Practice Exam 1 - COP 3502 Spring 2022

Module 0: Introduction to Computer Science

Q1. What does the Java Compiler produce as output?

Q2. What is the input provided to the Java Compiler?

Q3. How can you comment multiple lines in Java?

Module 1, 4: Variables and Arithmetic

Q1. What would be printed by the following code?

```
public static void main(String args[])
  {
     int a = 12, b = 2;
     int c = a / ++b;
     int d = b / a;
     System.out.println(c + " " + d);
  }
```

Q2. What would be printed by the following code?

```
public static void main(String[] args)
 {
     int a = 5, b = 2;
     a *= 5;
     a += b++;
     System.out.print(a++);
     System.out.print(++b);
     System.out.print(a++);
 }
```

Q3. What would be printed by the following code?

```
public static void main(String[] args) {
    int a = 5, b = 2;
    b = a > b ? a++ : ++a;
    System.out.print(b);
}
```

Module 2: Program Control

Q1. Predict program output:

```
public static void main(String[] args){
      int i = 5;
      switch(3%i)
      {
          case 0:
            System.out.print("1");
          case 1:
            System.out.print("2");
          case 2:
            System.out.print("3");
          case 3:
            System.out.print("4");
          case 4:
            System.out.print("5");
      }
}
```

Q2. What is the output of the following program?

```
int nyans = 20;
if (nyans < 20 || 5 < 12 && nyans < 30)
    System.out.println("True");
else
   System.out.println("False");
```

Q3. What is the output of the following program

```
public static void main(String[] args) {
    int a = 3;
    int b = 4;
    int c = 6;

    if (b < 2 || b > 3) {
        a -= 2;
    }
    if (c > 4) {
        a -= 1;
    }
    System.out.println(a);
}
```

Q4. What is the output of the following program?

```
public static void main(String[] args) {
    for (int acc = 2; acc < 20; acc += 3) {
        System.out.print(acc + " ");
        if (acc % 5 == 0 || acc % 4 == 0) {
            break;
        }
        if (acc % 3 == 0 || acc % 2 == 0) {
            acc++;
            continue;
        }
    }
}
```

Q5. Find Errors in the following program.

```
int sum = 80;
int i = 0;
for (int i = 1; i <= sum; i++)
{
     if (i % 2 = 0) {
          System.out.println(2 + " is a divisor of " + i);
     }
     else if (i % 3 = 0){
          System.out.println(3 + " is a divisor of " + i)
     }
     else if (i % 5 = 0)  {
          System.out.println(5 + "is a divisor of " + i)
     }
}
```

Q6. Find the errors in the following code snippet.

```
public static mysterious(x) {
    double x = 2; j;
    double y = 0;
    for(;i <= num;) {
        y += x;
    }
}
```

Module 3: Methods and Number System

Q1. Predict the output of the following code.

```
public static void main(String[] args)
{
   int num1 = 2;
   int num2 = 8;
   int num3 = 6;
   num1 = multi(num2, num3);
   System.out.println(num1);
}

public static int multi(int var1, int var2)
{
   int answer = var2 + var2 * var1;
   return answer;
}
```

Q2. Predict the output of the following code.

```
public static void main(String[] args)
{
   int num1 = 4;
   int num2 = 9;
   int num3 = 18;
   multi(num2, num3);
   System.out.println(num3);
}

public static int multi(int num2, int num4)
{
   int num3 = num2 + num4 / num2;
   return num3;
}
```

Q3. Convert the binary number 0b01110011 to decimal number.

Q4. Convert the octal number 77 to a binary number.

Q5. Covert the decimal number 88 to binary, octal and hexadecimal number.

Module 4A: Data Types

Q1. Predict the output of the following program.

```
public static void main(String[] args) {
      double num1 = 17/2;
      double num2 = (double) (17/2);
      double num3 = (double) 17 / 2;
      double num4 = (double) 17 / (double) 2;
      System.out.println(num1);
      System.out.println(num2);
      System.out.println(num3);
      System.out.println(num4);
 }
```

Q2. What is the output of the following program?

```
public class MyClass {
 enum Level {
   FIRST,
   SECOND,
   THIRD
 }

 public static void main(String[] args) {
   Level myVar = Level.SECOND;
   System.out.println(myVar);
 }
}
```

Q3. What is the output of the following program?

```
public static void main(String[] args) {
    char c1 = 'A';
    char c2 = 'c';
    char c3 = 'e';

    if (c1 == Character.toUpperCase('a')) {
        System.out.print("Is it 1?");
    }
    if (c2 > c3) {
        System.out.println(" No.");
    }
    else {
        System.out.println(" Or 11?");
    }
}
```

Q4. What is the output of the following program?

```
public static void main(String[] args) {
      String name = "Al E. Gator";
      String sName = "";


      for (int i = 0; i < name.length(); i++) {
          if (name.charAt(i) == ' ') {
              continue;
          }
          if (name.charAt(i) == '.') {
              break;
          }
          sName = sName + name.charAt(i);
      }
      System.out.println(sName);
  }
```

Q5. Given the following code, predict the value of variable var1 and var2.

```
public static void main(String[] args) {
        int num1 = 3;
        int num2 = 8;
        boolean var1 = !(++num1 >= 3);
        int var2 = var1 ? ++num2 - num1-- : num1++ + --num2;
}
```

Coding

Q1. Implement your own version of the built-in substring method of the Java library. The function header for the substring method is as follows:

```
public String substring(String s, int begIndex, int endIndex)
{


}
```

This method **returns** a **new string** that is a substring of the string, s. The substring begins with the character at the specified index and **extends** up **to endIndex – 1**

Note: Only write the method and any helper methods, no need to create a class. You are not allowed to use *substring( )* method from the Java library, but feel free to use functions such as *charAt( )* and *length( )*.

Q2. Write a method *`identicalDigits(int num)`* that takes in an integer num in the range of 10 – 90. This method doesn't return anything. It prints out a countup starting from the integer num, and stopping when both output digits are identical.

Example 1

num = 18

Output: 18 19 20 21 22

Example 2

num = 66

Output: 66

Note: For coding simplicity, follow each output number by a space, even the last one. You will assume num value is always in the range of 10 – 90. There is no invalid num value passed in.

Q3. Write a method *printTriangle(int base)* that takes in a positive integer base and prints a triangle made of asterisks with a base of the given size.

Example 1: base = 5 Output: * ** *** **** *****	Example 2: base = 7 Output: * ** *** **** ***** ****** *******

BONUS: Write a method *printInverseTriangle(int base)* that prints the same triangle pattern from above, but with the base at the top.

Example 1: base = 5 Output: ***** **** *** ** *	Example 2: base = 7 Output: ******* ****** ***** **** *** ** *

Q4. A prime number is a whole number greater than 1, which is only divisible by 1 and itself. Write a method to detect whether a number is prime or not. The function header is as follows:

```
public static boolean isPrime(int n) {

}
```

Q5. A user will enter an initial number, followed by that number of integers. Output those integer's sum. Repeat until the initial number is 0 or negative.

Ex 1: if the user enters 3 9 6 1 0, the output is 16.

- Explanation: 3 is the initial number that represents you will add up the following 3 integers 9 + 6 + 1 = 16. Stop when you encounter 0 as the initial value.

Ex 2: if the user enters 3 9 6 1 2 5 3 0, the output is

16

8

- Explanation: 3 is the initial number that represents you will add up the following 3 integers 9 + 6 + 1 = 16. Then 2 is the initial number that represents you will add up the following 2 integers 5 + 3 = 8. Stop when you encounter 0 as the initial value.

Q6. Write a method indexOfString(String str1, String str2) that returns the index of the first occurrence
of the specified str2 in str1. If it does not occur as a substring, -1 is returned.

Example: str1 = "Good Morning", str2 = "od", return 2

Example: str1 = "Good Morning", str2 = "op", return -1