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 June 24	*Why continue onward in programming?* Course Overview The C++ Programming Language	Chapter 1	
T June 25	*How can we define functions in terms of themselves?* Functions in C++ Recursive Functions	Chapters 2 and 7	
W June 26	*How can we process text recursively?* Strings Recursion over Strings	Chapter 3	Assignment 1 Out
Th June 27	*How do computers parse expressions?* **`Stack`** The Shunting-Yard Algorithm	Chapter 5.1 – 5.3	
M July 1	*How do we store aggregate data?* C++ Streams **`Vector`**	Chapter 4	
T July 2	*How do we work with associative data?* **`Map`**, **`Set`**, and **`Lexicon`** **`foreach`**	Chapter 6	Assignment 1 Due Assignment 2 Out
W July 3	*How do you safely store passwords?* **`Queue`** Password Management	Chapter 5.4 – 5.6	
Th July 4	**July 4th: No Class!**		
M July 8	*How can recursion aid in problem solving?* Thinking Recursively	Chapters 7 and 8	
T July 9	*What is a fractal?* Graphical Recursion Exhaustive Search I	Chapter 9	
W July 10	*How can we find all solutions to a problem?* Exhaustive Search II Backtracking Search I		Assignment 2 Due Assignment 3 Out
Th July 11	*How can we explore a huge search space?* Backtracking Search II		

M July 15	*Why are some algorithms faster than others?* Algorithmic Efficiency Big-O Notation	Chapter 10.1 – 10.2	
T July 16	*How do computers sort data?* Sorting Algorithms, Part I	Chapter 10.3 – 10.5	
W July 17	*How does sorting theory match practice?* Sorting Algorithms, Part II		
Th July 18	*How do we define our own collection classes?* Designing Abstractions Pointers	Chapter 11	Assignment 3 Due Assignment 4 Out
M July 22	**CS106B Midterm #1** **7 – 10PM, Cubberly Auditorium**		
T July 23	*How are dynamic arrays implemented?* Dynamic Allocation Implementing **`Stack`**	Chapter 12	
W July 24	*How does data representation impact efficiency?* Optimizing **`Stack`**		
Th July 25	*Are arrays really necessary for storing linear data?* Linked Lists I	Chapter 13	
M July 29	*How are the stack and queue implemented?* Linked Lists II Implementing **`Stack`** and **`Queue`**	Chapter 14	Assignment 4 Due Assignment 5 Out
T July 30	*How can we rapidly store and look up values?* Hash Tables Implementing **`Map`**	Chapter 15	
W July 31	*How can we efficiently store text data?* Tries Implementing **`Lexicon`**		
Th Aug. 1	*How can we efficiently store data in sorted order?* Binary Search Trees Implementing **`Set`**	Chapter 16	
M Aug. 5	*How do we explore network structures?* Graphs Graph Searches	Chapter 18.1 – 18.4	
T Aug. 6	*How can we minimize trip times and wiring costs?* Graph Representations Graph Algorithms	Chapter 18.5 – 18.7	Assignment 6 Out
W Aug. 7	*How can we store a large file inside a smaller one?* Huffman Encoding Greedy Algorithms		Assignment 5 Due

Th Aug. 8	*How can computers recognize groups of data?* Dendrograms Hierarchical Clustering		
M Aug. 12	**CS106B Midterm #2** **7 – 10PM, Cubberly Auditorium**		
T Aug. 13	*Fun and exciting additional topics!*		
W Aug. 14	*What comes after CS106?* Where to Go from Here		
Fri Aug. 16	Assignment 6 Due at 11:00AM **No Late Submissions Accepted**		