Introduction to Computers and Programming
Midterm Review

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midterm

• Thursday 3/4 during class
• It is a closed book exam
• You will have the entire class period to complete the exam
Midterm material

• From the book:
  – Chapters 1 – 3, 4.1, 4.2
  – Except nested loops
Q: How to study for the exam?

*Answer:* Practice, practice, practice!

- Study class notes and textbook readings and examples
- Review the programs that we wrote and analyzed in class;
- Write your own code; practice programming at the computer;
- Run programs and print out variable values... watch how variables change as the program runs ...
- These are the primary tools which will help you to study and to prepare for the final exam.
What to focus on? Review list

**syntax**

- /* comments in code */
- // more comments in code
- *Import statements;* why are they used? what do they do? name one example and why/when you would use it
- **Blocks** and `{braces}`: what do the braces do?
- **What is a statement?** (Note the ";" at the end.)
- **Algorithm:** what is it? how is it used?
- What is the difference between (parentheses), `{braces}`? Which ones do you use and when?
What to focus on? Review list

Variables

• variables
• data types: what are they? name at least 5. Which ones are used when?
• declarations
• initialization
• assignment
  \( = \) vs \( == \) What is the difference?
• operators: name at least 11; name at least one example and define unary operators, binary operators, and ternary operators
• reserved words: what are they? name at least 5
What to focus on? Review list

• **integer division:** what is it and how is it used?
• **operator precedence:** what is it? how does it work?

• **more operators:** ++, --, +=, *=, etc. How are these used?

**Errors**

• We have seen examples of run-time errors, logic errors and compilation or syntax errors. Which are which? How do you fix them? How do you find them?
What to focus on? Review list

Control Structures

• **Sequence structure:** what is it? How do you describe this in Java?

• **Selection structure:** what is it? How is it used in Java?

• **Repetition structure** (aka "iterative structure"): what is it? Give examples in Java

• **Boolean values:** How can they be used in iterative structures?

• **Nested statements:** what are these? what does this imply? give examples

• **if vs else if:** which is which?
What to focus on? Review list

• **logical operators**: list at least five. How are they used? What are the results?
• **switch**: what is it and how is it used?
• **while loops**: what are they and how are they used? What are the three required components for all while loops? Give examples.
• **What is an infinite loop?** Give an example.
• Define **counter-controlled repetition** and give an example.
• Define **sentinel-controlled repetition** and give an example.
Summary of control structure in programming languages

• Sequence
  – Statement follow one another

• Selection Structures
  – if
  – if/else
  – if/else if/else
  – switch

• Repetition Structures
  – while
Review Questions

• Which symbol is the statement terminator in Java?

• Re-write \( y = y - 1 \) using a predecrement operator.

• What is the value of \( z \) after this statement has been executed and which data type should you use?

\[
z = \left( 3 + 2 \times 25 \mod 5 \right);
\]

• How many ways can you name to add 1 to a int variable \( x \)?
Review Questions

- What does the following code output?

```java
char ch1, ch2;
ch1 = 'c';
ch2 = (char)( ch1 + 1);
System.out.println(ch2);
```
Review Questions

• Rewrite the following if statement as a switch statement:

```java
if (a == 1)
    System.out.println ("one");
else if (a == 2)
    System.out.println ("two");
else
    System.out.println ("larger than 2");
```
Review Questions

• How many times does the following loop execute?

```java
int counter = 1;
while (counter < 100)
{
    System.out.println("counter is now: " + counter);
    counter *= 2;
}
```
Review Problems

• Write a program that reads characters until it encounters a period. It then prints the character read before the period. Example: if the input is `asd5f.rd`, the program prints `f`.

• Write a program that reads a string consisting of two digits. It then prints the second digit, the number of times indicated by the first digit. Example: if the input is `53`, the program prints `33333`.

• Write a program that gives you the character for a given ASCII code read as input. Example: if the input is `48` the program prints `0`; if the input is `65`, the program prints `A`. 
Review Problems

• Write a program to add up all of the integers which are evenly divisible by 3 from 3 to 30. Print out the sum.

• Write a program that will print an arbitrary number of lines of arbitrary length. First you need to prompt the user for the desired number of lines. The program will then prompt the user for the length of each line. Each line should be printed to the screen using asterisks on a separate line of output.
Review Problems

• Write a program to determine whether a series of purchases comes in over or under a budget. The program starts by reading a budget and a sales tax rate. It then prompts the user for the price (before tax) of each item purchased. After reading all the input, it prints the total cost, the budget and the relationship between the budget and the cost.