Class Scheduling Readme

Project Status: In Development

Class Scheduling is a scheduling tool created by David Martinez, Alec Goldenberg and Ishtiaque Hussain for the CMPSC 487W class at Penn State - Abington, for the Engineering department. The goal of this project was to create a program that would take an input Excel file, and produce an Excel sheet of a possible schedule of the classes in a given semester, along with any conflicts that exist within that schedule.

How the program works:

1. The executable file the users receive will prompt them for the file-path to a correctly inputted (see Input Formatting section) Excel sheet with a list of courses, meeting times and days, instructors and possible locations.
2. Once the user provides said input file, the program will run a genetic algorithm over the course of hundreds of generations of schedules until a compatible schedule is found. This genetic algorithm will run based off of settings that the user can change in the settings tab of the UI.
3. Once this schedule is found, the program will consolidate the schedule information into an Excel spreadsheet with two tabs.

Input/Output Formatting:

Input Formatting:

1. **Faculty Preferences**
    a. **Full Name** (First Last)
    b. **Availability** (**“**MWF: 10am - 5pm”)
    c. **Courses** (“CMPSC131, CMPSC132, CMPSC463, CMPSC487”)
    d. **Total # of contact hours** (single number or “12 to 15”)

	A	B	C	D
1	**Full Name**	**Availability**	**Courses**	**Total # of Contact hours**
2	Ishtiaque Hussain	MWF: 10am - 5pm	CMPSC131, CMPSC132, CMPSC463, CMPSC487	9
3	Vinayak Elangovan	TR: 10am - 5pm	CMPSC131, CMPSC462	9
4	Ahmed Nuriye	TR: 9:05am - 5pm	CHEM110, CHEM111, CHEM210, CHEM212, CHEM213	9
5	Andrei Blinkouski	MWF: 8am - 5 pm	PHYS211, PHYS212, PHYS213, PHYS214	12 to 15
6	Ann Schmiedekamp	MWF: 9am - 5pm	ASTRO141N, PHYS212, PHYS213, PHYS214	6

2. **Courses**
    a. **Subject**
    b. **Number**
    c. **Description**
    d. **# of contact hours**
    e. **Meeting pattern** (“ 3X50' or 2X75' “)
    f. **Enrollment Capacity**
    g. **Pre-Req** (various patterns will be accepted, see screenshot)
    h. **Co-Req** (same patterns as Pre-Req, see screenshot)
    i. **Potential Conflicts** (skipping this for now)
    j. **Mutually Exclusive with** (weird formatting, talk to ishti)
    k. **Room in**
    l. **# of sections**
    m. **Concurrent OK?** (can be either blank, “No”, “Yes”, “no more than #”, or “# concurrent”)

	A	B	C	D	E	F	G	H
1	Subject	Num	Descr	# of Contact hours	Meeting pattern	Enr Cpcty	Pre-Req	Co-Req
2	ASTRO	141N	Astrobiology Films	3	3X50' or 2X75'	60	None	None
3	BIOL	110	Biology Conc Biod	3	3X50' or 2X75'	72	None	None
4	BIOL	110L	Biology Conc Biod	2	1X120'	24		BIOL110
5	BIOL	161	A&P I Lect	3	3X50' or 2X75'	72	None	
6	BIOL	162	A&P I Lab	3	1X180'	24		BIOL161
7	BIOL	163	A&P II Lect	3	3X50' or 2X75'	72	BIOL161	
8	BIOL	164	A&P II Lab	3	1X180'	24		BIOL163
9	BIOL	220W	Biology Pop Comm	3	3X50' or 2X75'	72	BIOL110	
10	BIOL	220WL	Biology Pop Comm	2	1X120'	24		BIOL220W
11	BIOL	230W	Biology Mol Cells	3	3X50' or 2X75'	67	BIOL110	
12	BIOL	230WL	Biology Mol Cells	2	1X120'	24		BIOL230W
13	BIOL	240W	Function and Development	3	3X50'	72	BIOL110 and CHEM110	
14	BIOL	240WL	Function and Development	2	1X120'	24		BIOL240W
15	BIOL	404	Cell Mech Vert Phy	3	3X50' or 2X75'	24	BIOL230W	
16	BIOL	406	Symbiosis	3	3X50' or 2X75'	36	BIOL220W or 230W or 240W	
17	BIOL	409	Biology of Aging	3	3X50' or 2X75'	36	BIOL230W or BIOL240W	
18	BIOL	416	Biology of Cancer	3	3X50' or 2X75'	36	BIOL230W	

	I	J	K	L	M
1	Potential conflicts	Mutually exclusive with	Room in	# of sections	Concurrent OK?
2	None			1	
3	CHEM110, CHEM111, MATH26, MATH140	BISC1, BISC2		4	No
4	CHEM110, CHEM111, MATH26, MATH140		W246	12	No
5		BISC4		1	
6			W242	1	
7		BISC4		1	
8			W242	1	
9	CHEM210, PHYS250	BISC2		1	
10	CHEM210, PHYS251		W246	3	No
11	CHEM210, PHYS252			1	
12	CHEM210, PHYS253		W246	3	No
13	CHEM112, 113, PHYS250, 251			1	
14	CHEM112, 113, PHYS250, 251		W242	3	No
15	4xx BIOL courses, BMB401			1	
16	4xx BIOL courses, BMB401			1	
17	4xx BIOL courses, BMB401			1	
18	4xx BIOL courses, BMB401			1	

3. Classroom Capacities

	A	B	C	D	E	F
1	BLDG	RM	MX	TYPE	Notes	
2	W	112	186	CLASSROOM LECTURE		
3	W	121	32	CLASSROOM		
4	W	119	24	PHYS LAB	PHYS211 and 250 should be scheduled here	
5	W	124	24	PHYS LAB	PHYS212, 213, 214 and 251 should be scheduled here	
6	W	132A	34	PC LAB	Priority for IST and CMPSC courses	
7	W	132B	24	PC LAB	Priority for IST and CMPSC courses	
8	W	133A	18	ART		
9	W	133B	24	PC LAB	CMPEN275 and EE210 should be scheudled here	
10	W	135	24	Engineering PC Lab	EDSGN100 should be scheduled here, but can also use for CMPSC courses	
11	W	136A	18	ART		
12	W	136B	18	ART		
13	W	220	36	CLASSROOM		
14	W	222	24	CHEM LAB	CHEM111 labs only can be scheduled here, no other courses	
15	W	224	24	CHEM LAB	CHEM113 labs only can be scheduled here, no other courses	
16	W	242	36	BIOL LAB	BIOL162, 164, 240W lab and 437L should be scheduled here. No other courses	

4. Meeting Times

	J	K	L	M	N	O	P	Q	R	S
1	T or R, 4 hr	M, 120 min	T, 120 min	W, 120 min	R, 120 min	F, 120 min	TR, 180 min	MW, 180 min	MWF, 120 min	TR, 180 min
2	8:00 a-12:00 p	8:00 - 10:00 a	8:00 - 10:00 a	8:00 - 10:00 a	8:00 - 10:00 a	8:00 - 10:00 a	8:00-11:00 a	8:00-11:00 a	8:00-10:00 a	8:00-11:00 a
3	1:35-5:35 p	10:15 - 12:15	10:15 - 12:15 p	10:15 - 12:15 p	10:15 - 12:15 p	10:15 - 12:15 p	1:00-4:00 p	1:00-4:00 p	10:10-12:10 p	11:15-2:15 p
4		1:00 - 3:00 p	1:00 - 3:00 p	1:00 - 3:00 p	1:00 - 3:00 p	1:00 - 3:00 p			1:25-3:25 p	2:30-5:30 p
5		3:15 - 5:15 p	3:15 - 5:15 p	3:15 - 5:15 p	3:15 - 5:15 p	3:15 - 5:15 p			3:40-5:40 p	
6		5:30 - 7:30 p	5:30 - 7:30 p	5:30 - 7:30 p	5:30 - 7:30 p	5:30 - 7:30 p				

Output Formatting:

1. **Schedule**
    a. **Class ID**
    b. **Course**
    c. **Faculty**
    d. **Building**
    e. **Room**
    f. **Day(s)**
    g. **Time**
    h. **Duration**

	A	B	C	D	E	F	G	H
1	Class id	Course (Subject, Number, Section)	Faculty	Building	Room	Day(s)	Time	Duration
2	0	ASTRO141N	Staff	W	112	TR	6:00 pm - 7:15 pm	75 min
3	1	BIOL110_001	Thomas Mcguire	W	313	MWF	12:20 pm - 1:10 pm	50 min
4	2	BIOL110_002	Eric Ingersoll	W	313	WF	4:00 pm - 5:15 pm	75 min
5	3	BIOL110_003	Eric Ingersoll	W	313	MW	7:30 pm - 8:45 pm	75 min
6	4	BIOL110_004	Thomas Mcguire	SU	009	WF	7:30 pm - 8:45 pm	75 min
7	5	BIOL110L_001	Jamie Howard	W	246	T	5:30 pm - 7:30 pm	120 min
8	6	BIOL110L_002	Mary Murphy	W	246	M	6:00 pm - 7:55 pm	120 min
9	7	BIOL110L_003	Thomas Mcguire	W	246	W	3:35 pm - 5:30 pm	120 min
10	8	BIOL110L_004	Mary Murphy	W	246	F	10:15 am - 12:15 pm	120 min
11	9	BIOL110L_005	Mary Murphy	W	246	F	8:00 am - 9:55 am	120 min

2. **Conflicts**
    a. **Class ID**
    b. **Course**
    c. **Faculty**
    d. **Building**
    e. **Room**
    f. **Day(s)**
    g. **Time**
    h. **Duration**
    i. **Type**
    j. **Conflicting Class**
    k. **Severity**

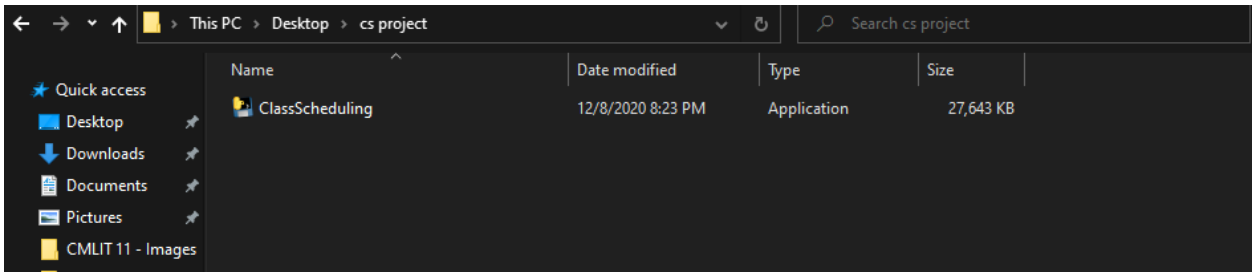
	A	B	C	D	E	F	G	H
1	Class id	Course (Subject, Number, Section)	Faculty	Building	Room	Day(s)	Time	Duration
2	104	CMPSC131_002	Yi Yang	W	133B	TR	7:30 pm - 8:45 pm	75 min
3	123	EDSGN100_007	Burcu Ozden	W	135	TR	1:00 pm - 4:00 pm	180 min
4	218	MATH110_013	Faranak Pahlevani	SU	308	MWF	11:00 am - 12:15 pm	75 min
5	260	PHYS211_004	Staff	W	119	MWF	3:35 pm - 5:15 pm	100 min
6	266	PHYS212_004	Ann Schmiedekamp	W	124	MWF	3:35 pm - 5:15 pm	100 min
7	N/A	N/A	Vinayak Elangovan	N/A	N/A	N/A	N/A	N/A
8	N/A	N/A	Barry Goluboff	N/A	N/A	N/A	N/A	N/A
9	N/A	N/A	Christine Krewson	N/A	N/A	N/A	N/A	N/A
10	N/A	N/A	Daniel Pearson	N/A	N/A	N/A	N/A	N/A
11	N/A	N/A	Frank Ganther	N/A	N/A	N/A	N/A	N/A
12	N/A	N/A	Jamie Howard	N/A	N/A	N/A	N/A	N/A
13	N/A	N/A	John Majewicz	N/A	N/A	N/A	N/A	N/A
14	N/A	N/A	Marcus Roux	N/A	N/A	N/A	N/A	N/A
15	N/A	N/A	Masataka Okutsu	N/A	N/A	N/A	N/A	N/A

	J	K
1	Conflicting Class	Severity
2		Major
3		Major
4		Major
5	PHYS250_001, Staff, W119, MWF 3:35 pm - 5:15 pm	Major
6		Major
7		Major
8		Major
9		Major
10		Major
11		Major
12		Major
13		Major
14		Major
15		Major

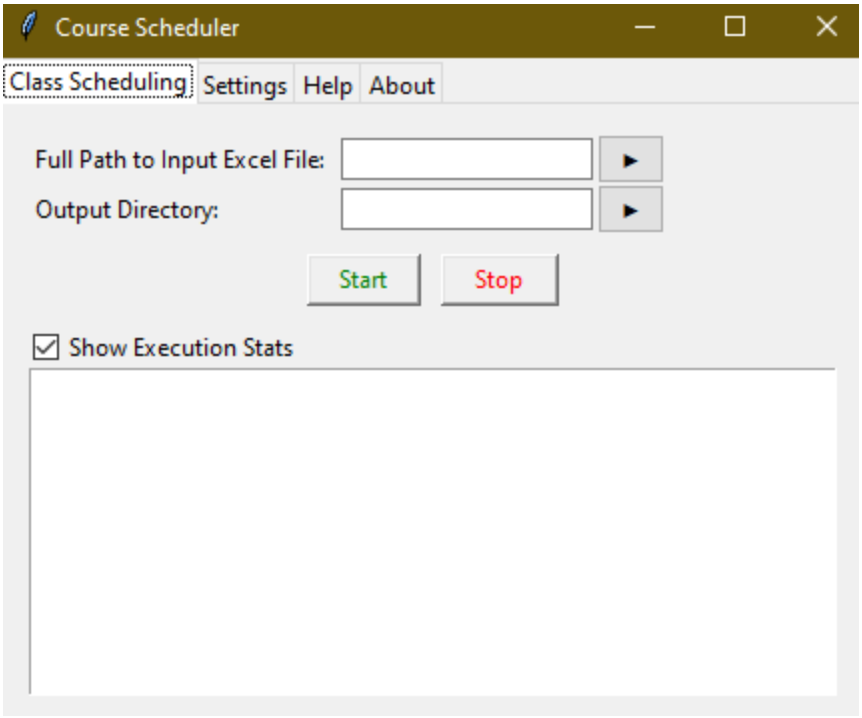
Config Settings:

Demo:

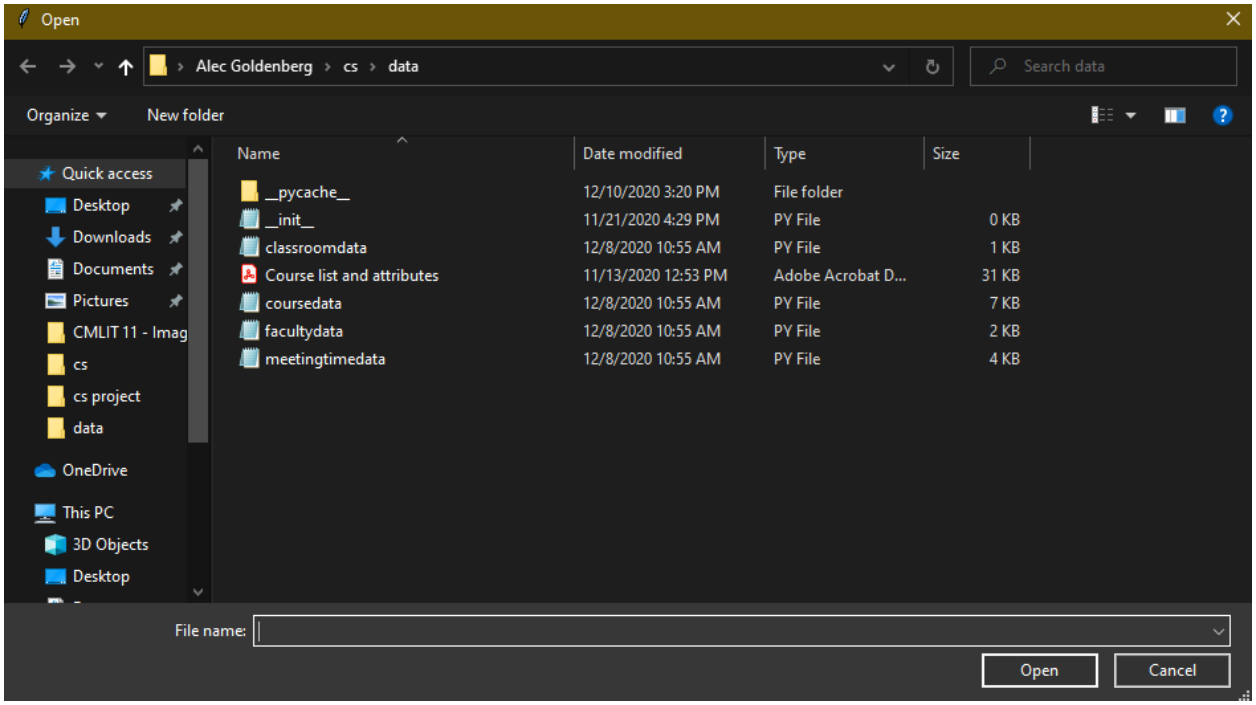
When you receive the folder with the executable, you should see a folder like this somewhere on your computer. (It may be named something else on your computer)



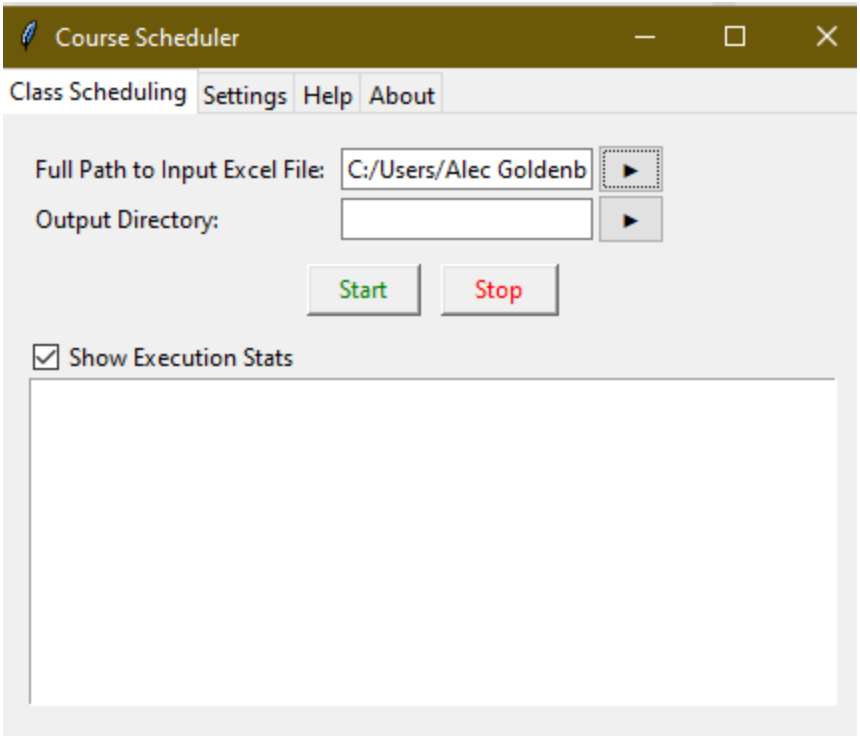
Once you find this file, double click on it and you should now see this…



This will be your main area for utilizing this program. From here, you should click the arrow next to the box that appears after “Full Path to Input Excel File”. You will then see a popup like this.



From here, you need to locate the input Excel file you would like to use and then double click on it.

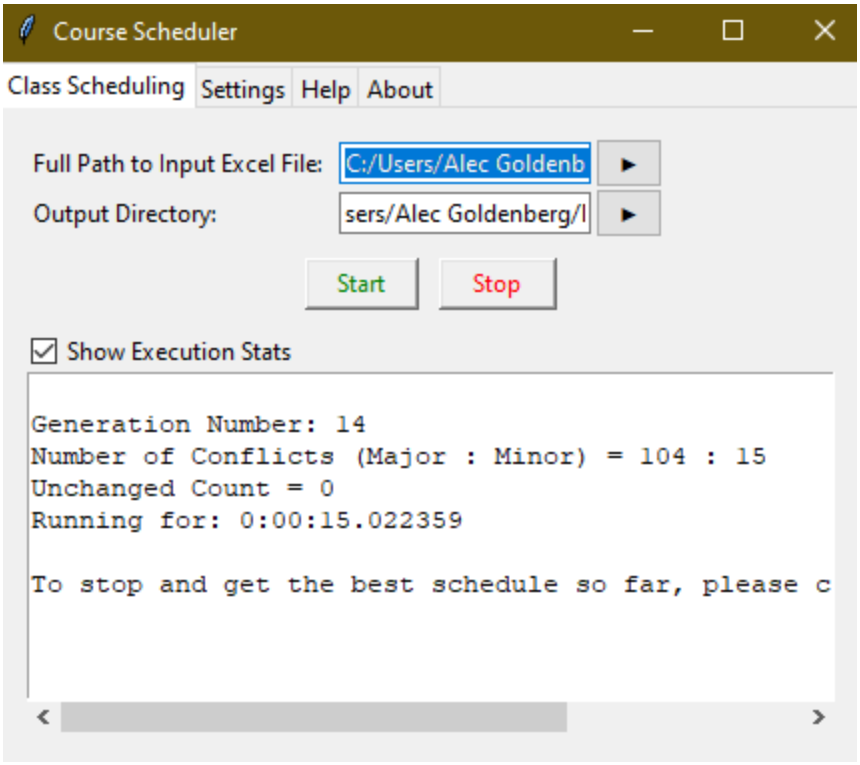


Once that area is populated, you will now see the file path to the input file. Next, click the area directly below that one, to tell the program where you would like the output Excel sheet, the schedule and conflict list, to be located on your personal computer. You will see another popup similar to the first one, this time, just click in what directory or area of your computer, for example, the desktop, you would like for the file to go after the program is done.

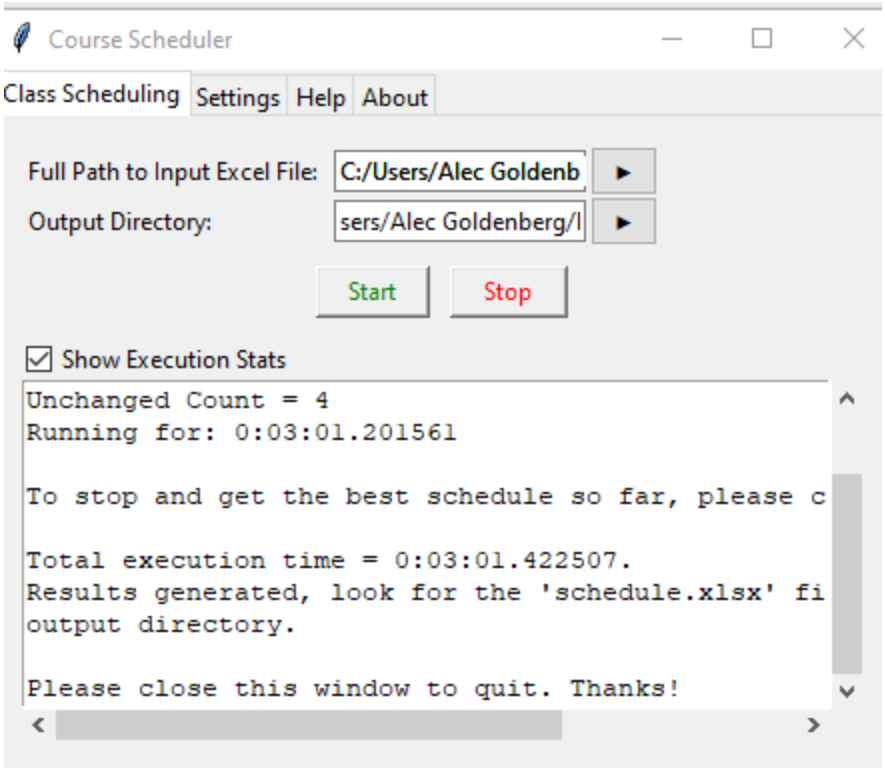
Finally, you are ready to run. With one click of the start button you will start the process of creating the schedule, but there are a couple more things to understand.

You may notice under the “Start” and “Stop” buttons there is a check box next to the option “Show Execution Stats”, this is on by default and we recommend you leave this on as this will show important information about the process of running and creating the schedule. If you would like to turn this off, simply click the checkbox once and you will no longer see this information below.

If you leave this setting on, once you click Start, you should immediately see some output in the box below.



In this box, you will now see all the important information you may need about the process running. Here you can see what generation number the program is on, the current number of major and minor conflicts, how many generations have occurred with no improvement to the schedule and finally how long the program has been running for. If you would like to stop the program, simply hitting the stop button above will cease the schedule creation and will create an Excel sheet with the current best schedule and put it in the directory you put in the previous box.


Course Scheduler
Class Scheduling
Settings
Help
About
Full Path to Input Excel File:
C:/Users/Alec Goldenb
Output Directory:
sers/Alec Goldenberg/I
Start
Stop
Show Execution Stats
Unchanged Count = 4
Running for: 0:03:01.201561
To stop and get the best schedule so far, please c
Total execution time = 0:03:01.422507.
Results generated, look for the 'schedule.xlsx' fi
output directory.
Please close this window to quit. Thanks!