CMSC 105, Fall 2019, Haverford College.

Instructor: Rajesh Kumar

Lab Instructor: Suzanne Lindell

Teaching Assistants: TBA (one teaching assistant per six students)

Topics:

- Problems and solutions
- Preconditions and postconditions
- Correctness of solutions
- Testing for correctness, test suits, and doctest
- Variables, Assignment, Mutation, Rebinding, Scope of variables,
- Conditionals, if-else, nested if-else, chain of conditionals,
- Loops (while, for): loops, nested loops
- Functions, arguments, default arguments, keyword arguments
- Lambda expressions
- Basic Recursive Design: Linear, Tail, Mutual, Exponential
- Strings: basics operations
- Strings: pattern matching
- A brief introduction to regular expressions and their utility in combination with string operations in text pre-processing
- List: one dimensional, manipulation, mutability, rebinding
- Multi-dimensional lists. Matrix operations (addition, subtraction, multiplication, transpose)
- Dictionary: creation, population, sorting,
- Tuples: sorting tuples
- Dictionary and Tuples
- Sorting: Bubble and Counting Sort
- Searching: Linear, Binary, and Hashing (dictionary)
- An informal introduction to the complexity of algorithms: by looking at the code or algorithm deriving the number of computations in terms of input size n.
- Introduction to asymptotic notations and then Master theorem
- Proof techniques
- Some classic problems and solutions (keeping efficiency in mind)
- Advance recursion (if time permits, with examples like computation of permutations)
- Project: proposal presentation, and final report presentation (it will be two classes).
- Code reviews through pair programming labs/homework, enforcing submission of contribution log of “driver” and “navigator”.

Evaluation

- Lab (5%*8 =40%)
- Project (15%)
- Midterm (15%)
- Final exam (25%)
- Attendance (5%), 85% attendance is mandatory in total (lab and class) to earn this 5%