CS 158: Topics in Algorithms

Catalogue description. Recent developments in the design and analysis of algorithms. Topics vary from year to year and may include randomized algorithms, online algorithms, approximation algorithms, parallel algorithms, distributed algorithms, average-case analysis, as well as algorithms more specific to one area of application such as computational geometry, computational biology, economic theory, graph and network algorithms, etc.

Syllabus outline. CS157 is a general-purpose course that is mostly on essential Algorithms topics. In contrast, CS158 aims at providing some breadth in Algorithms by exploring exciting but less central venues so as to provide a broader perspective.

Here is an example of possible elements of a syllabus.


2. Online algorithms: competitive ratio, ski rental, paging, load balancing.

3. Computational geometry: convex hull, Voronoi diagrams.

4. String algorithms: KMP, suffix trees.

5. Self-adjusting and dynamic data structures

6. String matching: KMP

7. Graph algorithms for matching problems


Postrequisites. This course is a good course for upper-level undergraduate students and for new PhD students to broaden their perspective on Algorithms.

Textbooks