

COMP 1020 - Introductory Computer Science 2

Calendar Description: More features of a procedural language, elements of programming (Lab required)

Prerequisite: COMP 1010, or high school Computer Science 40S (75%) and any grade 12 or 40S mathematics or equivalent

This course is a prerequisite for: COMP 2130, COMP 2140, COMP 2160, and COMP 2190.

Outline

- 1) Introduction (1 week)
 - Review of COMP 1010 concepts: procedural programming, iterative development of “growing”) algorithms, parallel arrays
- 2) File input and output (1 week)
 - Character-oriented file I/O, line-oriented file I/O
- 3) Basic objects (1 week)
 - Introduction to objects, constructors, variables, methods, representation of objects (object references/pointers)
- 4) Strings (1 week)
 - Character manipulation, string manipulation, immutable objects
- 5) Object Collections (1 week)
 - The ArrayList class, ArrayList operations
- 6) Object Inheritance (1 week)
 - Object hierarchies, variable and method inheritance; shadowing and over-riding; polymorphism, the Object class; object cloning
- 7) Review (1 week)
 - Finish inheritance and review first half of term, term test
- 8) Sorting (1 week)
 - Bubble sort, selection sort, insertion sort
- 9) Recursion (1 week)
 - Recursion: base case; recursive case
- 10) Multi-dimensional arrays (1 week)
 - Simple introduction to multidimensional arrays (primarily two-dimensional)
- 11) Linked Lists (1 week)
 - Organization of linked lists, linked lists using a Node class
- 12) Analysis of Algorithms (1 week)
 - Introduction to analysis of algorithms, worst case $O(f(n))$, analysis of sorting algorithms and various other algorithms
- 13) Review (1 week)
 - Review of course material

Text: David Scuse, *Growing Data Structures and Algorithms*, Course Notes