UBC OKANAGAN

COSC 111
Computer Programming I

Midterm Exam 1 Revision

Midterm

Date: Thu, May 27

Time: 8:**30** am PDT

Duration: 75 minutes + 38 min for technical issues/break

Structure: online Canvas Quiz: MCQs, analysis and coding questions

Process: Connect your camera. Go to Canvas → Zoom →COSC 111 Lecture There you will receive a passcode, cheat sheet and instructions.

Cheat-sheet: Provided on Zoom screen.

Invigilation

- Live invigilation through Zoom
- **You MUST try your system on the mock exam before the actual exam**
  - to make sure everything works as expected.

Midterm #1: Format

2 marks on 2 multiple choice questions

8 marks on 7 Analyse questions based on a given Java code. e.g.,

- "What is the output?"
- "Find in given Java code".
- Trace the code, understand each statement.

3 marks for 1 short coding questions

- e.g., "write an 'if' statement that does a specific task".
- Not required to write complete program

12 marks for two long coding-question.

- e.g., "Write a *complete* Java program that prompts the user for an input and then displays some results"
  - When writing a complete program, you must include all Java statements starting from the import statement

What have we learned in Ch1 to Ch5?

Theoretical background:
- Hardware vs. Software,
- software development process,
- Types of programming errors: Logic, Runtime, Syntax

Variables, constants, and data types.
- Naming convention, data casting (explicit and implicit)

Displaying output using `println()`, `print()`, `printf()`

Reading input using `Scanner` methods

Operators:
- assignment, mathematical, logical
- How to write or evaluate an expression

Predefined Java classes and their methods
- Math class (e.g. `sqrt()`,`pow()`,`sin()`,`random()`,etc)
- Character class (e.g. `isDigit()`,`isUpperCase()`,etc)
- String class (e.g.`length()`,`charAt()`,`indexOf()`,etc)

Selection using `if`, `switch`, `?` (conditional expression)

Loops using `while`, `do-while`, `for`

Exam Structure

MCQ

Code analysis

Short coding

Long coding

Sample Analysis Question: **What is the output?**

What is the output of the following code? Justify your answer

```
int x = 5;
if(x > 5 && ++x < 10)
    System.out.print("T");
else
    System.out.print("F");

System.out.println(x);
```

Exam Structure

- MCQ
- **Code analysis**
- Short coding
- Long coding

Sample Analysis Question: **Find and Fix Errors**

Identify and fix the errors in the following code:

```
Scanner in = new Scanner(System.in)
System.out.print(Is today Thursday (Yes/No)?);
String answer = in.nextInt();
if(answer == "Yes");
{
    system.out.println("Correct");
}
else System.out.println["Wrong!"];
```

Exam Structure

- MCQ
- **Code analysis**
- Short coding
- Long coding

Practice Question3

Write a program that prompts the user to enter two characters and displays the major and status represented in the characters.

- The first character indicates the major. Suppose the following characters are used to denote the majors:
  - M: Mathematics
  - C: Computer Science
  - I: Information Technology
- The second character is numeric character 1, 2, 3, 4, which indicates whether a student is a first, a second, a third, or a fourth year.

Assume the user enters valid input

Exam Structure

MCQ

Code analysis

Short coding

Long coding

Practice Question 3 – solution

```
import java.util.Scanner;
public class Test {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter two characters: ");
        String s = input.nextLine();
        char ch1 = s.charAt(0), ch2 = s.charAt(1);
        if(ch1 == 'M')System.out.print("Math, ");
        else if(ch1 == 'C')System.out.print("CompSci, ");
        else if(ch1 == 'I')System.out.print("InfoTech, ");
        else System.out.print("Invalid Major ");

        if(ch2 == '1')System.out.print("First Year");
        else if(ch2 == '2')System.out.print("Second Year");
        else if(ch2 == '3')System.out.print("Third Year");
        else if(ch2 == '2')System.out.print("Fourth Year");
        else System.out.print("Invalid Year");

        System.out.println(" Student");
    }
}
```

Practice Question 4

Rewrite your code from Question 3 using `switch` statement instead of `if` statement.

Add code to Practice Question 3 in order to check the validity of the user's input using if statement. That is, make sure that:

- the length is 2 characters.
- the first character is a letter.
- the second character is a digit.

Exam Structure

MCQ

Code analysis

Short coding

Long coding

Practice Question 5

Write a program that reads **a monetary value as a string**, e.g., "11.56". Your program should extract the dollar amount before the decimal point and the cents after the decimal amount **using the indexOf and substring methods**.

Restriction: you cannot convert to double and use % or /

Notes:

- Assume user enters valid monetary amount
- Your code should be able to handle the three different amounts below:
  - Dollars with cents. For example:
    - **Input**: 15.75 **Output**: Dollars: 15 Cents: 75
  - Dollars with NO cents
    - **Input**: 15 **Output**: Dollars: 15 Cents: 0
  - Cents with No Dollars
    - **Input**: .75 or 0.75 **Output**: Dollars: 0 Cents: 75

Exam Structure

MCQ

Code analysis

Short coding

Long coding

Practice Question 5 – solution

```
import java.util.Scanner;
public class Q4 {
 public static void main(String[] args) {
  Scanner in = new Scanner(System.in);
  System.out.print("Enter the amount: ");
  String x = in.nextLine();
  int dollars = 0, cents = 0; // assume amount = 0.0
  int idx = x.indexOf('.');    // get location of decimal
 point
  switch(idx) {
    case -1:  // no decimal, e.g.: 15 -> dollars=15, cents=0
      dollars = Integer.parseInt(x); break;
    case 0:     // no dollars, e.g.: .75: dollars=0, cents=75
      cents = Integer.parseInt(x.substring(1)); break;
    default:  // dollars and cents, e.g.: 15.75
      dollars = Integer.parseInt(x.substring(0, idx));
      cents = Integer.parseInt(x.substring(idx + 1));
    }
  System.out.printf("Dollars: %d\tCents: %d\n", dollars,
 cents);
```

Practice Question 6

Can you add code to Practice Question 5 in order to check the validity of the user's input using if statement.

- Loops are part of this midterm exam. You can use them if you wish, but you don't have to solve the question (the mark won't be reduced).