COMP 248 - Tutorial #4 - SOLUTION

Loops

Question 1: What is the output of the following?

a)
```
int count = 0;
while ( count <= 6 )
{
   System.out.print( count + " " );
    count = count + 2;
}
System.out.println(  );
```

Output:
0 2 4 6

b)
```
int count = 7;
while ( count >= 4 )
{
  System.out.print( count + " " );
   count = count - 1;
}
System.out.println(  );
```

Output:
7 6 5 4

c)
```
int i; int j;
boolean again = true;

for (i = 1; i < 5; i++)
{
  again = !again;
  for (j = 1; j < 5; j+=2)
  {
    System.out.print( i + " " + j);
    if (again)
     System.out.print("-") ;
    else
     System.out.print("*");
    }
    System.out.println();
 }
```

Output:
```
1 1*1 3*
2 1-2 3-
3 1*3 3*
4 1-4 3-
```

d)

```
int a = 30;
int b = 3;

while (a >= b)
{
  System.out.println("while " + a + " " + b);
  if ((a%b) == 0)
  {
      a = a/b;
      b++;
  }
  else
  {
      a = a-1;
      b = b-1;
  }
}
System.out.println("the end " + a + " " + b);
```

Output:

```
while 30 3
while 10 4
while 9 3
the end 3 4
```

e)

```
int i, j;
int n = 5;
for (i = 1; i <= 5; i++)
{
    for (j = 1; j <= n-i; j++)
       System.out.print ("-");

    for (j = 1; j <= i; j++)
       System.out.print ("-a");

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

Output:

```
-----a
----a-a
---a-a-a
--a-a-a-a
-a-a-a-a-a
```

f)

```
int i=5, count=0;
while (i!=1)
{
     System.out.println(count + " " + i);
     count++;
     if ((i%2) == 0)
        i/=2;
     else
        i= 3*i+1;
}
```

Output:

```
0 5
1 16
2 8
3 4
4 2
```

g)

```
int sum = 0;
for (int k = 0; k < 7; k++)
{
    for (int j = 7; j > 2*k; j-=2)
    {
       System.out.print(" " + (j-k) + "+");
       sum += (j-k);
    }
    System.out.println();
}
System.out.println(" = " + sum);
```

Output:

```
7+ 5+ 3+ 1+
6+ 4+ 2+
5+ 3+
4+


= 40
```

h)

```
boolean sign = true;
int sum = 0;
int n = 0;

while (sum < 30)
{
  if (sign)
     sum = sum + n;
  else
     sum = sum - n;
  System.out.print(sum);
  sign = !sign;
  n = n + 10;
}
```

Output:

```
0-1010-2020-3030
```

Question 2: Assume the following fragment of code:

```
int age, k = 0;
int low;
int up;
Scanner keyboard = new Scanner(System.in);

System.out.print("Enter lower bound and upper bound:");
low = keyboard.nextInt();
up = keyboard.nextInt();

for (age = low ; age <= up ; age += 5)
{
   if (age == 25)
      System.out.print("one");
   else if (age == 35 || age == 20)
   {
      k++;
      System.out.print("two");
   }
   else
      System.out.print(age);
   age = age + 5;
}
```

Re-write the instructions outlined in grey by:
replacing the `for` loop by a `do/while` and
replacing the `if` by a `switch`.
Your new code should behave exactly as the above code in every possible situation.

Answer:

```
age=low;
if  (age <= up)  // to prevent from entering the loop
                 // first time if the condition is false
                 //  from the beginning
{
   do
   {
      switch(age)
      {
        case 25:
            System.out.print("one");
            break;
         case 35: case 20:
            k++;
```

```
                System.out.print("two");
                break;
             default:
                System.out.print(age);
                break;
          }  // end of switch
          age = age + 10;
       }
       while (age <= up);
   }
```

Question 3: Write a program to:

- ask the users for a line of text
- then re-display this line, but with all lower case 'a' 'e' and 'i' in the line replaced by a star ('*').

Your program cannot use the method `replace` from the `String` class.

Here is an example of how your program should behave:

```
Please enter a line of text:
hello Angella Eralli
h*llo Ang*ll* Er*ll*
```

One possible Answer:

```
public static void main(String[] args)
{
    String s;
    Scanner keyboard = new Scanner(System.in);

    System.out.println("Please enter a line to display");
    s = keyboard.nextLine();
    for (int i =0; i < s.length() ; i++
    {
       if ((s.charAt(i) == 'a') || (s.charAt(i) == 'e') ||
               (s.charAt(i) == 'i'))
         s = s.substring(0, i) + "*" + s.substring(i+1);
    }
    System.out.println(s);
 }
```

Question 4: Write Java code that uses a do…while loop that prints even numbers from 2 through 10.

Answer:

```
int number = 2;
do
{
      System.out.println(number);
      number +=2;
}
while (number <=10);
```

Question 5: Write Java code that uses a while loop to print even numbers from 2 through 10.

Answer:

```
int number = 2;
while (number <=10)
{
    System.out.println(number);
    number +=2;
}
```

Question 6: Write Java code that uses a for statement to sum the numbers from 1 through 50. Display the total sum to the console.

Answer:

```
int sum = 0;
for (int i = 1; i<=50; i++)
{
   sum += i;
}
System.out.println(sum);
```