WIT COMP1000

Exam 1 Review

Format

- The exam will be 5-6 problems, with some problems having multiple sub-questions
- You are allowed a single 8.5x11" piece of paper with whatever notes you want on it
  - Can be handwritten or computer printed
  - You may use both the front and back
- No calculators, books, laptops, phones, or anything besides your single page of notes may be used

Format

- Kinds of questions to expect:
  - Explain a program or part of a program
  - Translate between "normal" math expressions and their Java equivalents
  - Write your own code
  - Fix incorrect code / find bugs in code
  - Fill in the blank (in a program)
  - Short answer

Content

- Essentially, everything we've covered so far in the semester, including:
  - Basic computer layout and components
  - Compilers and the JVM
  - Variables / data types
  - Input and output
  - Mathematical expressions in Java (order of operations, integer division, etc)
  - `if-else` statements

Review Exercises

- The following slides contain exercises that will help you prepare for the exam
- The exercises give you an idea of the style of questions to expect as well as the complexity

Exercise

- Convert the following mathematical expressions into their Java equivalents
  - $3xyz$
  - $11z/2(x-3y\hat{}2)$
  - $y+z-2\leq 3x\leq 5yz$

Answer

- $3xyz$
  - `3*x*y*z`
- $11z/2(x-3y\hat{}2)$
  - `(11*z) / ( 2*(x - 3*y*y) )`
- $y+z-2 \leq 3x \leq 5yz$
  - `(y+z-2) <= (3*x) && (3*x) <= (5*y*z)`

Exercise

- What is the output of the following program fragment?

```
int some_value = 99/100 + 4 + 5/2;
System.out.println(some_value);
```

Answer

6

Exercise

- What is the output of the following program fragment?

```
double num = 3.75;
if (num <= 0) {
    System.out.println("Less than 0!");
}
else if (num >= 1) {
    System.out.println("Greater than 1!");
}
else if (num == 3.75) {
    System.out.println("Equal to 3.75!");
}
else {
    System.out.println("Umm... something?");
}
```

Answer

```
Greater than 1!
```

Exercise

- What is the output of the following program fragment?

```
double num = 3.75;
if (num <= 0) {
    System.out.println("Less than 0!");
}
if (num >= 1) {
    System.out.println("Greater than 1!");
}
if (num == 3.75) {
    System.out.println("Equal to 3.75!");
}
else {
    System.out.println("Umm... something?");
}
```

Answer

```
Greater than 1!
Equal to 3.75!
```

Exercise

- What are the values of `x1` and `x2` at the end of the program fragment below? Explain your answer.

```
int x1 = 14 / 4 * 3 / 2;
double x2 = 14.0 / 4 * 3 / 2;
```

Answer

```
int x1 = 14 / 4 * 3 / 2;
double x2 = 14.0 / 4 * 3 / 2;
```

- x1 has value 4 due to integer division and order of operations:
  ((14/4) * 3) / 2 == (3 * 3) / 2 == 9/2 == 4
- x2 has value 5.25, there are no integer operations:
  ((14.0 / 4) * 3) / 2 == (3.5 * 3) / 2 == 10.5 / 2 == 5.25

Exercise

- Find and list all errors in the Java program fragment below

```
Scanner input = new Scanner(System.in);

int input_value;
System.in.print("Enter an integer between 1 and 5: ");
input_value = input.nextInt();

if (input_value < 0 && input_value > 5) {
     System.out.print("That is not between 1 and 5!")
}
else if (input_value = 1) {
     System.out.print("OK");
}
else (input_value > 1) {
     System.out.print("GREAT");
}
```

Answer

```
Scanner input = new Scanner(System.in);

int input_value;
System.in.print("Enter an integer between 1 and 5: ");
input_value = input.nextInt();

if (input_value < 0 && input_value > 5) {
    System.out.print("That is not between 1 and 5!")
}
else if (input_value = 1) {
    System.out.print("OK");
}
else (input_value > 1) {
    System.out.print("GREAT");
}
```

System.in should be System.out

&& should be ||

Missing ;

= should be ==

No condition after an else!

Exercise

- Write a complete Java program that reads in three numbers from the user and prints out the maximum (largest) of the three.

Answer

```
import java.util.Scanner;

public class Max {
	public static void main(String[] args) {
		Scanner input = new Scanner(System.in);

		double num1, num2, num3;
		double max;

		System.out.println("Enter three numbers: ");
		num1 = input.nextInt();
		num2 = input.nextInt();
		num3 = input.nextInt();

		if (num1 >= num2 && num1 >= num3) {
			max = num1;
		}
		else if (num2 >= num3) {
			max = num2;
		}
		else {
			max = num3;
		}
		System.out.println("The max was " + max);

	}
}
```

Wrap Up

- Review the previous slides and assignments
- Work through all the examples and exercises
- Check the book if you have it for additional exercises (with answers)
- Use the page of notes as a study guide to help you prepare for the exam
- Come see me with any questions or if you need some help understanding anything we've covered so far this semester