Lecture 17 − Midterm Review

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The exam is based on material we have covered in the lectures, tutorials, and programming/weekly assignments.

Exam coverage is up to Lecture 16. More on the next slides.

Weekly assignments and programming assignments with due dates before the midterm may also appear on the exam.

- Course introduction
- Computer development
- When to write a program
- Goals of software

- The von Neumann architecture
- The memory model
- Execution of software
- How code goes from source to executable
- Syntax vs Semantics
- Software design process
- Elements of a program

- The "Hello World" program
- The `main` entry point
- Writing & compiling the program
- Simple types: variables
- Declaring and assigning variables
- Built-in types: numeric, char, bool

- Writing to the console
- A bit about strings
- Newlines and escape sequences
- Console input
- Reading and parsing numbers
- Code comments

- Operators and operands
- Assignment operator(s)
- Arithmetic operators
- Unary operators
- Order of operations (BEDMAS)
- Type promotion
- Explicit type conversion

- Relational operators
- Numerical comparisons
- Boolean logic (AND/OR/NOT)
- Short-circuit evaluation
- Bitwise operators

- The `if` statement
- The `if-else` statement
- All together now: `if/else if/else`
- The `switch` statement

- Iteration statements
- Pre- and posttest loops
- The `while` loop
- The `break` statement
- The `continue` statement
- `do-while` loops

- The `for` loop
- Variations on the `for`
- Use of `break` and `continue`

- Defining an enumerated type
- The `struct`
- The dot operator
- Structure assignment and nesting

- Defining arrays
- Declaring arrays
- Initializing arrays
- The [ ] operator
- Dynamic array allocation
- Array length

- Strings as arrays
- Multi-dimensional arrays

- Mathematical functions
- Function signatures
- Formal and actual parameters
- Calling a function
- Defining a function
- Function execution semantics
- Return types
- `void` functions

- Structuring the program with functions
- Documenting: pre/postconditions
- Variable scope
- Function overloading

- Optional parameters
- Pass by value, pass by reference
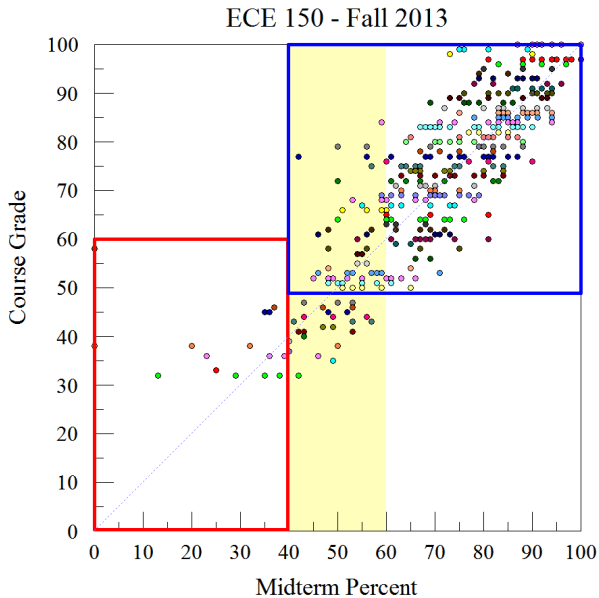- Values, references, and arrays

- What is recursion?
- Recursion vs iteration
- Thinking recursively

How to prepare for the midterm exam:

1 Review lecture notes and slides.
2 Review the tutorial slides.
3 Understand your programming assignment solutions.
4 Try old exams.
5 Do textbook questions for extra practice.
6 Ask for extra help (we have many TAs and instructors).

Tips for the Exam:

1. Take the time to read the question carefully.
2. You can use point form instead of full sentences in answers if it's not a code question.
3. Don't leave questions blank - Nothing on the page = 0 marks.
4. Do the questions you know (or find easy) first, then move on to more challenging ones.
5. Keep an eye on the time.
6. Review your work before the end of the exam.
7. Sleep the night before (all nighters are bad).

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Histogram for total, 401 samples, mean 70.1, median 72, X=1

  0-  0:
  1-  4:
  5-  8:
  9- 12:
 13- 16: X
 17- 20: X
 21- 24: XX
 25- 28: X
 29- 32: XXXX
 33- 36: XXXXXX
 37- 40: XXXXXX
 41- 44: XXXXXXXX
 45- 48: XXXXXXXXXXXX
 49- 52: XXXXXXXXXXXXXXXXXXXX
 53- 56: XXXXXXXXXXXXXXXXXXXXXXXXXX
 57- 60: XXXXXXXXXXXXXXXXXXXXXXXX
 61- 64: XXXXXXXXXXXXXXXXXXXXXXXXXX
 65- 68: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 69- 72: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 73- 76: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 77- 80: XXXXXXXXXXXXXXXXXXXXXXXXXX
 81- 84: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 85- 88: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 89- 92: XXXXXXXXXXXXXXXXXXXXXXXXXXX
 93- 96: XXXXXXXXXXXXXXXXXXXX
 97-100: XXXXX
```

No midterm grades can be released until midterm week is over.

We will try to mark quickly, but we can't promise a specific date.
Important note: asking does not make marking faster.