

Programming skills

- Some experience with programming : master the fundamental constructs of a programming language (like Python, Java or C++) including
 - Basic syntax and semantics of a higher-level language
 - Variables and primitive data types (e.g. numbers, characters, Booleans)
 - Expressions and assignments
 - Simple I/O including file I/O
 - Conditional and iterative control structures
 - Functions and parameters passing
 - The concept of recursion

The students must be able to analyze and explain the behavior of simple programs involving the fundamental programming constructs variables, expressions, assignments, I/O, control constructs, parameter passing and recursion. The students must identify and describe the use of primitive data types and write programs that use primitive data types. The students must know how to design, modify, expand, short programs that use standard conditional and iterative control structures and functions. The students must know how to test, and debug a program that uses the following fundamental programming constructs: basic computation, simple I/O, standard conditional and iterative structures, the definition of functions, and parameter passing.

- A basic understanding of fundamental data structures is also required:
 - arrays,
 - records/structs (heterogeneous aggregates),
 - string and string processing,
 - abstract data types and their implementations (stacks, queues, priority queues, sets, maps)

The students must know when and how using appropriate built-in data-structures. Students must understand common applications of stack,,,, queue, priority queue. The students must know how to write short programs that use each of the following data structure: arrays, records/structs, strings, linked lists, stacks, queues, sets, and maps. The students must know how to compare alternative implementations of data structures with respect to performance and to choose appropriate data structure for modeling a given problem

- Some familiarity with more advanced programming structure is a bonus but is not required.