Esc101: Introduction to Computing

This class introduces students to programming. We use “C” language for the course. The duration will be approximately 14 weeks. There will a mid-semester exam, and an end-semester exam and few surprise quizzes. The lectures are accompanied by weekly labs. There will be a mid-term lab exam and an end-term lab exam.

Syllabus

The major topics covered in the class are as follows. The order of topics covered may change depending on the feedback from the class.

1. Variables, Operators, Expressions, and Statements
    a. Variables and their values, types
    b. Lvalue and Rvalue
    c. Unary, binary and ternary operators
2. Functions
    a. Arguments and Return value
    b. Parameter passing (pass by value, hint to pass by reference)
    c. Function execution
    d. Library functions
    e. Local, global and static variables
3. Conditionals
    a. If-then, if-then-else, switch-case
    b. Nested conditionals
4. Loops
    a. If-then
    b. If-then-else
    c. Switch-case
    d. Break and continue
5. Arrays
    a. Creation and Traversal
    b. Arrays as function arguments
    c. Multi-dimension arrays
    d. Strings as array of characters
    e. Data structures using arrays : Stack, Queue
6. Pointers
    a. Address of a variable
    b. Parameter passing by reference
    c. Dynamic memory allocation
    d. Similarity/differences between arrays and pointers
7. Dynamic Data structures
    a. Linked list, Tree
    b. Stack, Queue, Graph
8. Recursion
    a. Comparison with Mathematical Induction
    b. Structural Induction and recursion on dynamic data structures

9. Input/output
    a. Standard I/O
    b. File I/O
10. Other C features
    a. Process of compilation and Linking
    b. Debugging
    c. Enumerations
    d. Macros