ICS 4U0 Exercise – Repetition

1) **Write a cash register program that continuously prompts for prices until a negative price is entered. Calculate and print the total. Print the number of items that were purchased. Do not include the negative number.**

```
Scanner input = new Scanner(System.in);
float price=0;
float temp=0;
while (price>=0){
        temp = temp + price;
        System.out.println("Enter price:");
        price = input.nextFloat();
}
System.out.println(temp);
```

2) **A house is for sale at $427,000, but is not selling. The seller decides to reduce the price by 5% each week until the house sells. Assuming the house finally sells for $376,000 (ouch!), determine how many weeks it takes to sell. Use a while() loop to do this.**

```
double price = 427000;
double temp = 0;
int weeks = 0;
//Calculating amount of weeks it takes the house to sell
while (price>376000) {
        temp = price-(price*0.005);
        price=temp;
        weeks++;
}
System.out.println("it takes " + weeks + " weeks to sell the house");
```

3) **At present there are 10 animals in a lab and enough food for 1000 animals. Every hour the population of animals doubles, and enough food is added for 4000 more animals than the previous hour. Use a while loop to determine when the population will outgrow the food supply. Display a line of information each time the loop is executed.**

```
int animals = 10;
int tempAnimals = 0;
int food = 1000;
int tempFood = 0;
int hour =0;
do {
```

```
            tempAnimals = animals*2;
            animals = tempAnimals;
            tempFood = food+4000;
            food = tempFood;
            hour++;
            System.out.println("There are " + animals + " animals and enough
food for " + food + " animals in " + hour + " hour");

        }
        while (animals<food);
```

4) **Using a counted loop, output the numbers from 1 to 100. In addition, keep a running total of the numbers from 1 to 100 (the arithmetic series) and output the total (i.e. 1+2+3+...+100).**

```
int sum = 0;
for (int x=1; x<=100; x++) {
        sum = sum + x;
}
System.out.println(sum);
```

5) **Write a program that will prompt the user for the first term (first), last term (last), and common difference (diff) of an arithmetic sequence. Output the sum of the sequence.**

```
Scanner input = new Scanner (System.in);
System.out.println("Enter first term:");
float first = input.nextFloat();
System.out.println("Enter last term:");
float last = input.nextInt();
System.out.println("Enter common difference:");
float diff = input.nextInt();
float temp=0;
float sum = first;
if(first<last){
        for (float x=first; x<last; x=x+diff) {
                temp = sum+(x+diff);
                sum = temp;
        }
}
System.out.println(sum);
```

6) **Write statements that will print a table of values of the function f(x) = 2x + 5 for the indicated values of x.**

For example if x = 6,5,4,….0

a) x = 0, 3, 6, …., 30

```
for (int x=0; x<=30; x=x+3) {
int function = (2*x)+5;
System.out.println("x = " + x + ", 2x+5 = " + function);
}
```

b) x = -15, -10, -5, ….. 15

```
for (int x =-15; x<=15; x=x+5) {
int function = (2*x)+5;
System.out.println("x = " + x + ", 2x+5 = " + function);
}
```

c) x = 1, 2, 4, 8, …., 1024

```
for (int x = 1; x<=1024; x=x*2) {
int function = (2*x)+5;
System.out.println("x = " + x + ", 2x+5 = " + function);
}
```

7) **Suppose that a large piece of paper with an area of 1.0 m_2 and a thickness of 0.090 mm is cut in half and the two pieces are stacked, one on top of the other. Suppose further that the process of cutting in half and stacking is repeated over and over again.**
Write a program to find both the thickness of the pile and the area of each piece after the procedure has been carried out forty times

```
double area = 1;
double thickness = 0.09;
double stack = 1;
for (int x=0; x<40; x++) {
        area = area/2;
        stack = stack*2;
        thickness = thickness*stack;
}
System.out.println("The area of each piece is " + area + "m2");
System.out.println("The thickness of the pile is " + thickness + "mm");
```

8) **A geometric series can be modeled with the formula $s_n = [a(r^n - 1)]/[r-1]$, where a is the first number of the sequence, n is the number of terms in the sequence, and r is the multiplier between the terms (also r can not be 1). Create variables for each of r, a, n and prompt the user for their values. Calculate the sum using the formula.**

```java
Scanner input = new Scanner (System.in);
System.out.println("Enter the first number of the sequence:");
int a = input.nextInt();
System.out.println("Enter the number of terms in the sequence:");
int n= input.nextInt();
System.out.println("Enter the multiplier between the terms");
int r= input.nextInt();
if (r>1) {
        double  Sn = (a*((Math.pow(r,n))-1))/(r-1);
        System.out.println("The sum of the geometric series is " + Sn);
}
else {
        System.out.println("Error, multiplier value cannot be 1");
}
```

9) Nested loop
Write a program that prints out the times table up to 6 times 6:

```
1 times table - 1        2        3        4        5        6
2 times table - 2        4        6        8        10       12
3 times table - 3        6        9        12       15       18
4 times table - 4        8        12       16       20       24
5 times table - 5        10       15       20       25       30
6 times table - 6        12       18       24       30       36
```

```java
int calculation;
for (int x=1; x<=6; x++) {
        System.out.print(x + " times table\t");
        for (int y=1; y<=6; y++) {
                calculation = x*y;
                System.out.print(calculation + "\t");
        }
        System.out.println();
}
```

10) Modify the previous program so it will prompt the user for an integer called *x*. This program will print out the times table up to *x* times *x*.

```java
System.out.println("Enter an integer");
int x = input.nextInt();
for (int a=1; a<=x; a++) {
        System.out.print(a + " times table\t");
        for (int b=1; b<=x; b++) {
                int calculation = a*b;
```

```java
            System.out.print(calculation + "\t");
        }
        System.out.println();
    }
```