Computing Science Course Outlines 2018 Spring

CMPT 307 - D100 Data Structures and Algorithms

Instructor(s): Valentine Kabanets

SFU Burnaby

Calendar Objective/Description:
Analysis and design of data structures for lists, sets, trees, dictionaries, and priority queues. A selection of topics chosen from sorting, memory management, graphs and graph algorithms.

Instructor's Objectives:
The objective of this course is to introduce concepts and problem-solving techniques that are used in the design and analysis of efficient algorithms. This is done by studying various algorithms and data structures.

Prerequisites:
CMPT 225, MACM 201, MATH 151 (or MATH 150), and MATH 232 or 240.

Topics:
- The following topics may be included:
  - Motivating example: the stable matching problem
  - Greedy (graph) algorithms, BFS, DFS, Dijkstra's Kruskal's and Prim's
  - Simple data structures: priority queues (with heaps) and union-find
  - Divide and conquer algorithms and their analysis: solving recursions
  - Dynamic programming algorithms and their analysis
  - Flow algorithms and matching
  - Randomized algorithms
  - NP-completeness

Grading:
The course has a final examination (worth 40% of the total grade). There will be four homework assignments which won't be collected and graded. Instead, there will be four 50-min quizzes in class (worth 15% each).

Required Books:
Algorithm Design, J. Kleinberg, É. Tardos, Addison Wesley, 2006, 9780321295354

Reference Books:

Academic Honesty Statement::
Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies ( http://www.sfu.ca/policies/gazette/student.html ).