

6.005.2x Syllabus

Schedule

Week	Readings	Assignment
1	1. Recursion 2. Recursive Data Types	
2	3. Regular Expressions & Grammars 4. Parser Generators	Problem Set 1 Beta
3	5. Concurrency	Problem Set 1 Beta, continued
4	6. Thread Safety	Problem Set 1 Final
5	7. Sockets & Networking 8. Queues & Message Passing	Problem Set 1 Final, continued
6	9. Locks & Synchronization	Problem Set 2 Beta
7		Problem Set 2 Beta, continued
8		Problem Set 2 Final
9		Problem Set 2 Final, continued
10		Final Exam

Topics

1. Recursion

- recursive steps and base cases
- helper methods
- recursion vs. iteration

2. Recursive Data Types

- data type definitions
- functions over recursive data types
- immutable lists

3. Regular Expressions & Grammars

- grammar terminals, nonterminals, productions

- regular expressions
- matching a grammar or regular expression
- using a grammar or regular expression to parse

4. Parser Generators

- using a parser-generator library to convert a grammar to a parser

5. Concurrency

- models of concurrency: shared memory and message passing
- processes and threads
- time-slicing
- race conditions

6. Thread Safety

- confinement
- immutability
- threadsafe data types

7. Sockets and Networking

- client/server model
- sockets, streams, and buffers
- blocking

8. Queues & Message Passing

- synchronous queues
- poison pills

9. Locks & Synchronization

- locks
- deadlock
- monitor pattern
- Java's synchronized keyword

Problem Sets

Problem sets are done on your computer. We give instructions for Eclipse, but you can use another Java IDE or command-line tools if you prefer.

Every problem set has two submission points: a **beta** submission and a **final** submission. The initial release of the problem set will include tests for the beta. After the beta deadline passes, additional tests will be released for you to download from edX. You can then run the final tests against your solution, fix any new problems that are found, and then submit for the final deadline.

For the problem sets, all the test cases are given to you, and you'll run the tests on your own machine before uploading your problem set, so you'll always know which tests are passing and which are failing before you submit. There are no hidden tests for the problem sets. The beta submission grade is based only on the beta tests, and the final submission grade is based on the beta + final tests.

Final Exam

The final exam consists of questions on edX, plus a short Java programming portion that you'll do on your own computer. The edX questions are similar to reading exercise questions. The programming portion is similar to a problem set but much shorter, and with just one submission. Some of the tests will be provided, but some will be hidden and used for grading.

The final exam will be open for four days, from Tue Apr 25 to Fri Apr 28.

During the exam period, the forums will be shut down. You will still be able to read posts but you will not be able to post any questions. The honor code prohibits students from communicating with one another during the exam period in any way whatsoever – so please don't discuss the exam on any other forum, website or in person with anyone else.

Grading

Reading Exercises (10 readings): 15%

Problem Set Betas (2): 25%

Problem Set Finals (2): 25%

Final Exam: 35%

In order to earn a certificate for 6.005.2x, students must pass the course with a grade of C or better. The following grading breakdown will apply:

>= 80%: A

>= 65%: B

>= 55%: C