

Exercise - counted loops

1. Trace the following

```
for (int k = -1; k<3; k++)
```

```
    System.out.println( k + 2 );
```

OUTPUT	MEMORY (i.e. k)
k=-1,0,1,2,3,4	1 2 3 4 5 6

a.

```
int step =6;
```

```
int counter=10;
```

```
for (int k = step; k <= counter; k++)
```

```
    System.out.println(k*k);
```

OUTPUT	MEMORY (i.e. k)
Step=6	36
Counter=10	42
K=6,7,8,9,10	64 81 100

b.

```
for (int x = -3; x <=3; x++)
```

```
    System.out.println("*");
```

OUTPUT	MEMORY
X=-3, -2, -1,0,1,2,3	* * * * * * *

c.

```
for (int countdown = 5; countdown > 0; countdown--)
    System.out.println(countdown + "seconds");
```

OUTPUT	MEMORY
Countdown=5,4,3,2,1	5 seconds 4 seconds 3 seconds 2 seconds 1 seconds

d.

```
for (int c = 2; c < 100; c*=c )
    System.out.println(c);
```

OUTPUT	MEMORY
c=2,4,16	2 4 16

3. Using a counted loop, write a program that prints

a) 1 to 10

```
for (int a=1; a<=10; a++)
    System.out.println(a);
```

b) 4 to 1000

```
for (int b=4; b<=1000; b++)
    System.out.println(b);
```

c) 100 to 4

```
for (int c=100; c>=4; c--)
    System.out.println(c);
```

d) 10 to -10

```
for (int d=10; d>=-10; d--)
    System.out.println(d);
```

e) the odd numbers from 5 to 103

```
for (int e=5; e<=103; e+=2)
    System.out.println(e);
```

4. Using a counted loop, write a program that prints a) 1 up to 5

```
for (int counter=1; counter<=5; counter++)
    System.out.println(counter);
```

b) the square of each number.

```
for (int counter=1; counter<=5; counter++)
    System.out.println(counter*counter);
```

5. Write a program to Count backwards by 2's from 40 to 20.

```
for (int counter=40; counter>=20; counter-=2)
    System.out.println(counter);
```

6. Write a program to Count backwards from 10 to 0 on one line.
After the zero, output "Blastoff!!".

```
for (int counter=10; counter>=0; counter--)
    System.out.print(" " + counter);
System.out.println(" blastoff");
```

7. 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 $x = 6, 5, 4, \dots, 0$

SAMPLE OUTPUT
x= 6, $2x + 5 = 17$
x= 5, $2x + 5 = 15$
.....

a) $x = 0, 3, 6, \dots, 30$

```
for (int x=0, y; x<=30; x+=3)
    System.out.println("x = " + x + " y = 2x + 7 = " + (y=2*x+5));
```

b) -15, -10, -5, 15

```
for (int x=-15, y; x<=30; x+=5)
    System.out.println("x = " + x + " y = 2x + 7 = " + (y=2*x+5));
```

c) $x = 1, 2, 4, 8, \dots, 1024$

```
for (int x=1, y; x<=1024; x*=2)
    System.out.println("x = " + x + " y = 2x + 7 = " + (y=2*x+5));
```

8. Write a program that will print all leap years between 2000 and 2100. (Assume any year divisible by 4 is a leap year) Use a for loop to solve this problem

```
for (int year=2000; year<=2100; year+=4)
    System.out.println(year);
```

9. Write a program to output a neat table of three columns. The first column contains all the integers from 1 to 20. The squares of these integers appear in the second column, and their square roots in the third.

```

        for (int integer=1,square2=1,square3=1; integer<=20;
integer++,square2=integer*integer,square3=((integer*integer)*(integer*integer)
))

```

```

        System.out.println(integer + "\t\t" + square2 + "\t\t" + square3);

```

10. Use a for loop in a program that prints a Celsius to Fahrenheit conversion table from 0 to 100° Celsius in 10° steps

```

for (int celcius=0,fahrenheit=32; celcius<=100;
celcius+=10,fahrenheit=(celcius*(9/5)+32))
    System.out.println(celcius + "°C ----->" + fahrenheit + "°F");

```

11. Use a for() loop to prompt for and input 10 integers, then calculate and output the average.

```

Scanner input = new Scanner(System.in);
double integer,total,average;
total=0;
for (Double track=0.0; track<=9; track++) {
    System.out.println("Enter integer:");
    integer = input.nextDouble();
    total=total+integer;
}
average = total/10;
System.out.println("The average is " + average);

```

12. Create a constant string with the value "abcdefghijklmnopqrstuvwxyz". Write a loop that will print each letter one at a time in an individual line.

```

String value;
value = "abcdefghijklmnopqrstuvwxyz";
int length;
length=value.length()-1;
for (;length>=0;length--)
    System.out.println(value.charAt(length));

```