CS106B Syllabus

This handout contains the tentative syllabus for CS106B. Depending on how quickly we're able to make it through the material, we may end up spending more or less time on each of these topics. Readings should be done **before** the lecture for which they are assigned.

Date	Topics	Readings	Assignments
M April 1	*Why continue onward in programming?* Course Overview The C++ Programming Language	Chapter 1	
W April 3	*How can we define functions in terms of themselves?* Functions in C++ Recursive Functions	Chapters 2 and 7	
F April 5	*How can we process text recursively?* Strings Recursion over Strings	Chapter 3	Assignment 1 Out
M April 8	*How do computers parse expressions?* **Stack** The Shunting-Yard Algorithm	Chapter 5.1 – 5.3	
W April 10	*How do we store aggregate data?* C++ Streams **Vector**	Chapter 4	
F April 12	*How do we work with associative data?* **Map**, **Set**, and **Lexicon** **foreach**	Chapter 6	
M April 15	*How do you safely store passwords?* **Queue** Password Management	Chapter 5.4 – 5.6	Assignment 1 Due Assignment 2 Out
W April 17	*How can recursion aid in problem solving?* Thinking Recursively	Chapters 7 and 8	
F April 19	*What is a fractal?* Graphical Recursion Exhaustive Search I	Chapter 9	
M April 22	*How can we find all solutions to a problem?* Exhaustive Search II Backtracking Search I		
W April 24	*How can we explore a huge search space?* Backtracking Search II		Assignment 2 Due Assignment 3 Out
F April 26	*Why are some algorithms faster than others?* Algorithmic Efficiency Big-O Notation	Chapter 10.1 – 10.2	

M April 29	*How do computers sort data?* Sorting Algorithms, Part I	Chapter 10.3 – 10.5	
W May 1	*How does sorting theory match practice?* Sorting Algorithms, Part II		
F May 3	*How do we define our own collection classes?* Designing Abstractions Pointers	Chapter 11	Assignment 3 Due Assignment 4 Out
M May 6	*How are dynamic arrays implemented?* Dynamic Allocation Implementing **Stack**	Chapter 12	
T May 7	**CS106B Midterm #1** **7 – 10PM, Location TBA**		
W May 8	*How does data representation impact efficiency?* Optimizing **Stack**		
F May 10	*Are arrays really necessary for storing linear data?* Linked Lists I	Chapter 13	
M May 13	*How are the stack and queue implemented?* Linked Lists II Implementing **Stack** and **Queue**	Chapter 14	Assignment 4 Due Assignment 5 Out
W May 15	*How can we rapidly store and look up values?* Hash Tables Implementing **Map**	Chapter 15	
F May 17	*How can we efficiently store text data?* Tries Implementing **Lexicon**		
M May 20	*How can we efficiently store data in sorted order?* Binary Search Trees Implementing **Set**	Chapter 16	
W May 22	*How can we store a large file inside a smaller one?* Huffman Encoding Greedy Algorithms		Assignment 5 Due Assignment 6 Out
F May 24	*How can computers recognize groups of data?* Dendrograms Hierarchical Clustering		
M May 27	**Memorial Day** **No Class**		
T May 28	**CS106B Midterm #2** **7 – 10PM, Location TBA**		

W May 29	*How do we explore network structures?*
	    Graphs
	    Graph Searches
		Chapter 19.1 – 19.4	

F May 31	*How can we minimize trip times and wiring costs?*
	    Graph Representations
	    Graph Algorithms
		Chapter 19.5 – 19.7	

M June 3	*Fun and exciting additional topics!*		Assignment 6 Due Assignment 7 Out
W June 5	*What comes after CS106?* Where to Go from Here		
W June 12	Assignment 7 Due at 12:15PM **No Late Submissions Accepted**		