#### King Saud University College of Computer & Information Science CSC111 – Tutorial06 Loops All Sections

## **Objectives:**

Student should learn how to:

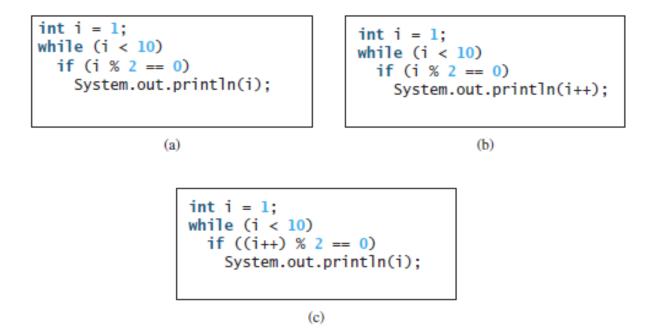
- 1- Follow the loop design strategy to develop loops.
- 2- Control a loop with a sentinel value.
- 3- Write loops using for statements

## **Exercise 1**

 Analyze the following code. Is count < 100 always true, always false, or sometimes true or sometimes false at Point A, Point B, and Point C?

```
int count = 0;
while (count < 100) {
    // Point A
    System.out.println("Welcome to Java!");
    count++;
    // Point B
}
// Point C
```

2) How many times are the following loop bodies repeated? What is the output of each loop?



3) Suppose the input is 2 3 5 4 0. What is the output of the following code? Explain what it does.

```
import java.util.Scanner;
public class Test {
  public static void main(String[] args) {
    Scanner input = new Scanner(System.in);
    int number, max;
    number = input.nextInt();
    max = number;
   while (number != 0) {
      number = input.nextInt();
      if (number > max)
        max = number;
    }
    System.out.println("max is " + max);
   System.out.println("number " + number);
 }
}
```

4) Convert the following while loop into a do-while loop.

```
Scanner input = new Scanner(System.in);
int sum = 0;
System.out.println("Enter an integer " +
    "(the input ends if it is 0)");
int number = input.nextInt();
while (number != 0) {
    sum += number;
    System.out.println("Enter an integer " +
        "(the input ends if it is 0)");
    number = input.nextInt();
}
```

Suppose the input is 2 3 4 5 0. What is the output of the following code?

```
import java.util.Scanner;
public class Test {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int number, sum = 0, count;
        for (count = 0; count < 5; count++) {
            number = input.nextInt();
            sum += number;
        }
        System.out.println("sum is " + sum);
        System.out.println("count is " + count);
     }
}
```

# Solution

#### 1)

Count < 100 is: Always true at Point A Sometimes true sometimes false at Point B (when is it false?) Always false at Point C

#### 2)

a will repeat forever (infinite number of times) b will repeat forever (infinite number of times) c will repeat 9 times

#### 3)

max is 5 number 0

This program finds maximum number among input numbers.

sum is 14 count is 5

## Exercise 2

Write a program using for loop that prompts the user to enter two integers x and y. Then program prints numbers between x and y (excluding x and y) that are either divisible by x or divide y in reverse (from largest to smallest).

Here are is a sample run:

```
Enter two integers: 10 50 4 40 30 25 20
```

```
Enter two integers: 5 1 4
```

#### Solution

```
import java.util.Scanner;
public class Reverse {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter two integers: ");
        int x = input.nextInt();
        int y = input.nextInt();
        for (int i = y - 1; i > x; i--){
            if (i % x == 0 || y % i == 0)
               System.out.print(i + " ");
        }
    }
}
```

## **Exercise 3**

Solve exercise 2 using while loop and without using logical operators || and &&. (Note: there is no relation between while and ||, &&. This is just to train you on different equivalent ways of writing loops and conditional statements)

```
import java.util.Scanner;
public class Reverse2 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter two integers: ");
        int x = input.nextInt();
        int y = input.nextInt();
        int i = y - 1;
        while (i > x)
            if (i % x == 0)
                System.out.print(i + " ");
            else if (y % i == 0)
                System.out.print(i + " ");
            i--:
     }
   }
ł
```

