) ~ extensions must be pre-approved by both clinic director and fac. advisor
Oct. 8 Tue.	**11am-12:15pm** Project-pairs-feedback,, part 2 (presentation-preparation)
Oct. 10 Thu.	Career Fair (Cross-STEM focus) in the LAC from 11am-2pm
Oct. 15 Tue.	**11am-12:15pm** Project-pairs-feedback,, part 3 (share-back and reflection)
Oct. 21-22	Fall break
Oct. 29 Tue.	**11am-12:15pm** Phase I Clinic presentations [[Recital Hall + McAlister]]
Nov. 5 Tue.	**11am-12:15pm** Phase I Clinic presentations [[Recital Hall + McAlister]]
Nov. 12 Tue.	**11am-12:15pm** Phase I Clinic presentations [[Recital Hall + McAlister]]
Nov. 19 Tue.	**11am-12:15pm** Phase I Clinic presentations [[Recital Hall + McAlister]]
Nov. 26 Tue.	**11am-12:15pm** Phase I Clinic presentations [[Recital Hall + McAlister]]
Nov. 27-29	Thanksgiving break
Dec. 3 Tue.	**11am-12:15pm** Professional development in Galileo McAlister (fall finale + spring in clinic)
Dec. 4 Wed.	**by 10am** **Draft midyear update due to advisor** (cc Clinic Director and D. Thomas) ~ deadline extensions must be pre-approved by both clinic director and fac. advisor

Dec. 10 Tue.	No clinic meeting: *work on Midyear Update*
Dec. 13 Fri.	**by 4pm Fac.Adv.-approved *Midyear Update* due** + email a copy to the Clinic Coordinator and Director ~ extensions must be pre-approved by both clinic director and fac. advisor
Dec. 16 Mon.	Online-survey Clinic Feedback is due; fall-term classes have ended; fall exams begin (to 12/20)
week of Jan. 21	**New project managers** find a short span to meet individually with the Clinic Director (To welcome the new PMs; director shares thoughts from winter break's check-ins.)
Jan. 21 et al.	**11am-12:15pm** Clinic spring presentations begin ("Phase III" in the CS clinic handbook) + Spring presentations are held each Tuesday in McAlister and Shan 1260 + through the full spring semester: *these are mandatory to attend each week*
Jan. 31 Fri.	Career Fair, all-STEM focus, in the LAC from 11am-2pm
Mar. 16-20	Spring break
	(No draft or final poster)
	(No April spring-series clinic presentations: the Tuesday-in-McAlister talks)
Apr. 10 Fri.	Software feature freeze ~ deadline extensions must be pre-approved by both clinic director and fac. advisor
Apr. 15 Wed.	**by 4pm Draft of final report due to advisor** (cc Clinic Coordinator and Director) ~ deadline extensions must be pre-approved by both clinic director and fac. advisor
Apr. 24 Fri.	Software code freeze ~ deadline extensions must be pre-approved by both clinic director and fac. advisor
May 1 Fri.	**by 4pm Draft of final presentation (in agreed-upon form) due to advisor** + cc Clinic Director and S. Gunasena (CS) / D. Thomas (Math) ~ deadline extensions must be pre-approved by both clinic director and fac. advisor
May 5 Tue.	**(Original date of Projects Day)**
May 8 Fri.	**Final presentation** By this date, each team should have created/given a final presentation of an agreed-upon sort, e.g., could be a pre-recorded video presentation, a presentation via video conference, a poster, or something more appropriate for a specifc project. + **Deliverable for archiving** There should be an archivable deliverable that captures some essential part of this presentation: slides are the most traditional form and are 100% acceptable. Alternatively, a recording, poster, or something else agreed-upon are all acceptable in 2020.
May 8 Fri.	**by 4pm Advisor-approved Final Report copies are due to clinic coordinators: S. Gunasena (CS)** + these do not have to be printed - we will print them + also emailed to both coordinators and Clinic Directors
May 8 Fri.	**by 4pm Clinic work and checklist due to Clinic Coordinator / Director** + this will be done by Google Form - still being drafted as of 4/7/20 + this will mostly - perhaps entirely - include (a) an archive (on knuth) of all clinic work products for the year, (b) return of equipment / canceling of services or subscriptions, (c) feedback
Late May	Soft-copy final report and other deliverables mailed to sponsor
Late August	Hardbound final report mailed to sponsor and students

HMC CS Clinic Program: 2019–2020 Highlights for Liaisons

Late August	The CS department matches clinic students and faculty advisors to clinic projects for '19-'20
Sep. 3 Tue.	Harvey Mudd's fall semester begins
Sep. 5 Thu.	**LAUNCH DAY** **With liaison(s), on HMC's campus, 10am-1pm.** This is the project launch, an introduction to the clinic program (10-11) and a face-to-face team meeting with liaisons, clinic students, and faculty advisors, (11-1), here on HMC's campus.
Sep. 11 Wed.	Career Fair (Software engineering focus) in the LAC from 11am-2pm
Oct. 1 Tue.	Team starts to develop a **Statement of Work** in tandem with liaison and faculty
Oct. 7 Mon.	Liaison and Fac. Advisor-approved **Statement of Work** should be complete (in this week)
Oct. 10 Thu.	Career Fair (Cross-STEM focus) in the LAC from 11am-2pm
Oct. 21-22	Fall break for the Claremont Colleges
Oct. 29 Tue.	**Phase I** Project presentations begin (five Tuesdays)
Nov. 27-29	Thanksgiving break for the Claremont Colleges
Dec. 13 Fri.	Faculty-Advisor-approved ***Midyear Update*** due to the clinic program
Dec. 13 Fri.	Fall semester classes end
Dec. 16-20	Final exam week for the Claremont Colleges
Dec. 21 Sat.	Winter break for the Claremont Colleges
Jan. 21 Tue.	**Phase II** Clinic presentations begin (Tuesdays throughout the spring)
Tuesdays/Thursdays early in the spring semester:	(Optional) Re-launch **On HMC's campus, 11am-1pm** (on Tue. or Thu. early in the term) This is an ***optional*** face-to-face team reconnecting liaisons, clinic students, and faculty advisors, here on HMC's campus as the spring semester starts up, as feasible and desired by liaisons.
Feb., 2020	Career Fair, all-STEM focus, in the LAC from 11am-2pm
Mar. 16-29	Spring break, 2020
Apr. 10 Fri.	Software feature freeze, CS-clinic-wide
Apr. 24 Fri.	Software code freeze, CS-clinic-wide
May 5 Tue.	**Original Projects Day** This, traditionally, is the culmination and presentation of the year's clinic projects and results.
May 8 Fri.	Faculty-Advisor-approved **Final Report (and all deliverables)** due to the clinic program
Late May	Soft-copy final report and other deliverables mailed to sponsor
Late August	Hardbound final report mailed to sponsor and students

Preface

This handbook will help you participate effectively in the Computer Science Clinic program, and to understand what is expected as part of CS clinic.

The construction of this document is the result of accumulated efforts of James Stepanek ’94, Joshua Hodas, Robert Keller, Julius Elinson ’13, DruAnn Thomas, and Geoff Kuenning. We also, often, pay homage to the Mathematics handbook and the Engineering Clinic guidelines. We try to keep this document up to date -- if you find anything that seems wrong, please let me (the Clinic Director) or your Faculty Advisor know -- and use those interactions as the more definitive word on a particular issue.

Chapter 1: Introduction to Computer Science Clinic

This introduction provides an overview of the Computer Science Clinic program at Harvey Mudd College. It includes both a description of the Clinic program and a discussion of the organization of the typical Clinic project.

What is Clinic?

The HMC Clinic Program brings together sponsors who have problems to be solved with student teams who have the skills to solve them. The concept for the Clinic Program originated in the HMC Engineering department in 1963. Then, Professors Jack Alford and Mack Gilkeson, who were interested in channeling HMC student initiative, drive, and intelligence into projects of a “real-world” nature. To quote Jack Alford:

> “I gained the idea that engineering was like dancing; you don’t learn it in a darkened lecture hall watching slides: you learn it by getting out on the dance floor and having your toes stepped on.”

The name ”Clinic” derives from HMC’s goal of giving students clinical experience similar to what medical students receive as part of their training: solving real-world problems in a controlled environment.

A Clinic is a year-long project sponsored by a company or other organization. It is a graded course in which students work together as a team to solve an externally-posed problem or set of related problems. Clinic projects often tackle difficult problems, where no known solution yet exists. Projects also reflect their origins in industry, research laboratories, nonprofits, or public service, giving the students (and faculty) involved real-world technical, managerial, and (sometimes) business experience. In addition to learning more about their technical field, Clinic students experience, ***as owners rather than spectators***, an authentic professional environment and the challenges of working with a group on a long-term team project. Leadership and "listenership" are essential to the experience. Students also practice written and oral communication skills, delivering reports and presentations through the course of the project.

In 1973, the Mathematics Department started its own Clinic program to emphasize mathematical modeling and analytic tools for applied mathematics problems. The Computer Science (CS) Clinic was created in 1993, targeting computational and information-based systems. Clinic became a graduation requirement for the Computer Science major in 1996. The Physics Clinic began in 1996, and Global Clinic in 2006. (As of 2017, other departments are also considering the program.)

What is the Computer Science Clinic?

The B.S. in Computer Science at Harvey Mudd College requires students contribute to a year-long Clinic project. Students typically fulfill this requirement as seniors; some who have completed the prerequisite coursework participate as juniors. On occasion students from other HMC majors and majors in CS programs hosted at Pomona participate in the program.

In all departments, sponsors of Clinic projects typically pay the college a fee to participate in the program. On occasion, too, *pro bono* projects are supported by the CS department and the College. The fee supports the CS and HMC Clinic program; it serves, too, to ensure sponsoring institutions have "skin in the game," in that they have an institutional (and, often, personal) stake in the collaboration and the project outcomes. This agreement provides an authenticity and mutual investment that reflects many professional interactions, nonprofit and for-profit, academic- and business-motivated. The department allocates faculty, students, equipment, (pre-clinic) pipelined support, and other resources to the sponsored project. The number and type of projects for a given year depends on both students participating and sponsor availability. Teams generally consist of three to five students, with four being the most common team size.

During the spring and summer before a year's projects begin, the Clinic Director meets with prospective sponsors to negotiate/brainstorm projects for the following academic year. This

negotiation process can be lengthy, particularly with new sponsors. First, it is necessary to identify a project that fits the Clinic timeline, spread from September to May. At least as important is finding a project that matches both the goals of the sponsor and the educational goals of the college and CS department. The project must have a reasonable chance of success, and must also pose significant, open-ended challenge. The negotiations underscore that Clinic is first and foremost an academic enterprise to provide a distinctive student experience. Specifically, clinic is *never* compatible with contract work or an employee/employer relationship. At the same time, the project must be of genuine benefit and meaning to the sponsor.

Late in the summer the descriptions of the projects are finalized. Students enrolled in the Clinic program receive brief descriptions of each project; they express their relative interests/preferences, as well as other constraints and objectives. Based in part on that input, the CS faculty as a whole match each student to a Clinic project, forming the year's teams. Only after the teams are formed are faculty advisors assigned, through an open-table discussion of interests and background.

Educational Goals

While working towards the sponsor's project specification is a key facet of the Clinic program, the success of a project is *not* measured only by the success of the technical outcomes from the sponsor's point of view. In fact, each Clinic team can -- and is expected to -- concretely define a vision for their planned contributions to the sponsor. The initial project specification is just that -- initial, and Clinic asks each student to become a genuine owner and shaper of their project, its trajectory, and its results. Because of this, Clinic can feel quite different from classroom assignments or even open-ended final projects in CS courses. In short, a Clinic project shares all of the ambiguities, balancing acts, and tradeoffs ubiquitous in post-HMC professional life.

These are the specific educational objectives of CS Clinic. CS Clinic students will

- Gain experience with the nature, demands, and ramifications of real world problems
- Consider and present the ethical repercussions of their specific, in-depth technical pursuit
- Practice design decisions and trade-offs
- Actively and proactively manage complexity, difficulty, and time constraints
- Control a large project via scheduling and resource budgeting (time, effort, costs,…)
- Develop a positive, professional sponsor relationship, including dealing with possibly ambiguous and changing priorities of the sponsor / liaisons.
- Develop and put into practice team leadership/membership skills:
    a. Division of work and delegation of tasks and authority
    b. Managing a variety of talents, skills, and interests
    c. Meeting responsibility and accountability expectations
    d. Handling and sharing evaluation and assessment
    e. Resolution of team and project conflicts, if/as they arise
- Demonstrate increased understanding of design and development processes:

    a. Proposal, negotiation, contract, execution, evaluation
    b. Background research, preliminary design, revision
    c. Researching and leveraging existing libraries, software resources, tools, etc.
    d. Detailed design, prototyping
    e. Field tests, debugging, code reuse and modularity
    f. Final release, acceptance test
    g. Documentation and reporting
- Show increased ability to apply theoretical course material:
    a. Recognize applications and limitations, both theoretical and practical
    b. Differentiation and adaptations between models and implementations
    c. Balancing analysis, design, experimentation, implementation, and optimization

Taking a bigger-picture view, Clinic's goals include

1. *Sustaining professionalism*, through a year-long, open-ended, challenging project

2. *Teaming well* via positive, effective collaboration and communication throughout

3. *Optimizing ouput for time input* Clinic's goal is to creatively maximize the *output* value for the time -- ten hours/week (or more) -- that is input.

   Strategic, reflective, and mindful action can make ten hours *much* more productive and much more valuable than larger, less deliberately spent timespans..

Or, Melissa O'Neill's apt four-word summary: *"Clinic finds a way."*

Intellectual Property, Confidentiality, and Clinic

Educational discourse deeply values openness. Commercial corporations, in contrast, sometimes rely on intellectual property protections, especially in the early/exploratory stages of an endeavor. This dichotomy creates a challenge for a program such as Clinic. The educational goals of the program must be balanced carefully with the realities of interacting with the commercial concerns held by some of the program's sponsors.

As a part of the value a Clinic collaboration can provide sponsors, the Clinic program and sponsor mutually agree that all intellectual property (IP) developed over the course of a project belongs to the sponsoring organization. We see this as a fair exchange for the efforts the sponsors make on behalf of the program, the fee they pay, and the confidence they place in Clinic's participants. In most cases the assignment of intellectual property rights is accomplished by the Letter of

Agreement (LOU) between the sponsor and the Clinic program. In some cases the sponsor may request that the team members individually sign a specific personal assignment of these rights.

Of course, not all projects have a commercial product as an ultimate goal. Sometimes, even with commercial sponsors, the projects are intent on producing software to be put into the public domain. Still other projects, e.g., with some government labs, *require* that all results be public.

The Clinic Director tries to identify projects that place the *fewest* limitations on the ability of students to discuss their work. Even so, we recognize some sponsors may have concerns. It does happen that sponsors decide that their projects require the protection of non-disclosure agreements (NDAs) that safeguarding the sponsor's interests.

There is a limit, however, to the degree of confidentiality to which the Clinic Director will agree. For example, we will *not* accept a project that requires any sort of security clearance. Similarly, because of the central role of on-campus presentations in Clinic's educational goals, we do not accept projects that make it impossible to present meaningfully. This is a balancing act: restrictions on presenting a few key details may be deemed acceptable.

In all cases, the Clinic program does make a promise to each sponsor to protect internal documents and materials to a reasonable extent. To that end, we expect the project team to act responsibly in handling such documentation and also require all Clinic students to sign a Student Participant Confidentiality Acknowledgement form (See Appendix B).

Organization of a Clinic Project

The success of the several Clinic programs of Harvey Mudd College involves a combined effort of students, faculty, staff, trustees, liaisons, and sponsors. At the most basic level, the students are the consulting team; the faculty member is coach, advisor, and evaluator; the sponsoring liaisons contextualize, inform, guide, and accept/reject/redirect results; staff members provide support; and the Clinic Advisory Committee, chartered by the trustees, provides formal Clinic-Program evaluation and additional long-term steering.

Faculty Advisor

You should think of your faculty advisor as the primary source of guidance for managing a successful project -- and of Clinic-specific information. Working closely with the student project manager (PM), the faculty advisor monitors the team's progress and directs the team in important decisions. Your faculty advisor may initiate communication between your team and your liaison. Faculty advisors keep the Clinic Director informed of team progress. Finally, in consultation with the whole CS department, each faculty advisor is responsible for assigning your grade and managing feedback for each semester of the project.

Liaisons

The liaison acts as representative of the interests of a project's sponsoring institution. Your liaison (or liaisons) share project context and goals and the channel for communication between your team and its sponsor. The liaison provides technical background necessary to define and begin exploration. Typically, the liaison has a personal and professional stake in the success of the project. Often the liaison promoted the idea of the project in the first place! Regular contact with the liaison can help protect a team from veering into unfruitful directions: a good working relationship with the sponsor liaison is crucial to a successful project outcome.

Typically, a team has a direct contact with the liaison at least once a week. Unless the sponsor is very close to Claremont, most weeks this contact will be in the form of a conference call or an online meeting (Skype, Hangouts, etc.) Liaisons almost always come to campus for face-to-face meetings at the very start and very end of the Clinic year; sometimes additional meetings happen at HMC, as well. Regular professional email contact is helpful. (Each team has two email aliases, one of which includes both the team and the liaison.)

In addition, Clinic teams usually visit the sponsor site early in the fall semester and sometimes again in the spring.

The future success of the Clinic program depends, in part, upon providing value for the liaisons and, thus, the sponsoring institution. Value includes *both* the technical deliverables, research, and products *and* a mutually-beneficial relationship with the liaison hinging on the project's vision.

It's worth emphasizing how valuable the liaison's time is, with respect to a clinic project. It's quite common that the 1-2 hours per week asked of a liaison is the most challenging barrier to sponsoring a Clinic project (not the fee). It is crucial that your Clinic interactions recognize the significance of the liaison's time-and-effort contributions to the project. Specifically, make sure that you are on time (or, better yet, early) for all liaison contacts. Come prepared -- prepared to bring the liaison up to date on recent progress, to outline the plan for next steps, to ask well-formulated and focused questions. You want the liaison to leave each contact with the justified sense that every member of the team is active, interested, and involved in the project.

Project Manager

Each Clinic team has a student project manager, or PM, responsible for directing the team in pursuit of the project goals. Just as in industry, academia, and entrepreneurial arenas, the project manager forges/fosters the relationships necessary to make the project come together. This means the manager maintains close contact with all project participants: the liaison(s), faculty advisor, staff, and fellow team members. The PM coordinates tasks, often schedules and creates agendas for meetings, monitors progress reports and deliverables, and generally ensures that the project moves ahead to completion.

That said, all team members are *equal co-owners* of their project and its progress! Do not wait for PM direction: success requires a proactive work-seeking attitude from each member. For more information on the duties of a manager see the “Project Manager’s Responsibilities” section later in this document.

When we survey preferences before Clinic begins, we also ask about your interest in acting as a project manager. Project management is an experience typically orthogonal to technical contributions. The team and the PM will strike a balance in those responsibilities -- and it's worth reinforcing that both are equally essential for success. Since project management carries significant additional responsibilities, teams often offset those with a reduced technical-work slate for the PM.

The project manager will be designated by the Clinic Director in consultation with the faculty. Once an initial designation is made, the team may, with appropriate discussion and the OK of the faculty advisor, change the assignment. The project manager can also change during the year; in fact, some advisors prefer to rotate the position. This often represents the desire to share the leadership and organizational experience that comes with project management.

Team Members

The team members are, as a group, equal co-owners of the Clinic project; they share the primary responsibility for the progress, ongoing reflection, and ultimate success of the Clinic project. Of course, the exact nature of each team member’s responsibilities will vary based on project and personal specifics. Whatever those details, *every* team member should be involved in the technical work of the project and the written and oral presentations. Every team member should have a clear vision of the project’s directions along with their roles and contributions within it. Discuss with your advisor if you do not sense this.

An unhappy team member can be enormously damaging to the progress of the project. As part of the team-based challenge of Clinic, it is vital for everyone involved to attend to the team's and each individual's dynamics. Occasionally, however, problems or tension may arise; Chapter 12 ("What to do if problems arise") contains suggestions on dealing with personality conflicts and other issues that may occur in the conduct of a project.

Course Requirements

Project goals will differ from project to project, sponsor to sponsor. Across *all* projects, there are Clinic course requirements that hold: all team members are expected to

- Attend all Clinic meetings (Tuesday 11am) and team-specific meetings
- Actively participate during any meetings or other contacts with the liaisons/sponsor
- Contribute to the work of the team, at the rate of about 10 hours per week
- Meet deadlines set by the project manager, faculty advisor, and Clinic program

- Contribute, in a timely fashion, to all written deliverables and to all presentations
- Properly document Clinic team activities, including helping maintain the project Trac site and wiki (or project-specific project management tools)

As part of this documentation, each student is provided with an official notebook for use during the course of the project. You should use this notebook for all project-related writing. Use it to take notes at meetings, record thoughts about the project, etc. Your faculty advisor may set other specific recording requirements as well, such as recording actual time spent on the project.

In addition, you are required, as a team, to maintain a project wiki (or other online/archived approach to documentation, decided on by the team, advisor, and liaison). This documentation should detail the progress of you project. The subsequent chapter on "Guidelines for Project Documentation" details these responsibilities. It is permissible to record information directly to the wiki, bypassing notebooks, if done carefully and thoroughly.

If you cannot attend a team meeting, Tuesday presentation, you must inform your project manager in advance. All of these gatherings rely on participation for their success, and attendance is not optional.

In terms of total time commitment, we expect each team member to invest ten or more hours per week on Clinic. The *kinds* of work will vary through the lifespan of the project, e.g., directed research and investigative prototyping; design and implementation; creating and refining deliverables.

Because Clinic projects are open-ended, it would be possible to spend all of one's time making progress towards such a project: such a thing is not possible, not expected, and not desirable. But it does point out the fundamental challenge of Clinic: *maximizing the value - creatively - of the limited time available*.

Because Clinic is team-owned, it is important for each team member to maintain a steady investment of time (at least Clinic's ten hours, including meetings) each week. Clinic's schedule is a "time box": deadlines and deliverables don't extend beyond the end of the project. (Many alums note that this *"maximize-value-in-available-time"* mindset is the most distinctive -- and authentic -- facet of the Clinic experience.

Grading

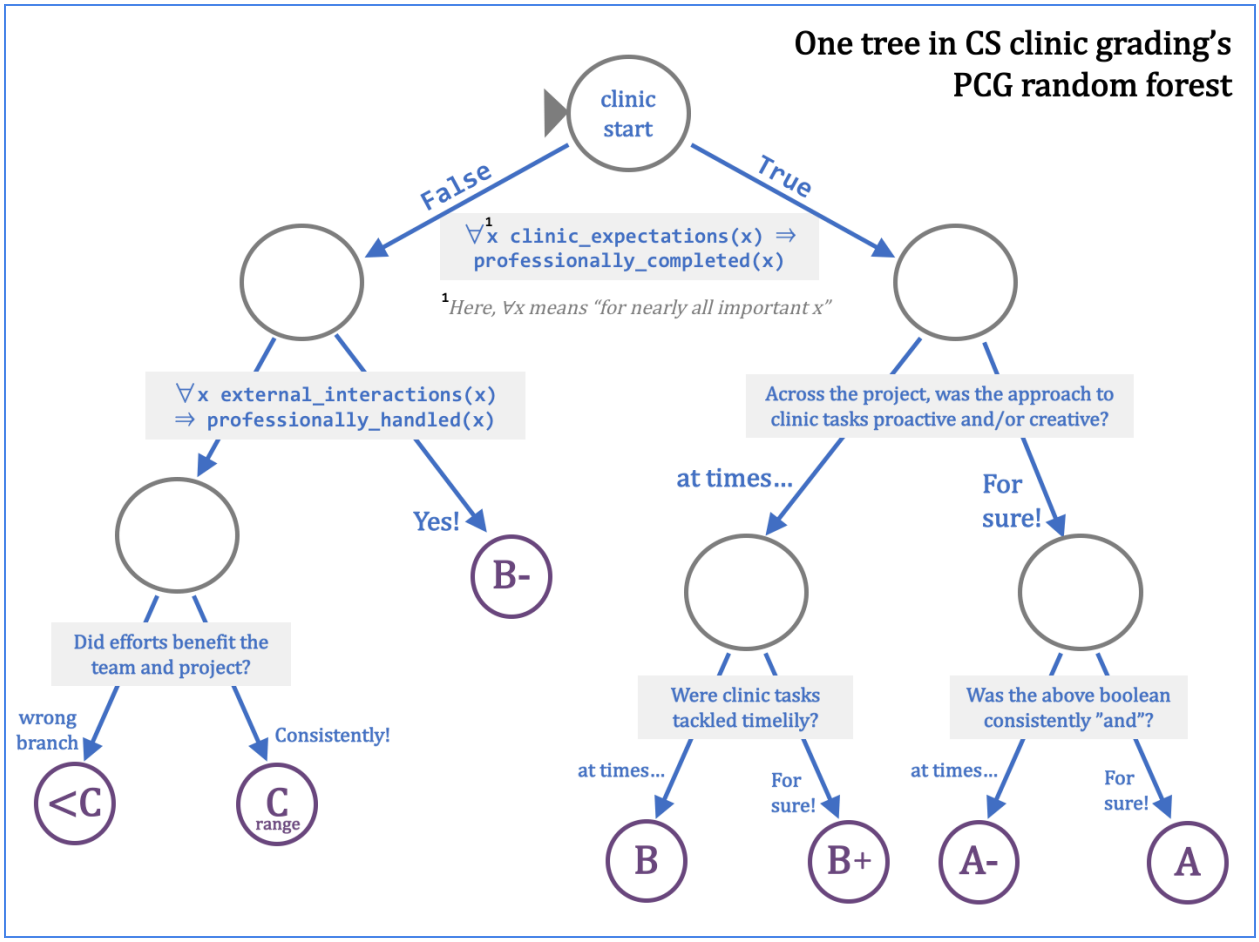
The faculty advisor takes responsibility for assigning grades and managing feedback for the Clinic course. Grades are determined in a meeting of the entire CS department, which helps maintain consistency across very different kinds of projects.

Note that Clinic projects are not zero-sum; there is no expectation that results fall along any particular distribution: it's entirely possible that every clinic project meets/exceeds the sponsor's and team's expectations. In fact, the program strives for precisely that outcome.

Among the criteria used in assigning grades are:

- Quality and timeliness of accomplished work
- Creatively using the time available to Clinic: effectiveness/efficiency
- Communication of ideas, balancing team-support and individual contributions
- Attendance at team meetings, presentations, and other activities
- Overall professionalism and impact on the project

These are less formally organized into a CS-clinic "grading tree":



Although the above tree is informal, it's not inauthentic -- some criteria differ from those of a typical academic course. Importantly, the Clinic program recognizes that it is simply not possible to disentangle each individual's efforts: many of these criteria will reflect not only your own work but also the work of the team as a whole. That said, team members may or may not receive similar grades; both your faculty advisor and your fellow team members will provide feedback. The faculty advisor and CS department consider all of those inputs to form as-complete-as-possible picture of performance upon which to base a grade.

Other Clinic Personnel

There are a variety of support personnel and other people involved in the Clinic Program behind the scenes. The roles of a few are detailed below. Contact information is given in the directory in Appendix D.

Clinic Director

In 2019-2020, Professor Zach Dodds serves as the Director of the Computer Science Clinic Program. The Director's responsibilities include soliciting and developing projects from potential sponsors, overseeing the formation of project teams, coordinating the purchase of major Clinic-related equipment, maintaining communications with sponsors over the course of the year, coordinating activities with the other HMC Clinic programs, and generally making sure things run smoothly for the CS Clinic program within the year -- and year-to-year.

Clinic Coordinator

Surani Gunasena is the Computer Science Clinic Coordinator. Her responsibilities include a variety of day-to-day administrative tasks including management of the program budgets, preparing written communications with the sponsors, etc. All requests for purchases and reimbursements, as discussed below, should (once approved by the Director or faculty advisor) be handled through DruAnn. She usually makes Clinic-related travel arrangements for the teams.

System Administrator

Individual teams maintain the computers/machines used for their project, with the help of the Computer Science Department system administrator and support staff. Because teams oversee their own machines, usually software installations and similar tasks are handled within each team.

If external support is needed, Tim Buchheim '01, x73485 is our current System Administrator, and he is the first point of contact for help with software, licensing, or other resources needed for your team's use. The best way to request help with a specific task is stop by Tim's office (Olin B159) and/or to email Tim at tcb@cs.hmc.edu.

Clinic Advisory Committee

The Clinic Advisory Committee (CAC) is appointed by the trustees of the college to provide oversight and advice on the administration of the Clinic program. It is chaired by a member of the Board of Trustees and consists of the Dean of Faculty, the Directors of the Clinic programs, and around sixteen external advisors from industry. Many of these advisors work for companies with a

history of sponsorship and other involvement in the Clinic program; many are past project liaisons themselves. The committee's charter is to evaluate projects, evaluate the Clinic program as a whole, and offer advice to students, faculty, and staff for the purpose of improving HMC's Clinic programs.

The CAC meets four times a year. Typically there is one meeting in the fall, two in the spring, and one during the summer. While much of the committee's work involves higher-level questions of the program's administration and execution, the committee also involves itself, to some extent, at the level of following the progress of the individual projects. To that end, the meetings that occur during the academic year take place on Tuesday, and the CAC members attend Clinic presentations on those days. The discussion at those meetings begins with an analysis, reflection, and critique of the projects presented.

Chapter 2: Calendar of Clinic Events and Milestones

In the course of the year there are a number of events and deadlines that frame your Clinic work and partially determine your schedule. In this section we present these milestones and some of their context.

Project Description Posting and Clinic Assignments

In late spring, CS and Math Clinic directors meet to assign joint majors to each of the departmental Clinic programs. Later, usually in early August, the Clinic Director posts brief descriptions of the Clinic projects that have been selected for the upcoming year. Clinic students receive an email pointing you to the descriptions and a survey to indicate your preferences. This survey also requests other information necessary for assigning students to projects, such as your willingness to be a team leader, etc. It is important that you fill this form out completely and return it by the deadline. Just before school starts, the CS faculty meet to assign students and advisors to the Clinic projects. These assignments are based on the students' preferences and skills, the projects' needs, and various other factors. Once assigned and announced, the project manager should send an introductory message to the liaison and team.

Student Orientation

The Clinic year begins with a full-group session at 11 a.m. on the first Tuesday of the fall semester. This is an introduction to Clinic, with all Clinic students and the Clinic Director. Afterwards, the PM should seek a time for the whole team and the faculty advisor to meet, ideally later that Tuesday afternoon (many times, 4:15pm or 5:15pm can be made to work for everyone). At that first team meeting, the faculty advisor will share additional project-management details, initial meetings can

be scheduled, and a plan for preparing for the Liaison Orientation Day / Project Launch Day is put together.

Liaison Orientation Day / Project Launch Day

Typically the first Thursday of the semester, Orientation Day is an intense introduction for the team, the liaison, the faculty member, and the project as a whole. All sponsor liaisons are asked to attend Orientation Day, if at all possible. They meet at 10am with the Clinic Director.

At 11am, the Clinic teams (students and faculty advisors) meet in a face-to- face with the liaison(s). This is a working-lunch meeting in which the liaison has a chance to flesh out the project description. The team should prepare for this meeting by investing some time in researching the sponsor and the area/context of the project. The team should have a written list of questions about the project -- the product of prior team meetings, and each team member should actively participate. In addition, this is a chance to (a) schedule regular weekly teleconference calls and (b) start to plan for a site visit by the team to the sponsor.

Ideally, this meeting will end with increased enthusiasm on all sides: the liaison should gain confidence in the professionalism and conscientiousness of the team, and the team should more deeply understand paths forward with the project.

Sponsor-Site Visit

We encourage each team to make plans with their liaison(s) to visit the sponsoring institution site. This often happens in late September or early October (but can vary considerably). Visiting the sponsor's site provides additional insight into the context of the project; it also allows the team to meet stakeholders beyond the liaison. These visits typically last at least half a day, and they provide a chance for longer, more in-depth and technical meetings as a follow-up on the Orientation Day meeting.

It is worth asking about appropriate attire for the company. Business casual is the norm in 2017, but different companies vary. (For example, American Express was a bit more formal last year.) Note that, even if it is casual, your attire and conduct should always be professional.

It is good to let your sponsor know ahead of time of any things in particular you'd like to accomplish during the visit. Also for project managers, you should make sure that you know who's leading each meeting for the day. If the team is leading, e.g., for a progress report, preparation will be important.

More generally, here is a list of things you might want to consider covering while on-site. Sometimes these will have been covered on Orientation Day, too:

- Ask for any information about remote/sponsor machine(s) that your software will be expected to run on. If it is very unusual/ specific, you might ask about borrowing a machine for testing
- Ask how the software you will be developing will be distributed, if at all. The sponsor may be able to show you how internal software is usually released.
- Ask to meet any targeted users of the software or people who contributed to the idea.
- If applicable, it's great to take a tour of the sponsor's institution and get to know how and what the working environment is like. The software you develop should suit the workflow that the user's are accustomed to.
- If you meet a number of people who are not specifically liaisons but who might be helpful to the project, ask for their contact information and the best way to reach them.

Statement of Work

Early in the fall term (late September), you will create, pitch, and converge on approval for a Statement of Work (SoW) document in collaboration with your sponsor (and faculty advisor). This important document makes explicit the exact goals and scope of the project and clarifies the expectations between the sponsor and the project team. It represents a fleshing-out of your understanding of the sponsor's original project description, and your plan of attack for the solution. It can range from about 6 to about 12 pages long. The "Statement of Work" chapter elaborates on the Statement of Work.

Project Managers' Meetings

Project managers' meetings provide a forum for the managers to get together and discuss common problems and consider approaches to organizational challenges for upcoming deadlines. It is also a time for the Director to discuss his concerns with the managers, based on feedback from faculty advisors and/or liaisons.

Tuesday Presentations, Phase I & II

Every Tuesday from 11:00am-12:15pm all Clinic students are required to attend a plenary session (mostly in Galileo for fall '17).

During the fall, your team will make two presentations during this session. More details on these presentations are given in Chapter 5.

Prior to the first of these presentations, the Clinic Director or a designated faculty member or guest will review aspects of project management and software design that might be helpful during the course of the term.

The following is an outline of the things that take place during the Fall Tuesday sessions, roughly in the order that they will occur. These should be supplemented by additional team meetings that you schedule.

Administrative Set-up Each team will hold an organizational meeting and, if time permits and deemed worthwhile, conduct a brief liaison conference call. Clearly you would have to coordinate with your liaisons beforehand. This meeting would be a good time to set up a weekly schedule for the semester, exchange contact information and discuss team expectations.

Liaison Orientation (Thursday meeting) The liaisons will attend an orientation session on campus. In addition to getting a fact-to-face project explanation from the liaison, as many remaining administrative details as possible should be worked out. Generally speaking, prepare and ask as many questions as you can.

Team Management Review project management and team organization. Things that should be discussed include: who is in charge of what, how will work be distributed, how meetings will run, etc. Keep the plans simple, however, since projects, and the associated responsibilities, evolve through time.

Development Practices Review software development models. Things that should be discussed include: version control, testing practices, coding standards, etc. Try to set clear and realistic goals; it will be a waste of time if you agree on elaborate development practices that no one ends up using.

Phase I Presentations Teams present their problem statements and plans of their approach for the rest of the year.

Phase II Presentations Teams present design review, progress reports, obstacles and risks to a few other teams in a rotation. This is an opportunity to both demonstrate and reflect on the progress made so far, as well as solicit input and ideas from other teams.

MidYear Update

The Mid-Year Update is relatively new to the Clinic project. Previously, a full report was expected that detailed the progress to date and future plans. However, this would cause all other work, development especially, to come to a halt. The Update is intended to allow teams to keep their momentum right up until Winter break. The document should be short -- some teams have submitted complete updates as short as 6 pages, usually it's between 8 and 12 pages. *The Midyear Update should not be too much longer than that - at least not without ok'ing it with both the clinic*

director and your advisor. Although "short" may seem like "simple," we emphasize that it is a worthwhile challenge to write concisely and clearly -- and that that approach is equally worthwhile for your audience (your liaisons and sponsor). You should touch base with your sponsor about what they would most like to see and know from this Midyear Update.

For more information on the form and content of the Mid-Year Update, see Chapter 4. A possible alternative to this document entirely is a substantial deliverable that you work out with your sponsor and the faculty advisor.

Tuesday Presentations, Phase III

Roughly a week into the second semester, Phase III presentations begin. These talks are held jointly with all the other Clinic programs. Talks are held in Shanahan 1430 on Tuesdays at 11 A.M. During this phase, three teams present each day, with talks limited to 15 minutes plus a few minutes for questions.

The Phase III presentations also may serve as a practice run for the presentation given on Projects Day. Compared to the Phase I and II presentations, they are more formal, designed for and presented to a broader audience, and with a higher level of polish. More information on the expected form and content for these presentations can be found in Chapter 5.

It should be noted that it is common for prospective sponsors of future projects to be invited to attend Tuesday presentations to get a sense of the depth of the Clinic programs. Thus the quality of these presentations can have a major impact on the future of the program.

Generally a specially-catered lunch with your team and liaisons is held in the Green Room immediately following the Phase III Clinic presentations at 12:15. Should you not be able to join your team for lunch or have any special dietary needs please contact Surani Gunasena (sgunasena@g.hmc.edu)

Feature and Code Freeze

Because there are many deadlines close together at the end of the year, it is vital to control work effort carefully in those last few weeks. To that end, the department has instituted a feature freeze three weeks before Projects Day and a code freeze one week after that. This will allow time for final testing and transition of code to the sponsor. Also during this period, you will need to focus on your other deliverables, complete your final report, construct your presentation, and complete your poster.

Projects Day and Final Presentation

The Tuesday after the last week of classes in the spring semester is Projects Day, on which Clinic teams from all departments make their final oral presentation. In addition to all of the college faculty and students, all the project liaisons and a large number of visitors from industry and academics are invited to attend. These include representatives of past sponsors and sponsors being recruited for future projects. Your liaison will usually attend, and may well bring other people from the sponsoring organization to show them what you have accomplished.

Details on the structure of Projects Day are found in Chapter 11.

The Computer Science Clinic holds its end-of-year banquet following the poster session and reception. Details will be provided in late April.

You should consider the Projects Day presentation one of the most important of the year. Other presentations during the year, particularly your Phase III Tuesday presentation, should leave you well prepared for it. You should endeavor to make the presentation as professional as possible. You are expected to prepare the talk well ahead, present it to your faculty advisor a week before Projects Day, and work with your advisor on refining and rehearsing the talk in the days leading up to Projects Day.

The basic format of the Projects Day presentation is the same as that of the Phase III Tuesday presentations, described in Chapter 5, except that you have about 25 minutes for presentation and questions combined. The same presentation is made three times during the day.

Projects Day Poster

QREF link for Clinic posters: www.cs.hmc.edu/twiki/bin/view/QREF/PrintingClinicPosters

Projects Day begins and ends with a poster session at which attendees may browse the posters of all the Clinic teams. The goal of the first session is to help attendees decide which team's presentations they are actually interested in attending, since they are only able to attend six talks. The morning and afternoon poster sessions provide them with an opportunity to learn more about some of the projects.

To simplify the creation of the poster and to provide a uniform, professional appearance, the Computer Science Clinic has standardized on one basic poster design, which is implemented as a single large-format Keynote slide. Keynote, rather than PowerPoint, is used to provide a better appearance of the result with our printer. Note that Keynote runs only on Macs. The template for this design can be found at www.cs.hmc.edu/twiki/bin/view/QREF/PrintingClinicPosters. More details of the poster format can be found in Chapter 7.

Note that you are expected to have a draft of your poster for the poster session ready for your advisor four weeks in advance of Projects Day. The final poster design must be submitted to the System Administrator in electronic form to allow time for it to be printed.

Final Report

The Final Report summarizes the results of your year-long effort on the project. This report should include a recounting of the problem, the conduct of your effort (including how your actual performance related to your original schedule), a description of the results, and a detailed discussion of recommendations to the client.

For more information on the form and content of the Final Report, see Chapter 4.

Deliverables and Deliverable files

In addition to the final report, each team prepares the contents of a thumb-drive or sim-card archive as their primary deliverable. This will be of the form of a directory on Knuth. This directory should contain all of the code developed for the project (including all source code and, where practical, executables), electronic copies of all of the project reports and the project poster. The System Administrator will produce the physical media or equivalent from the content there. For more information on the form and content of the archive, see Chapter 8.

Other Reports and Presentations

During the course of the project, your liaison may request that your team prepare interim presentations or reports (for example, a presentation to be given to others at the sponsoring organization during a site visit). Such reports and presentations should be given a great deal of attention, as not only the team, but the liaison as well, may be judged on the quality of these items.

Chapter 3: Project Management

Managing a year-long team-based project can be a difficult task, especially for those who, like many Clinic participants, have little or no technical management experience. For this reason, the task of managing a Clinic project provides both a serious challenge and a valuable learning opportunity. This section attempts to give those about to embark on the difficult task of managing a Clinic project some tools which will hopefully make the challenge a little less daunting.

While some of this section is directed at the project managers, most of it is relevant to, and should be read by, all of the members of the project team.

Project Manager's Responsibilities

Because the task of keeping things flowing in a Clinic project falls most heavily upon the shoulders of the project manager, he or she incurs some additional responsibilities beyond those of the rest of the team members. Essentially, this amounts to managing the resources available to the team (most importantly, the team's own time and labor) in a way that best suits the problem at hand, while at the same time making sure that others with a vested interest in the project, namely the sponsor and the faculty advisor, fully understand the intentions and progress of the team.

The project manager's responsibilities include the following:

- Maintaining an overall schedule for the project
- Working with advisor and team to assign tasks to team members based on their skills, the project's needs, and the development schedule
- Monitoring individual team members' progress and motivating them to complete their assigned tasks
- Coordinating project activities (meetings, presentations, site visits, etc.)
- Maintaining communication between the team and the sponsor liaison
- Maintaining communication between the team and the faculty advisor
- Representing the team's interests at Clinic related activities (project manager's meetings, presentations to the public, etc.)
- Dealing with any conflicts among team members

As discussed earlier, these additional organizational duties may be offset by a reduced technical load.

Scheduling and Time Budgeting

Each team must maintain and follow a schedule outlining the required steps for the completion of the project. It is vitally important for each team member to completely understand at all times exactly what work he or she is to be doing and when it is to be completed. The Trac site (or a comparable project management) can be helpful in this regard. The schedule should be as specific as possible, not only including the dates of expected completion of project goals, but also exactly which team members are working on what tasks at any given point. In addition to being essential for the team's success, a detailed schedule also makes monitoring and reporting the team's progress much easier.

The team should compose a preliminary schedule for inclusion in the statement of work. While it is important for you to try to stick to this schedule, most projects will require some flexibility in scheduling. For example, the schedule may adjust over time as a result of unforeseen difficulties or early completions. In general, the schedule will get more specific as time goes on and deadlines get

closer. As you begin to understand exactly the tasks and your role in completing them, you will be able to flesh out the specifics of the schedule.

The core schedule is in the form of milestones on the Trac site outlining the principal tasks and subtasks to be completed, their interdependence, and the deadline for each one's completion. You should also prepare a time budget.

Maintaining a time budget and timeline are integral to the Clinic educational experience, which is focused on recognizing the complexities of real-world projects. Therefore it is imperative that you reflect on the budget's accuracy to date in the mid-year update and final report, comparing the original theory to your actual performance. While it is not necessary for you to fill out timesheets, you should keep track of time spent on each task, for use in preparing these comparisons. An up-to-date project schedule and list of task assignments should always be available on the project's Trac site.

Communication

Perhaps the most important task in managing a Clinic project is maintaining effective lines of communication between all those involved in the Clinic project, including team members, faculty advisor, sponsor liaison, and the Clinic offices. Several guidelines will greatly increase the quality and value of communication.

- Always try to keep the overall goals of the project in mind.
- Listen carefully to what others are saying.
- Do not interrupt each other when talking. Really try to be mindful of this because we often do this without noticing.
- Use your notebook to take notes, and keep written records of important material.
- Formulate ideas in an explicit, easy-to-understand manner.
- Ask questions and paraphrase to clarify ideas.
- Don't be afraid to express your ideas or indicate they might be tentative.
- Anticipate the concerns and desires of others.
- Don't take criticism personally. Likewise, make criticism constructive and impersonal.
- Most likely, you will utilize a variety of forms of communication to accomplish your project goals. These include personal contacts, meetings, written records, reports, telephone/fax, and electronic mail. Each of these forms has its own advantages and disadvantages to consider.

Meetings

You and your team will schedule several types of meetings during the course of the project. Meetings are one very important means of communication and can also be used to actually get some work done. In all cases, so as not to waste other people's time, it is important for you to come to the team meeting prepared and on time.

At every meeting, the team should go once around the table and make sure that every team member can confirm the tasks on which he or she will be working up until the next meeting. Any new assignments should be noted in the form of tickets on the Trac site.

Weekly Meetings with the Faculty Advisor

All team members should meet together weekly with the faculty advisor to report progress, ask questions, and plan for the future. The faculty advisor can help the team keep on a course for success, but this requires maintaining an open and honest line of communication. A productive weekly meeting can make this possible.

Regular Team Meetings

You and your team should also plan to meet a minimum of at least once a week on your own, outside of the liaison conference calls. During this meeting, the team can interact to assess progress, assign tasks, and set goals. As part of his or her responsibility, the project manager should run the team meetings with these activities in mind.

Most teams hold long team meetings in which the team members actually work together on the project. This has benefits for keeping people motivated and informed about the project. Consider trying pair programming or other types of collaboration to get the best use the team's time.

Be mindful to schedule meetings only when the team will have had a chance to work since the last meeting and there will be something to discuss. Meetings are important and necessary but do take away from the team's time to work on concrete deliverables.

Team meetings should have agendas prepared by the project manager generally ahead of time.

Meetings with the Sponsor Liaison

Of all the contacts that a Clinic team establishes over the year, those with the sponsor liaison will be among the most important, both for the team's own benefit and for the benefit of the project and future success of the Clinic program.

Team members typically learn a lot from their correspondence with the liaison. As the representative of the sponsor's interests, the liaison deserves much of your attention. In addition to

his or her importance as a client, the liaison will most likely be a technical authority on the subject of your project.

As the sponsoring organization has made a significant commitment to your project, it is important to make a good first impression on the liaison. In your first meetings with the liaison, be sure to express your excitement and interest in the project. Make sure to take notes and ask many questions. For any face- to-face contact with the sponsor, you should dress and act in a neat and professional manner; business casual is most usual.

Conference calls with the Sponsor Liaison

A weekly telecon or video conference call is the norm for weeks in which there is not a face-to-face get together with the liaison(s). The project manager and the faculty advisor should work together to maintain close communication with the sponsor liaison. Ask the liaison what is his/her preferred form of communication. A popular and effective approach for meeting agendas is Google slides. Here are a few Google-slides agendas (from the MITLL Imaging team of '18-'19) as examples:

+ 09/17/2018
+ 09/24/2018

(Note that those examples have placeholders for Andrew's phone number!) It's a good idea to have images of the team for the first week or two -- and to have a slide for each member to present in each telecon.

If you are having any difficulty reaching or otherwise interacting with your liaison, please make sure your advisor and the Clinic Director is aware of the issue.

Using Email

In general, it is crucial to the success of a project that all those involved are always fully informed as to what is going on. Proper use of the team's email aliases can help insure this. As discussed in Chapter 9, each team has two email addresses, one of which reaches the members of the team and the faculty advisor, and the other of which reaches the liaison as well. When communicating with other members of the team, it is generally advisable to use the team email alias, so that everyone knows what is going on. When communicating with the liaison, we similarly strongly encourage you to use the alias including the liaison, rather than the liaison's direct email address. Should the liaison accidentally reply directly to you as an individual forward the response to the team and, in your next email to the liaison, gently encourage him or her to use instead the alias that reaches everyone.

Keeping Records

Maintaining written records of the team's activities will make the task of managing a Clinic project much easier. Written records can save hours of otherwise wasted time spent recalling and reproducing information about the project. These records should be entered in the appropriate web pages in your team's wiki. You will receive additional information about how the Trac/wiki is organized and managed early in the term. Several key types of documents deserve further consideration in this handbook.

For the purposes of keeping records, each team should ideally designate a team secretary, responsible for maintaining and distributing meeting minutes, trip reports, and dealing with other paperwork the team may encounter.

Meeting Minutes

By keeping a record of all of the meetings during the year, a project team gains a clear understanding of where they have been and where they are going. The minutes should include:

- Date, location, time, and persons present
- Accomplishments since last meeting and assignments for the next meeting
- Important changes in the status of the project (goals, schedule, task assignments, etc.)
- Following meetings, it is a good idea for everyone to review the minutes. Otherwise, it can be easy for people to forget about tasks assigned to them.

Trip Reports

For each trip, the team should designate in advance a scribe to take notes. Note-taking during a site visit can be a vital tool for understanding both the technical nature of the project and the interests of its sponsor.

While one person has ultimate authority for meeting minutes and trip reports, all members should take notes of those facets of the discussion that are relevant to their part of the project.

Maintaining the Project source code and wiki/Slack/Docs:

As mentioned earlier, you are required, as a team, to maintain a project source-code management system. When teams want something hosted locally, we offer Trac and its wiki. Another popular choice is the GitHub suite of tools. Others are welcome, as long as they provide an organizational structure for the source code and other documents collected and generated by the team.

A wiki or another communications site, e.g., Google Docs or Git/GitHub should also be used for communications with your sponsor liaisons. It should provide the liaison with an up-to-date view into the running status of your project, including all reports, timelines, etc. It is also a useful source

of information for your advisor and all the members of the team. To that end it is particularly important that the wiki/docs be kept up to date with recent meeting minutes, and, in particular, task assignments, as often as possible. Often, meeting agendas are desired in "slides" form, e.g., Google slides: this facilitates creating presentation drafts (and, for many liaisons, *they* use variations of the slides internally to report on the status and progress of the project).

Chapter 4: Guidelines for Written Reports

As described above, during the course of the year, your team will need to periodically present a written account of your progress. Essentially, this includes both a description of the problem at hand and a discussion of the solution. This discussion will include technical details about the project and logistical details of your team's work. The following guidelines in this section may help you in your writing.

Note that, in addition to the guidelines here, your advisor may place a variety of additional specific requirements on how you approach the process of writing your reports and submitting them for approval. For example, you may be asked to make use of the HMC Writing Center to improve the reports' content and style.

Important: The LaTex source for "ALL" reports and documents should be kept and turned in with the final materials.

Consider the Audience

When writing the main text of a report, always consider the exact nature of the intended audience. When writing, ask yourself the questions "Will the intended audience understand and appreciate what I am writing?" and "Am I adequately conveying the ideas I hope to express to the intended audience?" Often a single document may address several audiences. For example, a report may outline the project in a non-technical manner, and then go into more technical details later, or in an appendix. In these situations, you should consider the placement and order of the different sections relating to different audiences.

While the reports are obviously going to be read first and foremost by your liaison, it may be best not to think of the liaison as the primary audience. First, the liaison may pass the report on to other people at the sponsoring organization who are not directly connected to the project and may therefore be less familiar with the project's background and goals. Second, if you focus on the liaison as the audience, you may be inclined to gloss over details that you assume are shared knowledge. An

important purpose of these reports is to insure that such knowledge really is shared; that you and the sponsor are on the same wavelength.

Write for Understanding

You should make your writing as clear and understandable as possible. Consider beforehand the purpose of the document and how you intend to fulfill that purpose. Lay out ideas in easy-to-understand language. To make your documents more understandable, it is important to define any technical terms that may not be understood by the audience. It will be helpful to provide a glossary of such terms in an appendix. Don't be afraid to include details that may lead to greater understanding. This means that important ideas can be repeated. Also, don't try to say too much in too little space. Instead, break up complicated concepts across several sentences. Often, a visual or graphical representation can go a long way towards getting your ideas across.

Be Precise, Thorough, and Detailed

At each stage of the project, the report is in part an opportunity to demonstrate to the sponsor just how much you understand about the problem at hand. The more you can make clear that you know what you are doing, the more easily the sponsor can accept your judgments and results. To that end it is important that you be detailed about your knowledge. For example, if some aspect of your project depends on a particular API (application programming interface), then you should include some discussion of the API at the level of the calls you are likely to need to make; if it depends on a particular protocol, show diagrams or tables describing the protocol. Always cite appropriate sources.

This sort of knowledge should be demonstrated as early as possible. Although the Statement of Work is not generally a very lengthy document, it is important to make the depth of your initial research clear. It should be clear to the sponsor that your design decisions and plan are based on a thorough understanding of the technical underpinnings of the project.

Make an Adequate Number of Citations

Like any other academic document, all Clinic reports are expected to make adequate use of citations to source material for the concepts described. These citations may be to research papers, magazine or journal articles, published API specifications, user manuals, training guides and reference manuals or even to sponsor-provided documents, and documents available only on the worldwide web. When in doubt, cite. If you are unsure how to cite a particular sort of document, ask your advisor. Web citations should always include a date visited. Citations should be made to a bibliography included as an appendix to the report.

A good tool for doing citations is BibTeX. If you use it from the start, you'll be able to reuse citations throughout the project, rather than create them from scratch for each written document you

produce. BibTeX can be fickle, however. To use BibTeX in your Clinic documents, try the following steps:

1. Place hmcmath.bst in the same directory as your TEX document. The file should be available with the report template.

2. Create a file called references.bib. In it, add the BibTeX entries for source you wish to cite. There is lots of documentation for how to do this online.
3. Each time you want to cite a source inline, do the following:
    a. A sentence that needs a citation~\citep{lee12}. Where lee12 is the name of a BibTeX entry.
    b. Add the following lines at the end of your TeX document

        \backmatter
        \bibliographystyle{hmcmath}
        \bibliography{references.bib}
4. To compile BibTex correctly, you must run LaTeX, BibTeX, LaTeX, La- TeX. Running LaTeX once more for good measure couldn't hurt.
5. If you run into issues, here are few troubleshooting tips:
    a. Email latex-l@hmc.edu, the HMC LaTEX enthusiasts group.
    b. Check the log file (which is generally good practice when working with LaTEX).
    c. Delete all auxiliary files and try again.

Use a Consistent, Professional Format

Beyond its content, the report will also be judged by the quality of its presentation. For written reports, this includes both writing style, and overall format. The report should look as professional as possible. This means correct spelling and grammar and an easy-to-read layout. An attention to detail, and perhaps even a certain amount of flash in a report, can go a long way in pleasing the sponsor. Most importantly, though, whatever the format, the report should remain consistent in its formatting choices.

The Final Report (discussed below) will be bound in a custom hard- cover format. To insure an attractive presentation and a simplified printing process, it is preferred that teams use LaTEX to write the final report and should make use of a standardized style file provided within the example final reports on the CS website. To prepare you for that process, the MidYear Update should also be prepared using that LaTeX format. LaTeX should be the default; that said, some sponsors prefer Microsoft Word: check with your liaison to determine whether he or she has a preference.

Proofreading Requirement

To improve consistency and general quality, we require that every member of the team read and sign off on the entire report *before* it is submitted to the advisor. It is not sufficient to have members

write and correct sections independently and then have one member assemble the whole from those parts without review from the others.

Key Sections to Include in the Report

There is no one perfect structure for any of the standard reports you will file during the year. You must find your own style and structure. Nevertheless, there are certain sections that all of the reports should probably have:

Background

This section describes the context of the project both within the sponsoring organization, and within the larger framework of current systems. In particular, it discusses existing systems, standards, etc. that motivate the need for this project.

Problem Definition

This section is a detailed description of the task that has been set before you. Normally, it is not the same description originally given to the team by the liaison. Rather, it is the problem definition you have arrived at over several weeks of research and discussion as indicated by your statement of work. It should, therefore, highlight any major changes from the original specification, so as to insure that these changes are agreed to by all parties.

The core of this section should not change appreciably after the statement of work. Significant shifts in the focus of the project after that should be reflected by additions to the section, so that the fact that there was a shift in focus is readily apparent.

Deliverables

Enumerate those items that you promised to deliver to the sponsor, indicating which ones you actually delivered.

Approach to the Problem

This section describes how you will or did attack the problem. This should be as detailed as possible. In particular, it should include possible solutions that were considered and rejected, algorithms used, outside tools and software that were incorporated, similar solutions that you found during your research.

Schedule and Labor Budget

This section outlines the time to be spent on the project. It should include project schedules, labor budgets, and problem assignments to the individual team members. These should also be as detailed as possible, and should, in particular, include plan-versus-reality discussions in the MidYear and Final Reports.

Other General Guidelines

In addition to these sections, and such others as you deem necessary, all reports should have an abstract, a well-structured table of contents, lists of figures and tables if appropriate, and a bibliography. You may also want to include brief biographical information on the team members, focusing on the skills, experience and interests they bring that are relevant to the project.

Obviously, each of these sections, particularly the approach and schedule, will change between the statement of work, the mid-year update, and the final report. However, they provide a common framework for structuring all of the reports. Note that while we mention the possibility of reusing sections from one report in the next, this should be done with care, and at the very least you must make sure that the verb tenses make sense for their context.

You are encouraged to get copies of previous reports to use as a guide. Of course, not every old report is a good one. A good idea is to ask your advisor or other faculty what past project teams they think generated particularly good reports, and focus on those.

Note on Mailing of Reports

The Clinic Coordinator will coordinate the mailing of all reports to the project liaisons. This will enable us to file copies in our archive and log the mailing of these key deliverables. You will need to provide two copies each of the statement of work and the mid-year report, and several copies (one for advisor, one for *each* liaison, one for each team member, one for the library, and one for the file) of the final report.

Statement of Work

What Is a Statement of Work? Your SoW is your team's commitment to your sponsor. It includes a statement of what direct support—if any—you will receive from your sponsor, including items such as software, hardware, data, or written materials. It will also serve as a shared agreement by your sponsor to not demand more from your team than had been established. Your SoW amounts to a near-contract between your team and your sponsor, so it is important for you to prepare it carefully and to conduct your interactions with your sponsor's representatives with caution. Only use

technical terms you thoroughly understand your SoW: you don't want to discover you have promised the impossible!

A project's SoW needn't be and shouldn't be very long; typically it should be no more than five to ten pages when typeset using the hmcclinic LaTeX class file. The document spells out what your team is agreeing to do and, in turn, what you need from your sponsor and when you need to receive it to get the work done. Remember it is better to under-promise and over-deliver than vice versa… .

Stages of development: An important outcome of the Statement of Work is bringing together the HMC clinic program (team, advisor, directors) and the external sponsor and liaisons. The SoW task is to describe a concrete plan for the project's path forward and milestones/deliverables. All of the stakeholders listed above need to be on board in order to consider the Statement of Work complete.

This is done in three parts: the team's draft due on 9/30 (in 2019), an adivsor-approved version due 10/7 (in '19), and a liaison-approved version (still team-and-advisor approved) sometime in the week after that. The advisor-approved version goes also to the Clinic Coordinator and Director, so that they are aware of its contents.

You need not include the liaison in the early drafts (or you may), but you *should* discuss your ideas with your liaisons throughout! Since you will need liaison approval, the SoW usually balances the expectations of your liaison(s) and sponsor with the explorations, paths, and deliverables the team proposes. Your faculty advisor will help with this balance.

Note that LaTeX is required both for the SoW and for your subsequent Clinic reports.

Who Will Read Your Statement of Work? When writing any document, you should consider the audience for the document. Your expected audience will largely determine the style and vocabulary of your final document. The SoW is not meant solely for experts. It will be of interest to several parties of differing backgrounds and knowledge, not just your liaison, your advisor, and yourselves. For example, your sponsor's management, who funded the project, will need to understand what they paid for and be able to justify the expenditure to their own managers. If your work is successful and generates interest in implementing the results or in continuing the line of research, managers will once again be tapped for funds, and a later project team, who are not necessarily experts at the outset, will need to come up to speed on the project just as you did. A clearly written SoW, along with your final report, can be used by them as their starting points.

At the same time, you should recognize that not everything can be explained to the lay reader. Your choice of language is a matter of judgment. Just keep in mind that your Statement of Work must serve readers of multiple backgrounds and purposes. Define all acronyms, explain the technical terms, avoid esoteric language and use plain English where possible.

Content and Layout of Your Statement of Work

Your SoW should contain a description of the project as you and your team imagine it will progress. On the broadest level, you will probably want to include sections that roughly correspond to the following elements:

Problem Statement: A succinct restatement of the problem as presented to you by the sponsor.

Background: Some information about the sponsor, what they do, why they're interested in the problem, and so forth.

Goal: The overall, long-range, end result that your research is aimed at achieving; where you are ultimately trying to get. Stating a goal does not mean you believe you will achieve it during this project; it is the grand view towards which you strive. For example, the goal of HIV research is to find a cure for AIDS.

Objectives: The specific things that you will try to achieve during the course of your project; the immediate targets of your research. Your objectives spell out how you have parsed the problem of the ultimate goal into smaller pieces that you will work on. The objectives set the practical limits on your work. They point to what your team can reasonably expect to achieve. The objectives should clearly fit into and lead towards the long-range goal.

Optional Objectives: The objectives the team will pursue if time permits.

Tasks: The specific things that you will do to achieve your objectives. The tasks drive your determination of what skills and other resources (e.g., data, software, hardware, written materials, work environment) will be needed for your project. If any of these resources must be supplied by the sponsor, you will need to specify those items in your SoW.

Schedule: A list of dates and times that specifies when you will finish major parts of your project and provides a timetable for completion of deliverables. Internally, you should maintain as fine-grained a schedule as you need to keep your team coordinated and on track, but in your SoW it is best to make the schedule and list of deliverables as modest as the sponsor will allow.

Contingency Plan: If your project does require your sponsor to provide some important element, make sure that your SoW includes a last acceptable date for delivery of the material and contingency plans that will allow you to proceed in the event of a failed delivery. Note that this category could include, for example, consultation provided by the sponsor on the use of special equipment or software.

Milestones: A list of specific accomplishments that you can use to mark progress and maintain pace and coordination within your project. They will help your team to stay on track and to determine the success of a chosen line of attack on your problem. A list of milestones may or may not be

included in your SoW, but you should definitely think them through for your own use as you plan your project and SoW. They are checkpoints for you (and for your sponsor, if they are included in the SoW), not deliverables.

You may want to specify major milestones in your SoW to indicate what you would do if your research leads to the conclusion that some objective cannot be accomplished. For example, "If by some date we have found it impossible to achieve X, then we will begin Y." Research is exploration of the unknown, so you may bump into an intractable obstacle and need to work around it—you can't know everything ahead of time. Give some thought to these concerns and try to set milestones that allow you to judge how well you are proceeding towards your objectives and deliverables and what you need to do to proceed effectively in the event you don't meet a milestone.

Deliverables: The things you promise to deliver to the sponsor. In addition to any prototypes and code, for the project, other deliverables will include a midterm and final report, a poster, and a final presentation on Projects Day. They may also include site visits to the sponsor (usually one near the beginning of the project to get acquainted with the sponsor, and possibly one after Projects Day to present your work at your sponsor's location); written results of literature searches; white papers (i.e., written background information on such things as plans, methods, or concepts prepared for internal use); and so forth. These additional items are to be decided by you in consultation with your liaison. Your SoW need not use the vocabulary terms introduced above, but it should address the issues that they cover. And your SoW need not be as fine-grained as this example implies. For example, your team might set internal milestones as a way of maintaining pace and coordination but not include some or all of them in your SoW. Your SoW is like a recipe—getting the right ingredients and the right amount of each ingredient is a bit of an art.

Formatting Your Statement of Work To help you format your SoW, HMC provides a LaTeX document class, hmcclinic.cls, that can be used for your SoW as well as for your midterm and final reports.

The document-class file takes care of most of the basics of formatting your SoW, including formatting a title page and setting margins, fonts, and other common design elements of a document.

Note that the SoW document-class option forces the document to typeset as an article rather than a book. Thus your Statement of Work should use the \section command as the top-level structural command rather than the \chapter commands you'll use in your midterm and final reports.

Negotiating Your Final Statement of Work with Your Sponsor: Your SoW is a contract. It is the document that defines what your team will produce and what your sponsor will provide to make that work possible.

The trick is to figure out how to promise the right amount of effort without promising too much – you need to commit your team to goals that are within your abilities in the available time and that will make the sponsor happy. Be as modest as is reasonable. If you deliver everything you've agreed

to, or more, certainly the sponsor will be delighted. If you deliver less, you will disappoint yourselves, as well as your sponsor. In addition, you want to leave "space" for pursuing promising and unforeseen opportunities that might arise!

The SoW is not a one-sided document. If your team needs anything from your sponsor to complete your project – data, software, hardware, literature, services – anything essential to your project that you can only get from your sponsor, you need to ask for it in your SoW and make the consequences of not receiving those items clear to the sponsor. You should be aware that your liaison may (in good faith) promise more than the sponsor's managers and lawyers will actually allow. In particular, some types of data, software, hardware, and other proprietary or expensive items often prove not to be available. So, it is reasonable to propose a last-acceptable date in the SoW and an alternative course of action to be pursued if you don't receive the promised items by that date.

For example, failing the receipt of promised data you might state that you will generate your own simulated data. Failing the receipt of software, you might state that you will prepare alternative prototype software, but you should recognize that writing that software might turn out to be a major undertaking and affect your ability to make progress on the core problem. Thus you should take into account the fact that the sponsor's failure to deliver on their promises may slow you down and require that you moderate your commitments accordingly. Cautious contingency planning can save everyone grief later.

If your sponsor demands more work than you think you can reasonably commit to doing, try using phrases such as, "Time permitting, we will attempt to do X", or, "If our research leads successfully to A, we will then proceed to investigating B." Statements such as these show that you are aware of where your sponsor wants to go and that you are committed to trying to get there, but also serve as fair notice to the sponsor that you believe it may be asking too much to insist on B given the reach of the project's goals and the restraints your team is working within.

Intellectual Property Ownership: Remember that the sponsor owns all the intellectual property generated by the project. You may not use your results for your own purposes, or give them away to others without written permission from the sponsor. You may be required by your sponsor to maintain confidentiality of your progress and results.

Be sure to ask your liaison if your sponsor has any confidentiality concerns over and above those that you are agreeing to by signing the standard Clinic confidentiality form. In some cases, your sponsor may be willing to, or even desire to, have your progress made publicly available over the web, but any such exposure should be cleared with your liaison in writing first.

Midyear Update

This document, of about 6-12 pages (beyond the two-page header) should reflect on where you are versus where you expected to be at this point. You should tailor this to your liaison(s) and are welcome to discuss with them what would be most useful to summarize. For example, what parts of the project were easier than expected? Where are you behind?

Building from this context, you should present revised plans, including a (re)prioritized task list for the spring. This task-list depends on the project; it might be a list of functions to write, a list of experiments to be performed, or something else entirely. The important part is that it's prioritized, and that it will serve as a to-do list to guide the future of the project. It's also important to establish with your advisors and liaisons where the project stands at the moment.

The goal of the Midyear Update is to present a coherent snapshot of your work to the liaisons, your advisor, and yourselves. This will be useful for the entire team upon returning after Winter break, and the prioritized list of items should make it smooth to then re-engage with the project.

Examples of prior Midyear Updates as well as a template from which to start your team's update are available on the clinic website, here: www.cs.hmc.edu/clinic/2019/descriptions/examples.html This is part of the password-protected side of the site (using the same login and passwd as the project descriptions and Phase 1 presentation examples).

Public Summary

Note that approximately four to six weeks before Projects Day you will be asked to provide a short (roughly one paragraph) abstract of your project for inclusion in the Projects Day program. You must clear this brief project description with your liaisons before it is made public.

Final Report

QREF link for Clinic final reports: www.cs.hmc.edu/twiki/bin/view/QREF/PrintingClinicFinalReports

The Final Report summarizes the results of your year-long effort. With your Final Report in hand, someone unfamiliar with your project should be able to quickly understand your problem and achievements. Also, write the report so that someone could easily continue or extend your work. Ultimately, many will judge your work by the contents of this report, so it is to your benefit to make it as professional as possible.

This report should include a recounting of the problem, the conduct of your effort (including how your actual performance related to your original schedule), a description of the results (whether to include code documentation and/or the code should be decided among liaisons, advisor, and team), and a detailed discussion of recommendations to the client.

Note that, occasionally, a sponsor may request that in place of the Final Report the team prepare a research paper describing the project for submission to a scholarly conference or journal. In that case you will receive extensive guidance on format and coverage from the liaison and your faculty advisor.

How to print your final report: All copies should be printed on one of the color printers found in the CS workroom, Olin 1264. Be sure print (not copy), double-sided, using the special Hammermill paper found under the printer named chp in Olin 1264. Please email the CS Dept and the clinic teams when you will begin printing so that there isn't a backlog. The number of copies needed should equal number of students and advisors on the team, plus number of liaison(s), plus 2 additional copies.

Additional information if the wait to use the big printer is long you can use the slower printing named chp. Regarding chp, you can find it at chp.cs.hmc.edu, and there is a "chp" queue for it on cortana. The IPP URL is ipp://cortana.cs.hmc.edu/printers/chp although some versions of Windows need it in the format http://cortana.cs.hmc.edu:631/printers/chp.

As of 2019, here is the command -- which can be run from knuth -- to print a file in the appropriate final-report format on CHP. The command-line argument `-n 7` prints 7 copies: adjust as needed!

```
lp -d CHP -n 7 -o collate=true -o sides=two-sided-long-edge final.pdf
```

Chapter 5: Guidelines for Oral Presentations

Throughout the year, your team will make four distinct presentations during the Tuesday sessions. Phase I and II will be made in the fall, Phase III in the spring, and the final presentation on Projects Day. The "Phase II" presentations of prior years have not been part of 2019. As a result, we will be running only "Phase 1" presentations, or "Fall Presentations."

Phase I Presentations ["Fall Presentations" in 2019]

Phase I presentations are 12-15 minutes long (with 2-3 minutes each for questions and changeover). They should describe the background, the problem, and the organization of your team and project, in a way that fellow clinic seniors not on your team can clearly understand it.

With this presentation, there is <u>not</u> an expectation that significant progress has been made on the clinic project's deliverables themselves -- rather, the goal is to convey that those goals have been

understood, refined, and a promising path or set of paths for achieving them have been identified. Progress is wonderful, to be sure, but it's worth emphasizing that Fall presentations value clarity, thoughtfulness, and reflection on the project and problem(s) over sheer sprinting toward a particular outcome.

Often, the Fall presentation serves as a basis for an on-site presentation given by the team when they visit the liaison(s) and others at the sponsoring firm. In this case, its naturally leads into a discussion of specific strategies to pursue.

For all presentations, one goal to keep in mind is that, with time so valuable, *insight-per-slide* is a worthwhile objective to seek to maximize. The hope is that the audience gains as deep and broad a sense of the problem and project as possible -- especially those facets that may be unclear or non-obvious to those who have not been a part of the team's research and reflections.

Phase II Presentations [Not run in 2019]

Phase II presentations are about 30-35 minutes per team, with two teams presenting in a single room each week. (The total number of clinic projects determines how many rooms -- and groups of teams -- we use.)

At a Phase II presentation, one team shares a brief project-overview -- aiming for about 8 minutes -- which is most often a distilled version of their Phase 1 presentation. Remember that several teams will not have seen your Phase I presentation. It is important to convey the big-picture context and goal(s), but the details on the schedule, plans, and project progression can usually be elided.

Because this overview is so short, we recommend that you limit the number of prepared slides, in favor of using the chalkboard/whiteboard -- and having team members present salient aspects of their project and the design challenges for which they want feedback. It's a valuable experience to practice -- not the elevator pitch, but a slide-free and *technically sophisticated* pitch for your project. Such pitches are typically about 5-10 minutes.

Either way, in the remaining time (20 or so minutes), the Phase II-presenting team should explain one or more design challenges for which they seek insight and feedback from the others in the room. Often, there are opportunities to have small groups (e.g., the other clinic teams) discuss possibilities and then report-out their suggestions -- in discussion, in writing, and/or online… .

Projects run the gamut, and so do the design-challenges presented. They can be algorithmic, they can be data-handling/feature-defining, they can be systems-based challenges, they can be software-engineering/software-structuring challenges, or they can also be content-shaping for the Phase III audience in the spring.

Concretely, here are some examples of Phase II design-review feedback that teams have sought over the past few years:

- Teams working on UI-development projects have sought out feedback on a small number of designs they had come up with. The questions were careful to explain and ask about the most challenging parts of the UI (and tried to keep the answer space open-ended…).
- Teams working on image processing/assessing visual properties of a large family of images asked for feedback on what visual features they might define/use from an example set of images they "handed out" (online). Teams brainstormed approaches and provided that feedback.
- Visual problems are not the only ones in which feature-definition is crucial: AI and machine-learning projects often seek to assemble or select features, and teams have successfully presented the sort of information available to them and then asked for advice about how to combine or cull that information to help the task at hand.
- Algorithmic projects can invite teams to suggest the tradeoffs they see in particular approaches to the problem at hand. It's important to scope these tradeoffs broadly: a short discussion can get at big-picture, perhaps system-wide, tradeoffs in directions that the team may not have considered. The forum isn't suited to small details, e.g., that require mroe than 30 minutes to appreciate.
- Systems projects in the past have faced similar tradeoffs -- performance and convenience, or what's made easy/primary path -- and what's special-cased or handled out-of-band. A new perspective has caught potential downstream problems -- or reinforced in new ways the concerns about problems already known. In addition, not only systems and algorithmic projects, but …
- *Projects of all types* can sometimes benefit from additional concrete examples. At times, a clinic sponsor is investigating a particular idea's feasibility, but the *importance* of the idea is difficult to convey to a newcomer. Other clinic teams have suggested helpful and/or motivating contexts for these explorations.

  This "example-generation" is a special case of something that happens every so often:

- Once in a while, a project depends so deeply on significant background that it's infeasible for newcomers to contribute -- even to the big-picture or overall direction. These teams face a significant hurdle in preparing a spring-term Phase III presentation: the audience is much broader, and so should the project presentation. For these teams, one very successful model has been to ask the room (of CSers) to help contextualize the technical facets in a way that will be both understandable and compelling to the technically-savvy but much more generalist Phase III audience.

For the presenters, ask yourself what kind of answers your audience can give you. You're not going to have time to teach them all the nitty-gritty details of your project. Instead, think about your

overall approach. Would it help to have input on your overall software structure and class hierarchy? For some projects this is central. Are there societal impacts on which feedback will help?

A warning: there's a balance to be struck! On one side, you'll need to constrain your presentation to a manageable technical piece -- on which you'll seek insight and feedback. On the other hand, you want to give the audience the flexibility to go in unexpected directions -- that's the advantage of having newcomers think about your project! So, even as you guide the conversation and brainstorming toward useful goals, we encourage you not to guide them to specific conclusions. Be open to teams veering off on a tangent, and be ready to give additional background (briefly!) as needed. Often the presenting team circulates around the brainstorming teams to help with this and to get a sense of how their problem is seen by others.

Spring (Phase III) and Projects Day Presentations

Each team gives one presentation during the third phase. As described earlier, at fifteen minutes these talks are shorter, more formal, and less technical than the talks in the first phase. The talks during this phase can also be used as a practice run for the presentation given on Projects Day. These presentations are generally prepared using PowerPoint, Keynote, or other presentation software, and presented from the computer, though other modes are acceptable. Most teams practice the talk until it can be presented smoothly. Your faculty advisor will probably want to be involved in the preparation of the talk and see you rehearse it several times.

As these talks are intended for a broader audience, you must be careful to get the right balance between providing the audience with a sense of the depth and challenges of your project, and overwhelming them with technical details. Be careful in particular to limit the amount of jargon and the number of acronyms used. In direct contrast to the Phase I and II talks, detailed descriptions of protocols and such is probably too technical for these presentations.

The schedule of the Phase III talks is set by the various Clinic programs in joint consultation. Midweek of the week before your presentation, you will receive an email indicating the order in which the teams will present. This order should be used for the practice times as well. The night before, Shanahan 1430 is available for practice sessions, with the A/V equipment set up.

General Guidelines for Presentations

Who will be your audience?:

- SoW: Audience is the liaison sponsoring executive, and other people familiar with the intent of the project
- Fall Presentation (Phase I): Audience is Math+CS students and faculty

- [Not run in 2019] Phase II: Audience is CS faculty and students working on similar projects
- Midyear Update: Reading audience is liaison and persons familiar with the general area of CS covered by the project. Some readers may have been completely unaware of the existence of the project itself.
- Phase III: Audience is HMC students and faculty, plus random outside liaisons and interested people. It is safe to assume that the audience is technically and scientifically sophisticated, but that their training may be far from CS.
- Poster: Audience is complex. Some are the same as Phase III, but others are technically unsophisticated (e.g., parents and siblings who may be in a different field or who may still be in junior high). The poster will also be viewed by employees at the sponsoring company, and by pre-frosh touring HMC. The poster should be accessible to intelligent people with no technical knowledge, but should also provide enough technical detail to satisfy experts. For that reason, the poster is one of the most difficult documents to produce.
- Final presentation: Audience is as for the poster, except no pre-frosh
- Final report: Audience is the liaison plus anyone who will be carrying the project further forward (employees at the sponsor's company who wish to take it into production, or future Clinic students who will do a follow-on project?

Make sure your slides can be read

People almost always try to put too much text on slides. This is especially a problem with PowerPoint, because by default it will automatically reduce the font size as you add more text to a slide. You can disable this horrible misfeature by selecting Tools->Autocorrect ..., choosing the Autoformat As You Type tab, and unchecking AutoFit title text to placeholder and AutoFit body text to placeholder. Text on a slide should never be smaller than 24 points, and preferably 32.

In general, ten lines of text is the practical upper limit for a slide oriented in landscape format.

As with learning to speak at the right volume, the only way to know whether your slides are readable is to take them down to the lecture hall and look at them from the very farthest seat. Pay particular attention to slides that incorporate figures from other sources, since they are often the source of font-size problems. It's not enough to check that the slides can be read. Make sure they can be read easily—remember that some in your audience may not have particularly good vision.

In the unlikely event that you use handwritten slides, or transparencies that you plan to write on, be sure to check the size of your handwriting in the lecture hall. Most people's natural writing is too small for presentations.

Prepare a backup of your slides, and allow time to set up

A lengthy transition time between two teams presenting can make the audience restless, especially if there are complications. Therefore, we must do everything we can to minimize this time and make the transitions quick and smooth. To that end, at least one member of your team must arrive at the

presentation hall at least 15 minutes prior to the talk time (that is, by 10:45 A.M.). At that time one member should get the presentation copied over to the desktop of the presentation computer and make sure that it has transferred properly. Then, when it is time for the team to speak, all that is necessary is to double click the file and go. It is unacceptable for a team to login to another computer or copy the talk from disk while the audience is waiting.

Technical problems are a fact of life, and seem to be a certainty with regard to Clinic presentations. Therefore, you must come to your presentation with the slides available on a portable USB storage device. Use *both* Keynote and pdf. Do not plan to fetch it from a subordinate directory during the presentation interval. IMPORTANT: Make sure your presentation is on the computer desktop before you present and to turn off all automated reminders in Microsoft that may disrupt your talk.

In general it is preferable to have all presenting teams use a single computer to minimize cut-over time. If there is a legitimate need for your team to use a different computer (such as custom hardware being demonstrated) it is important that you notify the Clinic Director well ahead of time (no later than Thursday of the week before your talk) so that any potential complications can be discussed and anticipated.

Dress appropriately

While the presentations in all phases are attended mostly by students and faculty, more often than not there will be several outside observers, such as liaisons, prospective sponsors, or prospective students and their parents. On days that the Clinic Advisory Committee meets, there might be around a dozen professional observers present. While you may scoff at the notion, the reality is that many of these people will equate your level of dress with how serious you are and how much you care about the project. For the spring presentations you should wear business-professional attire, which can be described as deliberately neat, "uncasual," and signaling that the individuals and the teams are taking the event with the seriousness that the sponsor, the liaisons, and the effort should project. There are many online guides, (both nogendered and i.e., buttoned shirt, a coat (and/or a tie) - or a business suit or dressy blouse with pants or skirt for women. The dress of your teammates should be consistent, not having one member slightly less business like. If you have any question as to whether something is appropriate, check with your advisor or the Clinic director well before the day of your presentation.

Make sure you can be heard

Presentations are generally delivered in one of the large auditoriums. You may not realize just how much effort is necessary to make yourself heard in these rooms. During the week before your presentation, go down to the hall where you will talk and have a friend sit towards the back of the room. Practice talking until you can be heard easily. Consider requesting a microphone for your presentation. This will allow you to speak much more naturally while being heard easily. Remember to practice speaking at the level you can be heard

Prior to the start of the talks, coordinate with the other teams who will be presenting regarding computer use. Everyone's talk should be on the computer desktop, not inside a folder, not on a USB drive or a CD-ROM (except as emergency backups). This is to minimize annoying avoidable gaps between the talks, which cut into everyone's time. Avoid situations that would require rebooting a machine or operating system in particular.

The AV department or the CS Clinic Coordinator will have available a remote control USB device for changing slides. It will also contain a laser pointer. Thus, at your option, it is not necessary to assign a team member to change slides.

Please use the microphone when you speak. It makes for a better presentation to have everyone use it uniformly than to have some use it and some not. Switching between miked and non-miked adds extra discontinuity.

Make sure questions posed to you can be heard

Repeat any questions that audience members ask. This is especially important for the Phase III presentations, partly because only what's spoken into the microphone will be in the video recording. When one team member goes to answer the question, the other team members can quietly whisper to remind him or her to repeat the question.

Chapter 6: Guidelines for the Project Trac/Wiki (or other management system of choice)

Trac/wiki pages for internal project information are stored at:

http://www.cs.hmc.edu/trac

This Trac/wiki is to be used to distribute code, electronic versions of reports, etc. to the liaison, to maintain current information about project schedules, task assignments, etc. You may need to spend a few minutes learning the Trac/wiki protocol. See the end of this section for alternative tools for documenting the project.

1 Content Requirements

The project Trac/wiki is a vehicle of communication:

• among team members

• from the team to the sponsor

• from the team to the Clinic director and others not directly in the project, and in some cases, from the sponsor to the team

We are aware that your schedule is already very full and that maintaining information on the Trac/wiki may seem like an extra burden. However, the alternative of having no communication other than word-of-mouth about project status is not acceptable. (We don't endorse the "big-bang" model of development.) Thus we ask that team members jointly allocate the necessary time to keep the Trac/wiki up-to-date during the lifetime of the project. The information that you provide can be terse, but it needs to be there.

Among other things, the Trac/wiki shows progress that your team is making and issues it is facing. How diligently this policy is followed can play a role in determining your grade. We have already made an effort to minimize the number of distinct Trac/wiki topics, and would appreciate it if the provided template were followed without modification. We are always open to suggestions for improvement of the Trac/wiki structure, but please do not make them unilaterally.

You may certainly include other items on the Trac/wiki, and indeed your advisor or liaison may have specific items not listed here that they would like to have on the Trac/wiki.

Many of the documents that you must maintain on the Trac/wiki will be created in word processors, drawing tools, etc. Wherever possible, the Trac/wiki should contain both the source document and some form that can be rendered directly in the web browser. Typically, the latter would be an automatically generated HTML or PDF version of the document.

The predefined topics are listed below. If a topic name is predefined, you must use it for the given purpose so that others (e.g., your liaison and the Clinic director) will be able to find things in well-known places.

- • Title Abstract Description: This topic contains:
    - Project title
    - Project abstract
    - Extended project description (once that is established)
- • Project Personnel: This topic contains:
    - A table of all personnel connected with the project and their contact information
    - Task lists broken out by member
    - Links to individual member logs, named by the user's wiki name and the word "Log", e.g. Jane Smith Log.

    - There should be at least one log entry each week, normally completed before the Tuesday 11 A.M. meeting.
    - The log entries contain:
        - Tasks completed during the past week
        - Tasks still in progress from the past week
        - New tasks created in the past week
- Each task should be identified as a separate Trac/wiki topic. In that way, the item can be multiply referenced, for example if two or more people are working on the same item. The referenced page should show the status of that task
- Meeting Schedule And Logs: This topic contains:
    - The current regular schedule of meetings
    - List of meetings, most recent first
    - Each meeting log is a separate Trac/wiki topic identified as follows:
      sponsor Log *month day* For example, LaserficheLogSept05
      and containing the following information:
        - Current status of the project
        - Summary of progress as reported by the team members (It is OK to reference individual reports to avoid replication of details.)
        - Decisions made at the meeting
        - Unresolved issues
        - Goals for the next meeting
- Project Deliverables:
    - This page will state the target deliverables once they have been agreed upon with your liaison. It will be refined in the first month of the project, in conjunction with the work statement. You should also use this as a place to link user documentation.
- Development Parameters: This topic contains:
    - Description of the development model being used (an actual description, not simply a buzzword such as ”waterfall model”)
    - Version control description
    - Bug-tracking description
    - Any other clarifying information about the project
- Scheduling Diagrams: This topic contain:
    - Work Breakdown Structure
    - Precedence diagram
    - Project Schedule

  Note: Both testing and transition to the client must be scheduled.
- Design Documents:
    - This topic contains documents describing your solution to the problem, at a level that could be used by someone else to complete the implementation.
- Code Documents: This topic contains:
    - References to coding standards being used
    - Link the to bug-tracking system
    - Doxygen- or javadoc- generated (or similar) comments for all code

    - Data format descriptions, with links to sample data
- Testing Information: This topic contains
    - Test plan
    - Testing methodology – Testing results
- Reports Presentations Posters: Separate attachments for:
    - Statement of work
    - – Phase I presentation
    - – Phase II presentation
    - – Mid-year report
    - – Phase III presentation
    - – Poster
    - – Final presentation
    - – Final report
- Bibliographic Links: This topic contains:
    - Listing and links to bibliographic and research items
- Project Glossary:
    - This topic contains a glossary of all project-specific terms

Alternative Project Management Tools

Some teams or even liaisons may prefer if the source code and project documentation is hosted with a toolsuite other than SVN & Trac. (What could possibly be better, right?) A good alternative is GitHub. This will require all team members to create GitHub accounts. Who- ever makes the repository should ensure it is private. Free student accounts come with 5 private repos, though your sponsor may already be registered as an organization, in which case they should create the repo.

Important: always consult your liaisons before putting any project work on GitHub, or anywhere else in the cloud (with the exception of the CS Trac site).

GitHub supports both a Wiki and a ticketing system, which it calls “Issues.” The primary text formatting used is Markdown. One nice perk is that is supports spaces in page names. The Issue system supports project milestones, ticket assignments, labels and referencing/closing tickets with commits. Overall the interface is a bit more dynamic than Trac.

Chapter 7: Guidelines for the Project Poster

Each team prepares a poster to be displayed during the registration period and post-presentations reception on Projects Day. During the poster session, the teams stay at their posters so they can answer questions about the project. As discussed above, the poster session has two purposes:

- To provide guests with an opportunity to learn more about the various projects so that they can better decide which presentations they would like to attend.
- To allow guests to learn more about the projects whose presentations they will not be or were not able to attend and interact with those teams.

Thus the poster must at once generate interest and present a fairly complete picture of the project.

Example posters are available here: www.cs.hmc.edu/clinic/2019/descriptions/examples.html As with previous shared-documents, you will need your clinic credentials to access these: we can share them within the program, but they need to be kept within our clinic cohort. Four different examples there provide the source files, as well.

Each poster is represented as a single slide 48 inches tall and 36 inches wide, which will be printed as a single sheet on a large-format inkjet printer. Past experience has shown that Keynote is the best software for designing posters (as a pages file). If Keynote isn't available to you, odg (OpenOffice), pptx (Powerpoint), and Google slides can be used -- but be careful: at times in the past these formats have been more difficult to render as teams have wanted them to look. The completed poster must be turned in to the System Administrator, Tim B. in 2019, (in electronic form) by the published deadline to allow time for the posters to be printed prior to Projects Day.

In general, you should consider the examples with respect to the placement of items in the poster header, overall font use, and font sizes. You may vary the size and placement of text columns, graphics, etc. (If you have reason to believe you could come up with a much more pleasing overall design, wonderful - please discuss your ideas with your advisor!)

Clinic Poster Design

Posters lend themselves to a news-writing style: most important information first, working down to the least important information at the end. The contents do not need to be in chronological or any other order. When you think the viewer is going to skim, this is probably the best way to hook them.

Eyeflow:

- Eyeflow is the most important consideration for the poster design. You want the viewer drawn to the most interesting points first (i.e., not the problem statement, the company info, etc.), to “hook” them before they’ve finished their initial skimming and are ready to move to the next poster. Try to emphasize aspects that make your project unique among all the others. Two common eyeflow models are:
    - Center-out eyeflow: If you have a big, attractive visual, then you’re lucky. You could use a three-column design, with the center column larger than the outer ones, and the large visual in the center column, lined up with the top of the body. The viewer’s eye will be drawn to the center picture first, then the poster header, and then radiate outwards.

    - Newspaper eyeflow: If no visual is larger than any other, the viewer will skim all the visuals, look at the poster header, and then go left to right, looking down each column. You just have to hope that one of your visuals and its caption will be interesting enough to "hook" the viewer.

  Center-out is the stronger eyeflow model, because you can make the viewer look at the most interesting part of your poster first, rather than having them start at the upper-left corner and risk boring them with the company description, problem statement, etc. Nevertheless,
- A good test of the overall layout is to print the poster on an 8.5 x 11 piece of paper and hold it out at arm's length. If you can read the text and your eyes follow the intended flow, that is a good sign.

Visuals:

- Every visual should have a caption, no matter how much you think it is self-explanatory, and even if it's explained in a corresponding text block. The viewer will look at the visuals before the text blocks, and a caption will help them understand it right away, making it more likely that they'll be "hooked." Having the captions in a smaller face, bold, and/or in a different font helps the viewer distinguish them from body text.
- Background pictures are generally not a good idea. When the viewer has finished skimming the pictures, you do not want him/her to be distracted by anything, including pictures behind the text, while reading about your clinic project.
- When showing screenshots or other sorts of graphics, it would be good to have lines to the elements you want to point out, and blurbs written about them. However, this isn't a substitute for a caption.
- Bear in mind that the large-format printer has limited resolution for printing color. Keep the visuals relatively simple and use colors with high contrast. Expect some of the colors to come out a little different than how they look on a screen.

Content:

- No one is going to read large blocks of dense body text. It is OK to go light on explanations and such, as long as there is a logical progression and you include enough keywords. It's like reading a resume: the viewer will skip all the boring stuff and the stuff he/she doesn't understand, and will latch onto phrases and keywords that are understandable and familiar. You can say that you employed a genetic-learning neural-net in Java to intelligently parse your XML- based distributed-system finite state machine messages, but all the viewer is really going to get is "Java" and "XML".
- Reducing some (but not all) of the material to bullet lists is helpful. This also helps introduce whitespace.
- For dense body text, "graphs" should be used as much as possible. [A "graph" is a really short paragraph—three lines, or so, like what you see in news stories in newspapers. When the text block is longer than it is wide, it's better to break it up visually with lots of indents. Also, graphs help your writing style because they force you to think in short thoughts, especially when there is a lot you want to say but not a lot of space in which to say it.] A section should

definitely be composed of multiple graphs. This becomes more important the narrower the physical column size gets.

- The next page contains a sample poster from Projects Day 2004. It follows many but not all of the suggestions above. You may wish to critique it as an exercise before doing your own poster.

Header

- Please maintain a consistent header: the Harvey Mudd College logo is in the upper left and the company logo is in the upper right.
- Both the title and body should be in a sans-serif font, such as Arial.

Body

- Section headers (Problem Statement, Acknowledgments, etc.) should be smaller than the title and larger than body text, and should be closer to the text block below them than the one above.
- Whitespace is good, especially between sections. If you have a graphic between sections, use lots of whitespace to make it clear which section it belongs to. It is probably better to err on the side of too much whitespace than too little.
- Four columns works well. Five could also work, if the text font is not made too small. Columns containing big text blocks should not be allowed to be more than one third of the page (poster) width, so three columns should be a minimum
- Blocks of continuous text should be less than half a column long, and should not wrap to the next column.
- Graphics should be scattered evenly among the columns, and should not make the poster symmetrical (e.g., avoid putting all the pictures at the bottom of each column).
- The poster shouldn't have too many different fonts - three seems like a good limit.

Results Section:

- Unless there is good reason not to, every poster should have a "Results" Section that informs the viewer of the key results.

Again, example posters and source are available here:
https://www.cs.hmc.edu/clinic/2017/descriptions/examples.html

Chapter 8: Guidelines for Archiving Deliverables

In 2020, we archive all of the products and deliverables (on our main server, knuth) and then create usb drives or smart cards to ensure that sponsors have a physical copy. (We set up downloads, too, as requesteed.) It's important that the LaTeX (or other types of) source for ALL reports and documents be kept with the final materials, along with a *copy* of code repositories (e.g., github) and clinic materials (e.g., Google drive). A link to those resources is not enough: it may change or disappear.

[[Historical note: CD-ROMs used to be the medium on which we shipped a physical copy of all of a project's deliverables: because of that tradition, you may see "cdrom" used as a title or elsewhere -- we're changing its name to "archive" year by year… .]]

The thumb drives themselves will be created for each team by our System Administrator (Tim, in 2020. Thank you, Tim!) To make sure that everything is available, we ask you to create a set of files on knuth that matches the structure described below.

First, log on to knuth. Then, find your clinic directory -- for example, for the 2019-2020 Steelcase team, their directory is at

```
/clinic/2019/steelcase19
```

with appropriate variations for each team, to be sure. At first, that directory should be empty, but all of the team members should be in a group with read/write permissions to it. (Troubles? Let us know!)

Within your clinic directory, use [note that in '19-'20: this is archive, not cd-rom]

```
mkdir archive
```

to create a subdirectory named `archive` (for tradition's - and our scripts' - sake!)
The reason we desire uniformity here is so that we can easily scan for availability of certain items.

The top-level directory structure of the `archive` directory should contain at least the following subdirectories (even if some are empty):

```
codeanddocs/
otherdocs/
executables/
poster/
```

```
presentations/
reports/
SOW/
```

Important: **directory permissions**

With the `archive` directory and the above subdirectories created, the person who created them should run, from the top-level location that holds `archive`:

```
chmod -R g+rwX ./archive
```

This will ensure that *all* members of the team can access, and write to, the whole tree.

How to move files?

For github repos, cloning them into the `codeanddocs` folder is smooth.

Alternatively - and for other files - at the Mac OS X terminal command line, the `scp` command is available. Here are examples:

for a single file: `scp file.txt dodds@knuth.cs.hmc.edu:/clinic/2019/mitll19/archive/otherdocs/`
for a folder: `scp -r testdirectory dodds@knuth.cs.hmc.edu:/clinic/2019/mitll19/archive/otherdocs/`

… be sure to change the parts that need to be changed!

There are also graphical clients, e.g., for Windows, WinSCP for Mac, FileZilla, many others...

File details for each directory

Within the **`codeanddocs`** directory, put the project source code in a clear and organized manner with a detailed `README.txt` or other equivalent documentation / installation guide on how to build a working system from it, from scratch. The installation guide may also be a part or appendix within the final report. You can supply the code as raw files and directories, and/or an equivalent tree of another format. This is where a copy of your github repository, for example, would go. In addition, include all **documentation** for your system and code in a folder-tree or files, as appropriate for your project.

The **`otherdocs`** directory would include, e.g., a copy of your Google Drive's documents, along with all other documents, plans, notes, etc. that the team created as part of the clinic effort. ***If there are documents that aren't appropriate for the liaisons, please omit those.*** Some teams organize this per-team member; others do so per-topic: the organization of the drive itself is usually appropriate. This is mostly archival: the **`codeanddocs`** directory and the others listed below, typically have the most-central deliverables.

The **executables** directory should contain any final, compiled executables, if there are any/as appropriate. If your project does have executables, please include detailed README files (or other documentation) on how - and under what conditions - to use them. Make sure the target architecture of the executables is clear.

The **presentations** directory should contain the all of the team's presentations: fall, spring, final - in whatever format they were created, along with source, if there is a separate source document for slides, etc.

The **poster** and **reports** folders should hold the poster (if created, in 2020), and copies of all of the reports submitted, including the midyear update and final report. Some teams may have other "reports" (working papers, Internet drafts, conference papers, etc.)

The **SOW** directory should contain the statement of work.

For all of the presentations/reports, we ask that you *include **both** the source files, e.g., downloaded from Overleaf and/or Google Slides, as well as pdfs or other final, easily-shareable versions. Please include them in these break-out folders, even if they are also included in the* **otherdocs** *directory above.* It is very common that sponsors - and we in the clinic program itself - are looking for these communications-documents after the academic year has finished.

The storage media with these tree of files represents the full set of technical, communications, and documentation deliverables for the year! It is vitally important that you ensure that a complete set of all of these materials are present. In particular, you must be absolutely sure that it is the final, working versions of all your deliverables are included.

Not-so-tangential backstory: in May 2000 an otherwise remarkably successful team accidentally handed off to their sponsor a set of deliverables that contained their project as it had existed as of February of that year! The mistake was only discovered long after the students had left, and having the backups we did made it possible that all of their work -- and the project -- was still available to the sponsor.

Therefore, be sure that (1) your `archive` directory is complete and up-to-date, that (2) your documentation and README files enable a user to successfully create, install, and use your project materials.

Finally, do not delete your files from your clinic machines. We archive those, either by default or, if desired, via the instructions of the sponsor. [Not applicable in 2020] When you are ready to disconnect your clinic computers from the network, please do -- *and be sure that the clinic director has the password(s) to your machines.* If you need to reset the password to share it, do so.

[*Please do note, especially for 2020!*] However, *do delete* any clinic materials that may have made it onto non-clinic machines (this shouldn't happen, but it can happen). The clinic deliverables and support files are proprietary.

Since we are remote in 2020, here is the link to the Google Doc Checklist of all clinic-finale tasks (deliverables, emails, things to check, etc.)

Chapter 9: Facilities and Resources

The Computer Science Department makes a number of facilities and resources available for use by the Computer Science Clinic program. In addition to these resources, several facilities and resources are available for use by all the Clinics at Harvey Mudd College.

Computers and Software

Prior to the start of the fall term, the Clinic Director will solicit information from the sponsor liaisons about what they perceive their project's principal hardware and software needs to be. The Clinic Director will then coordinate the allocation of existing computers and software and the purchase of any new machines, software, and supporting items that may be needed for that year's projects. These requirements sometimes evolve -- as they do, we evolve alongside.

By default, each team member gets one machine and one monitor. Where possible, we expand screen surface area. Some projects require access to more than one computer per person (e.g., for client-server oriented projects). Please let us know, and we will provide additional computers as necessary.

Standard Software

The CS Department and Clinic maintain a large body of tools and systems for use by Clinic teams. Some examples of tools we've used in the past are:

Productivity:

- Microsoft Office - Word Processing, Spreadsheet, Presentations
- Microsoft Project - Project Management
- Apple Keynote - Presentations, Posters
- LaTeX with TeXShop - Formal Documents, Presentations

Graphics/Animation:

- Omnigraffle-Useful for any type of diagramming, including class diagrams and mock-ups. This software is provided on the CS lab computers and there are trial versions available for download.
- Macromedia Director, Dreamweaver - Useful for prototyping and/or simulating user interfaces.
- Should you need other software products to develop or complete your project, do not hesitate to request them from the Clinic Director, or purchase them according to the guidelines in the discussion of purchasing below.

Google and Cloud Services

Given the workflows typical of 2019, computer services outside HMC may be used for clinic projects, e.g., services such as Google Docs, Amazon Web Services, Amazon EC2, Dropbox, etc. However, *be sure to ask -- and get agreement from -- your liaison(s) before using such services*. Different sponsors have different sensitivities to how their information is used within these ecosystems.

System Maintenance

It is the responsibility of the team to do the initial operating system installation and subsequent maintenance of their Clinic machine. The department staff, especially Tim Buchheim, is here to help, but primary responsibility falls to the team. To guarantee that staff can help when necessary, and to insure that we have access to all materials at the end of the year, it is required that you provide Tim Buchheim, our System Administrator, and/or the clinic director with the root or administrative passwords for your team's computer as soon as the basic operating system installation has been completed.

In addition to the standard systems, each team is also allocated space on the department Unix file server in the /clinic/2019 directory tree. Each member of the team is a member of the group that owns the project directory and the team wiki directory.

Purchases

Your Clinic team may find it necessary to purchase equipment, software, books, etc. as part of your project. For small purchases (less than $100) this may be done without prior consultation. For larger purchases, you should discuss the purchase with your Advisor or the Clinic Director in advance.

Small purchases under $100 may also be made by personal credit card, in which case you should file a request for reimbursement. In this case (as with all requests for reimbursement) you must retain and submit the receipts for your purchase to Surani Gunasena within 30 days of purchase. Without a receipt, it's not possible to reimburse an expense. Should you order something over the Internet, make sure that you print the order confirmation page (or similar) in case no printed receipt is shipped with the product. All receipts must clearly show who paid for the item and how.

When you are purchasing supplies for your clinic team (books, software, GitHub subscriptions, etc), please keep the following guidelines in mind:

1. When possible and reasonable, please have Surani make the purchases for you. The reasons for this are three-fold:
- It saves you from having to submit a receipt and get reimbursed
- Surani can see if we already own the item and avoid duplicate purchases
- Surani can advise on the purchases before you spend your own money on it

2. Please consider the potential reuse of the item after your clinic team is done with it. If the cost of a reusable version of the item (e.g. print version versus electronic version of a book) is not substantially more than a non-reusable version of the item, and the item is likely to be useful to a future clinic team, please purchase the reusable version.

3. The library on the second floor of Sprague includes many books that are labeled as the property of CS Clinic. This means that clinic teams may keep the books in their work areas during the school year for use on their clinic projects. Please see if we already own some books that could be of use to you before purchasing new books.

4. For computer equipment, please check with Tim and Surani to see if we already own the item.

Once again all requests for reimbursement must be filed within 30 days of the expenditure.

Copying, Faxing, and Mailing

To send a fax, use the fax machine in the CS Department office, Olin 1264. You can give documents to be faxed to Surani Gunasena, as well. This machine can also be used to receive faxes. The phone number is (909) 607-8364. The Clinic also maintains its own account with Federal Express. You may request FedEx airbills with the Clinic account number on them from the Clinic Coordinator.

As discussed above, the Clinic Coordinator will coordinate the mailing of all reports to the project liaisons. You may also ask that she take care of copying, faxing, or mailing tasks for you. You must, however, give her twenty-four hours notice for such requests.

Clinic Workroom and Conference Space

The Clinic workroom, Sprague Library, 2nd floor, is the primary workspace for the Clinic teams. In 2019, an additional space (Beckman B134) has been added. These rooms are configured with workspace for each team and whiteboards for working through problems as a team.

To get access to Sprague's 2nd floor, Surani Gunasena will submit your name to Facilities to have your HMC ID card coded to give you access to the Sprague elevator, outside west door and stairwell 2nd door. If you have a problem entering any of these areas, please let Surani know as soon as possible so that she can get your card corrected. Surani will also provide the door code for BkB134.

Please ensure that all clinic spaces are secure, e.g., as you depart, ensure that the doors are closed behind you. Different clinic collaborators have different requirements for confidentiality and security of their project materials. We need to maintain security for *all* of Clinic's projects.

Clinic Kitchen and Snack Food

It is a longstanding Clinic tradition that we provide snack food in the clinic work areas in support of clinic efforts. The snacks are intended to be consumed when you are working on Clinic. It is an honor code violation to stop by the second floor just because you have the munchies, to take food from the Clinic area to be eaten elsewhere, to provide food to people who are not part of Clinic, or to substitute clinic snacks for normal meals.

IMPORTANT: We ask and expect all to keep the second floor clinic space and kitchen areas clean. In particular, this means that you don't leave open food containers sitting around to attract food-seeking fauna, which can be a problem in Sprague. It also means that if you use one of the coffee cups or any other non-disposable dishes, be sure to wash and re-rack it before you leave the second floor. We have varied the approach to snack-procurement year-to-year: regardless of the specifics, teams interested in that role should volunteer! We have budgeted $300-400 per month to cover snacks, most often from Costco, and ask that those funds be spent carefully (and in consultation with the clinic coordinator and director…).

Sprague Conference Rooms

The 2nd floor of Sprague also one conference room for 2019: the Glass Conference Room (the Old Conference Room is being used for the HEAT Lab temporarily). The Glass conference room has table, chairs, a whiteboard, and a speakerphone. The phone numbers are:

- Glass Conference Room: 909-607-7446
- Old Conference Room: 909-607-0446

- Beckman B100: 909-607-1814

Shared Conference Room

The glass conference room is intended as the primary space for team meetings. In the event that there is a conflict for use of this space, or if you need to meet with a larger group than the space will accommodate, the department conference room (Beckman B100) can be used, as well as CS's 1st-floor Olin Lounge. We also have, courtesy of Math, a 3rd-floor Sprague Conference room.

Reservations to use these spaces must be made in advance through the CS Clinic Coordinator.

Previous Clinic Reports

Copies of previous Mid-Year and Final Reports can be obtained from the Clinic Coordinator and are available on the (password-protected) clinic resources site.. Bound copies of past Final Reports can also be browsed in the department conference room. They should not be removed from the room without permission.

Chapter 10: Clinic-Related Travel and Dining

Most project teams will travel on Clinic business at least a couple of times during the year. Typically these trips will be to the client site. We strongly encourage a site visit early in the first semester to foster an understanding of the context of the project. A mid-year visit is a good opportunity to make sure everyone is still operating on the same wavelength, and may also be a chance to present the project to others at the client site. Some liaisons request a site visit near the end of the project for this same purpose.

Local Travel

For travel in the L.A. / San Diego region, we assume you will be traveling by car. For insurance reasons, you should not use your personal vehicle for this purpose. You may either arrange to rent a car, or one of the HMC vans. In either case, you should have the Clinic Coordinator make the arrangements, as the college has special agreements with certain local rental agencies. Important details about renting a car or using the college van are given below.

Airplane Travel

For visits to locations outside the region, we assume you will be traveling by air. You can ask the Clinic Coordinator to arrange airline reservations and car rentals. We ask that you plan your travel as far in advance as possible (ideally, at least two weeks ahead) so that we can take advantage of the best airfares.

College Vans, Car Rental, and College Insurance

To use the college van or to rent a car for reimbursement by the Clinic you must first be authorized for the college liability insurance. This requires providing the Clinic Coordinator with two copies of your driver's license and filling out a form authorizing the college to get a copy of your driving record. This process can take up to four weeks, so you should do it early in the first semester to insure you are covered when needed.

If you are renting a car locally or remotely, you must follow these rules:

- You should purchase any optional liability coverage; you are not covered by the college's liability insurance.
- Do purchase the optional Collision Damage Waiver (sometimes also called Loss Damage Waiver).
- Do purchase the optional medical coverage, if you are a student, but not if you are faculty. Faculty should not elect medical coverage, as they are covered by the college's Travel Accident policy and by Workmen's Compensation.
- Do not accept the offered full tank of gas (sometimes called the "fuel purchase option"); fill the car up yourself at the end of the rental and file the receipt for reimbursement. The Clinic will not reimburse you for the fuel purchase option if you accept it.

Meals and Snacks While Traveling

The Clinic program will pay for all food expenses (within reason) while you travel on Clinic business. You should pay for these costs yourself, then submit receipts (you must have original receipts) to the Clinic Coordinator for reimbursement when you return The Clinic program will not pay for alcoholic beverages.

Hotel Stays

Ordinarily, visits should be completed in a single day. If the site is particularly distant, or if the liaison has reasons to want you on-site longer, multi-day visits are possible. In this case, the Clinic program will pay for reasonable hotel expenses. In general, students will be expected to share hotel rooms, at least two students to a room, where at all practical.

Non-Travel-Related Meals and Snacks

The Clinic program will pay for the cost of reasonable food and meal purchases related to Clinic work on campus. In particular:

- If you find it convenient to schedule a discussion meeting during lunch or dinner and one or more of the team members is not on a dining plan that includes that meal, the Clinic will reimburse for the cost of that meal. If it is a one-time event, pay cash and submit a receipt for reimbursement. If it is a regularly scheduled meeting (note: this should be done only if there is really no other convenient time to schedule it) the Clinic Coordinator will submit a Platt Dining Hall Interdepartmental Charge Authorization form to the dining services staff.
- If you find it necessary to schedule a work meeting at meal time, you may purchase food (i.e., sandwiches, pizza, etc.) for the meeting and file the receipt for reimbursement. This should not be seen as license to regularly milk the Clinic for munchies. Teams perceived to be abusing this privilege will be cut off.
- It is customary to eat out with your liaison if they come to visit at an appropriate time. The Clinic program will reimburse for the cost of such meals, unless meals are being provided for the team at a designated site on campus.

Chapter 11: Projects Day Schedule and Logistics

The Tuesday after the last week of classes in the spring semester is Projects Day, on which all Clinic teams make their final oral presentations. Many visitors, often 200 or more, attend Projects Day: liaisons, other representatives, visitors considering clinic and educators wanting to know more about the clinic program are on campus through the day.

Schedule of Events

Projects Day runs from 10:30am until 6pm, with a celebration dinner afterwards. Here are the details from 2019:

+ Be sure your team's poster is up in the LAC by 9am
  + Often teams set up their poster the evening before

+ Teams typically split the 10:30-12:45 poster session into two halves
  + For the first part, half the team attends their poster, engaging with visitors
  + The other half visits other posters -- a good time to vote in the poster contest

  + At around 11:35 (or so), the halves swap and the other team grabs the lunches

+ Each team gives a culminating presentation three times in the 1pm-5pm span
  + Here is 2019's schedule as an example
  + These should be 20-22 minutes each, with 3-5 min. for Q+A, and 5 min. to switch talks
  + Teams may have to introduce themselves (sometimes an advisor is there to do so)
  + When your team is not presenting, you have an opportunity to visit other teams' talks

+ The afternoon poster session is 5:15-6pm, again in LAC
  + This sessions is a bit less formal than the morning's (and includes hors d'oeuvres)

+ Dinner -- which is for liaisons and clinic teams -- runs from ~6:15-8pm in Strauss Plaza

Dress for Projects Day

As with spring talks, dress is business professional. It's easier to define for men -- an oxford-style shirt with a suitcoat or a tie -- or both, if you'd like (it's often warm the first week of May), slacks, and avoiding athletic shoes. For women, "equivalent business-professional formality," even if less easy to characterize. You can contact the Clinic Director with any questions or thoughts.

Poster Session Logistics

The System Administrator will handle the printing of the posters in the days leading up to Projects Day. He will notify you by email once your poster is printed and ready to be picked up. The day before Projects Day the LAC will be open for poster set-up from 2pm to midnight the day before (Monday). Either on that Monday, or by 9:00am on Projects Day, members of the team must take the poster to the LAC and mount it on the provided posterboard (using provided pins). ***Bring two people!*** We have first-hand experience with posters tearing -- much more often when a single person is pinning it up.

During the morning poster session the poster should be attended continuously by several members of the team, who should already have changed into appropriate attire for the day. Usually the teams split the session into two halves.

The CS department has a poster-contest tradition for which each faculty member and student may vote. Please vote only once.

All team members should be present during the afternoon poster session.

Presentation Logistics

As mentioned above, each team is assigned to a presentation room with another team, and the two teams each make three presentations in alternation with the other team. You will be informed of your room assignment the week before Projects Day.

Teams usually provide their own computer for use for the presentation. If you need one from CIS, please let the clinic director know! If it's possible, the two teams can coordinate to present use one machine for both presentations, agreeing in advance which team's computers it will be. This will minimize the delays and potential technical problems that can occur when trying to swap computers between presentations. As long as the swapping is smooth, it's not a problem to use separate machines.

The presentation rooms will be available for setup and practice from 6 P.M. onwards Monday night. HMC Security is increased that evening, as the rooms are generally left unlocked to simplify access.

In the morning, as discussed above, the bulk of the team should be at the poster session. If all preparations are done, the team may attend the opening session in Shanahan 1430 at 1:00 P.M. Otherwise this time can be used for last-minute setup. The first team to present should be ready to start on time at 1:30 P.M. During the course of presentations, the team not presenting is free to attend other teams' presentations. They must be sure, however, to be ready to present on time at the beginning of their next timeslot.

Presentations should aim for 20-22 minutes, followed by 3-5 minutes of questions and answers. *Please repeat the questions asked, even if you're in a small, audio-friendly room.* The final 5 minutes gives visitors time to change from room to room between the talks.

Celebration Dinner and Etiquette

In the evening on Projects Day, the entire group -- liaisons and student teams -- celebrate the year's efforts and successes with a nice dinner. Remember that you are your liaisons' hosts during the dinner. Realizing that it does not need asking, I ask everyone to enjoy dinner -- and to stay professional through dinner -- as you host all of our Projects Day guests: tables will have liaisons, Clinic Advisory Committee members, and other visitors.

In the past, there have been cases where professionalism ended _before_ dinner ended. To share some examples: (1) guests abandoned by hosts leaving too early (unless there's a scheduled event or performance that can't be missed) and/or by sitting at a different table, or (2) hosts not being

sober at / through the dinner. These incidents reflected poorly, both on those participants and on the program as a whole. And, (3) there have been examples of liaisons asking to attend parties at the dorms after the dinner. If this happens, I encourage you to find a polite way to avoid it.

Clinic dinner is a lot like a dinner after an important -- and successful! -- job interview: both celebratory and professional.

Chapter 12: What to Do If Problems Arise

The Clinic staff works hard to make your Clinic experience a valuable part of your academic career at HMC. Nevertheless, as with any endeavor of this size, sometimes problems arise. These problems might be technical, interpersonal, or ethical. The question is: what do you do about them?

Below we attempt to outline some suggestions, depending on the type and scope of the problem. Note however, that these suggestions are not intended to be limiting. All faculty and staff of the college are prepared to intercede on behalf of students in any context.

In most circumstances, it is best not to open the problem to the liaison, at least initially. There are very few problems that they can help solve. Your advisor or the Clinic Director may decide later if it makes sense to involve the liaison.

The first line of defense, in particular if the problem relates to interaction with another team member, is the project manager. He or she may have a suggestion, or may talk to the faculty advisor to get a recommendation.

Next in line is, naturally, your faculty advisor. If you have problems with your teammates, with the nature of the task assignments you have been given, or if you have concerns about something the liaison has told you, these are reasonable concerns to raise with your advisor. Problems might include your feeling that your liaison is building up unrealistic expectations, or that the project has gone off track and you don't know how to deal with breaking the news to the liaison. Similarly, if there is some technical issue with the application or integration of the project results that concerns you, or an ethical concern about the conduct or outcome of the project, you should feel comfortable talking to your advisor about it.

Next in line is the Clinic Director. The Director's door is always open to talk about any aspect of Clinic. A situation in which it is particularly important to go directly to the director is if you feel that your project assignment is utterly inappropriate to your skills or interests, or if you have personal reasons for not wanting to be on the project to which you have been assigned. Obviously, in these

situations, the faster you contact the director, the more likely it is that you could be reassigned to another project. (Note that we cannot guarantee that every student will end up with the project, or even the project category, of their choice. We can only make our best effort.)

Finally, and most importantly, if you have exhausted your options within the program, or are uncomfortable approaching one of the people mentioned above, then you should realize that, as mentioned above, you can go to any faculty or staff at the college for support. In general, because the college does not have an ombudsman, there is a tacit presumption that any faculty or staff can represent a student in a difficult situation.

Chapter 13: Things Worth Repeating

You should have read the handbook thoroughly. But even then (and especially if you don't) it is possible to miss some things. Below is a list of some useful tidbits. If many of these are new to you, it'd be worth looking through the handbook again.

1. For an Acme team for the 2019-2020 academic year, the email aliases are of the form:
    - acme19@cs.hmc.edu (team with advisor)
    - acme19advisor@cs.hmc.edu (advisor only)
    - acme19l@cs.hmc.edu (team with advisor and liaisons)
    - acme19liaison@cs.hmc.edu (liaisons only)
2. It is each team's responsibility to obtain and install the operating system/software they choose to use for their clinic machines. Tim can help.
3. The end of the project gets *very* busy. You will be juggling feature freeze, designing a poster, writing a final report and preparing your final presentation (and possibly your phase III presentation as well, depending on when yours is scheduled). It is worth discussing and scheduling work for these milestones before spring break.
4. We expect each team member to invest ten (or more) hours a week on Clinic. [[This directly supports one of Clinic's three central goals: (1) *Creatively optimize clinic-project hours*.]]
5. It is important to come to team meetings prepared and on time. [[This supports the other two big-picture clinic goals: (2) Sustained professionalism and (3) Effective team-based collaboration.]]

Additional documents

- Feedback form (written) for Phase 1 presentations (2018)
- Clinic Student Agreement (including Clinic's default Confidentiality Agreement)
- Notes on the Spring-term Clinic Presentations (Phase 3)

- End-of-year Clinic checklist (need this…)
- Older CS Clinic Handbook (from 2013-2014)