ICS3UO Exercise – Selection

1) **For each legal expression, state its value (true or false). For each illegal expression, state the reason that it is illegal (i.e. why there is an error)**
   a. **(2 + (-5)) != 3**
      True
   b. **32 > 33**
      False
   c. **(7 / 3) = 2**
      ```
      Exception in thread "main" java.lang.Error: Unresolved
      compilation problem:
      Syntax error on token "=", <= expected

      at Question1.main(Question1.java:16)
      ```
   d. **(25 % 4) >= 1**
      True
   e. **8.23 <= 8.2300**
      True
   f. **10 > 9 + 3**
      False
   g. **- 6 % 3 < 0**
      False
   h. **(int) 1.1 * 0.9 <= 0**
      ```
      Exception in thread "main" java.lang.Error: Unresolved compilation
      problems:
      Syntax error on token "=", ( expected after this token
      Sysem cannot be resolved

      at Question1.main(Question1.java:39)
      ```
   i. **(1>2) == false**
      True
   j. **5>3 == true**
      True
   k. **((1+2) == 3) != false**
      True
   l. **((2 + 3 < 6) == true)**
      True
   m. **((2 * 3 < 5) != true)**
      True
   n. **(6 < 10) = = (5>3)**
      True
   o. **17 / 3 < 17 / 3.0**
      True

2) **State, with reasons, what this program will print.**

   class BooleanVariables

```
{
        public static void main (String[] args)
        {
                boolean perhaps, maybe;
                perhaps = 4 < 5;
                maybe = -17 % 4 == 1;
                System.out.println("perhaps: " + perhaps);
                System.out.println("maybe:   " + maybe);
        }
}
```

This program will print "true" as both of these two statements are true as "4 < 5" is true because 5 is greater than 4 as well as "-17 % 4 == 1" is true as -17 mod 4 is 1 and 1 equals to 1 therefore both of these Boolean statements are true.

3) **State the value of each expression.**

a) **"one".equals("one ");**
False
//there is a space in the second string of the line which does not math with the first one.

b) **"two".equals("2");**
False
//the first string is written in the numerical form whereas second string is written in the alphabet form.

c) **"Three".equals("Three");**
True

d) **"four".equals("for");**
False
//"four" does not match to "for"

For the following questions, ensure that the text in your output matches the text in the sample output. Comment ALL CODE!!!!

4) **Read in a student record which consists of a 6 digit student number and a mark. Output the student record with the comments "satisfactory" if the mark is over 50 %, otherwise output "unsatisfactory - parental interview required."**

Sample Output
Enter Student Number: **123456** **Enter mark:** **56** **Satisfactory**

```
Scanner input = new Scanner(System.in);
            int number;
            double mark;
            System.out.println("Enter student number:");
```

```
                number = input.nextInt();
                System.out.println("Enter mark");
                mark = input.nextDouble();
                if (mark>=50){
                        System.out.println("Satisfactory");
                        }
                else {
                        System.out.println("unsatisfactory - parental interview
required.");
```

5) A clothing store will give a 15% discount to anyone who spends over $100. Write a program that prompts for the total purchases made. The program will calculate the discount if it applies and output the total purchases.

a. Modify the program to calculate the tax and final total of the purchases. Calculate the discount BEFORE the tax.

Sample Output
Enter the total purchases made: **110** **Subtotal with discount: $ 93.5** **Total after taxes: $105.66**

```
Scanner input = new Scanner (System.in);
                double purchases, subtotal, total;
                final double TAX = 0.13;
                final double DISCOUNT = 0.15;
                final double PLACE = 100;
                System.out.println("Enter the total purchases made:");
                purchases = input.nextDouble();
                if (purchases>100) {
                        subtotal = (purchases-(purchases*DISCOUNT));
                        total = (subtotal+(subtotal*TAX));
                        System.out.println ("Subtotal with discount: $" +
Math.round(subtotal*PLACE)/100.0);
                        System.out.println ("Total after taxes: $" +
Math.round(total*PLACE)/100.0);
                        }
                else {
                        total = (purchases+(purchases*TAX));
                        System.out.println("Total purchases: $" +
Math.round(purchases*PLACE)/100.0);
                        System.out.println("Total after taxes: $" +
Math.round(total*PLACE)/100.0)
```

6) Read and print an integer. If it is divisible by 5, output: "number has a factor of 5.", else output "number has no factors of 5."

Sample Output
Enter a number: **15** **15 is divisible by 5**

```
Scanner input = new Scanner(System.in);
		int number;
		System.out.println("Enter a number");
		number = input.nextInt();
		if (number%5==0){
			System.out.println(number + " is divisible by 5.");
		}
		else {
			System.out.println(number + " is not divisible by 5.");
```

7) Read in a real value, x and print out the value of y = (5x+l)/(x-6). If the input value is 6.0, output should read "y is undefined".

Sample Output
Enter a value for x for the formula y = (5x+l)/(x-6): 7 The value for y is 36

```
	Scanner input = new Scanner(System.in);
		double x,y;
		System.out.println("Enter a value for x for the formula y =
(5x+l)/(x-6):");
		x = input.nextDouble();
		if (x==6) {
			System.out.println("y is underfined.");
		}
		else {
			y = ((5*x+1)/(x-6));
			System.out.println("The value for y is " + y);
		}
```

8) Tania is working for CanCan Gas Station where she gets $14.50 /h and $17.00/h (for overtime hours) for overtime if she works for more than 40 h/week. Write a program that prompts for the number of hours worked and calculates her gross weekly pay for various hours.

Sample Output
Enter the total number of hours worked 50 The gross weekly pay is $490.00

```
	final double PAY,OVERTIME;
		double hours,pay,overtime,grosspay;
		PAY=14.50;
		OVERTIME = 17;
		System.out.println("Enter the total number of hours worked");
		hours = input.nextDouble();
		if (hours>40) {
			overtime = ((hours-40)*OVERTIME);
			pay = (40*PAY);
			grosspay = (pay+overtime);
			System.out.println("The gross weekly pay is $" +
grosspay);
		}
		else {
```

```
                    pay = (hours*PAY);
                    grosspay=pay;
                    System.out.println("The gross weekly pay is $" +
grosspay);
```

9) Ian works at Baskin-Robins. He gets a bonus if he sells more than 150 cones per week. For his bonus, he receives $10 plus 10c each in excess of 150 cones. If he sells over 250 cones, he earns 25c per cone over 250. If he sells over 350 cones, he receives 35c per cone over 350. Write a program that prompts for the number of cones sold per week and calculate and output his bonus.

Sample Output
Enter the number of cones sold: **???** **He will earn $??? If he sells ??? cones**

```
Scanner input = new Scanner(System.in);
             int cones;
             double bonus;
             System.out.println("Enter the number of cones sold:");
             cones = input.nextInt();
              if (cones>350) {
                    bonus = (cones*0.35);
                    System.out.println("He will earn $" + bonus + " if he
sells " + cones + " cones.");
               }
               else if (cones>250) {
                           bonus = (cones*0.25);
                           System.out.println("He will earn $" + bonus + "if he
sells " + cones + " cones.");
             }
              else if (cones>150) {
                           bonus = (cones*0.10);
                           System.out.println("He will earn $" + bonus + "if he
sells " + cones + " cones.");
             }
```

10) Read in the lengths of three sides of a triangle ABC with c as the longest side. Output the appropriate message if the triangle is right angled or not (calculate if c*c = a*a + b*b. Output also its area. For right angled triangle use area = 0.5*base*height. [For non-right triangle, use Heron's formula: s = 0.5(a+b+c) and area = sqrt(s(s- a)(s- b)(s- c))]

```
Scanner input = new Scanner(System.in);
             double A,B,C,area,herons;
             System.out.println("Enter side A:");
             A = input.nextDouble();
             System.out.println("Enter side B:");
             B = input.nextDouble();
             System.out.println("Enter side C:");
             C = input.nextDouble();
             if (Math.pow(C,2) == Math.pow(A,2) + Math.pow(B,2)){
```

```
                        System.out.println("This is a right-angled
        triangle.");
                        area = (0.5*A*B);
                        System.out.println("The area of the triangle is " +
        area);
                }
                else {
                        System.out.println("This is a non-right triangle.");
                        herons = (0.5*(A+B+C));
                        area = Math.sqrt(herons*(herons-A)*(herons-
        B)*(herons-C));
                        System.out.println("The area of the triangle is " +
        area);        }
```

11) Write a program that prompts the user for a password. The program will compare this password to the constant stored password: "PASSWORD". If they match, the program will output the string – "password successful, access granted". Otherwise it will output "password denied"

```
Scanner input = new Scanner (System.in);
              String password;
              System.out.println ("Enter password:");
              password = input.next();
              if (password.equals("PASSWORD")){
                     System.out.println("password successful, access
granted".");
              }
              else {
                     System.out.println("password denied");
              }
```