



# SOFTWARE DESIGN & PROGRAM DEVELOPMENT

## Java Lab – For Loops

**IMPORTANT!** Save all your work to a safe location such as oneDrive.

Create a folder for SDPD into which you will save all your work for this module, arranged how you wish. Ideally you should create a folder each week for your lab exercises. Note that you should create a separate file for each exercise.

### *For Loops*

#### *Quick Reference*

```
for (int i = 0; i < 5; i++)  
{  
    System.out.println(i);  
}
```

**initialization section**  
allows the loop to initialize  
its own control variable

**test section**  
condition section of  
the loop, eg, while i is  
less than 5

**update section**  
of the for loop is the  
last part to execute at  
the end of each loop.

```
for (int i = 0; i < 5; i++)  
{  
    System.out.println(i);  
}
```

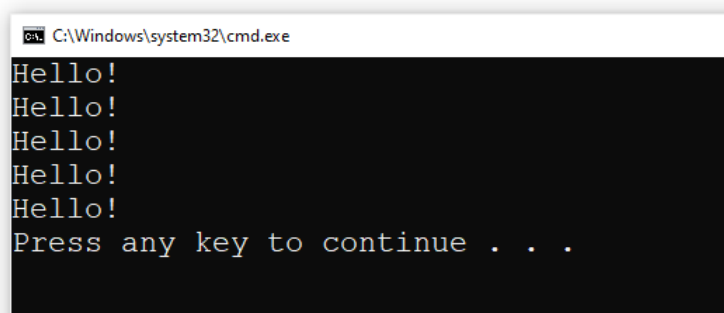
## Exercise 1

**Goal: Create a program in Java, using a for loop to output “Hello!” multiple times.**

Create a new a Java program called JavaFor1. Create a **for** loop as shown below that will output “Hello!” five times:

```
for (int i = 1; i <= 5; i++)  
{  
    System.out.println("Hello!");  
}
```

Your output should be similar to as shown below:



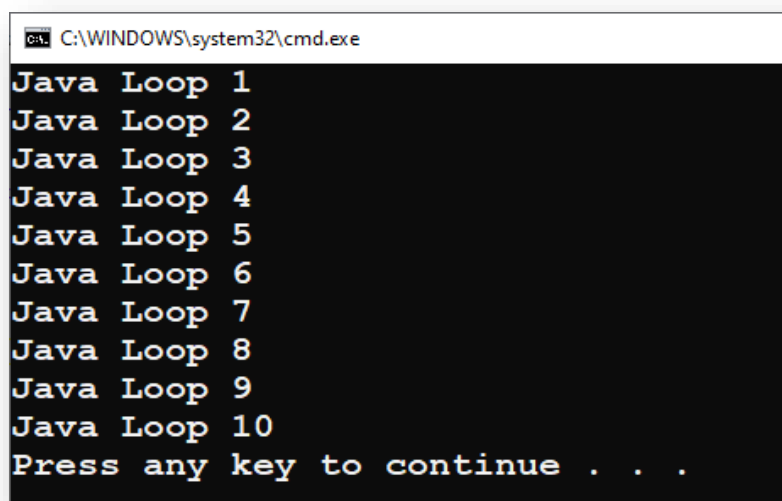
```
C:\Windows\system32\cmd.exe  
Hello!  
Hello!  
Hello!  
Hello!  
Hello!  
Press any key to continue . . .
```

## Exercise 2

**Goal: Create a program in Java, using a for loop to output “Java Loop” multiple times.**

Create a new a Java program called JavaFor2. Create a **for** loop as shown below that will output “Java loop” 10 times.

Amend your code so that it outputs it ten times, and includes the value of the *i* variable created in initialization section with each output:

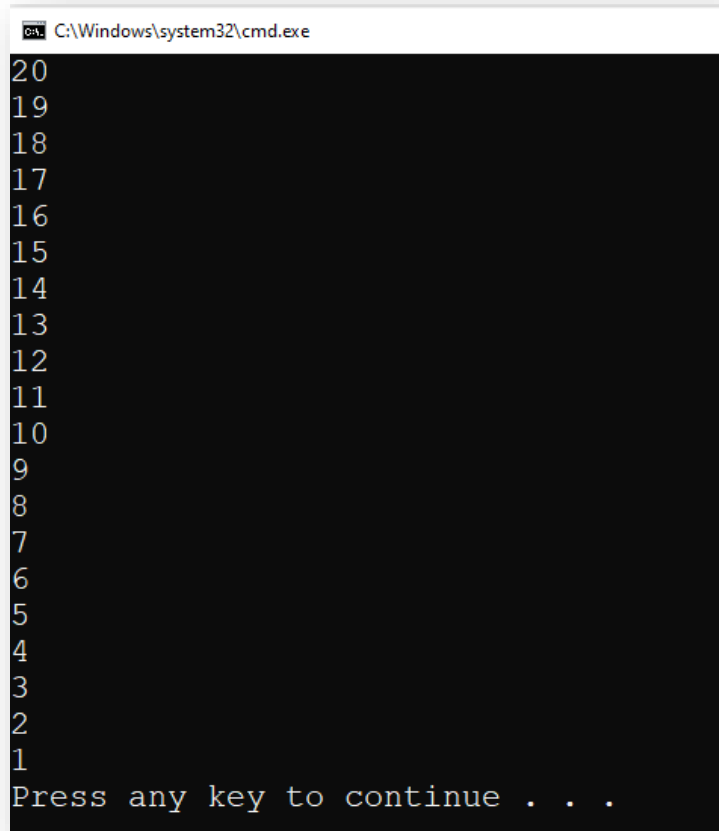


```
C:\WINDOWS\system32\cmd.exe  
Java Loop 1  
Java Loop 2  
Java Loop 3  
Java Loop 4  
Java Loop 5  
Java Loop 6  
Java Loop 7  
Java Loop 8  
Java Loop 9  
Java Loop 10  
Press any key to continue . . .
```

## Exercise 3

**Goal: Create a program in Java using a for loop**

Create a new Java program called JavaFor3. The program should output a countdown from 20 to 1 (use decrement on the update section), for example:

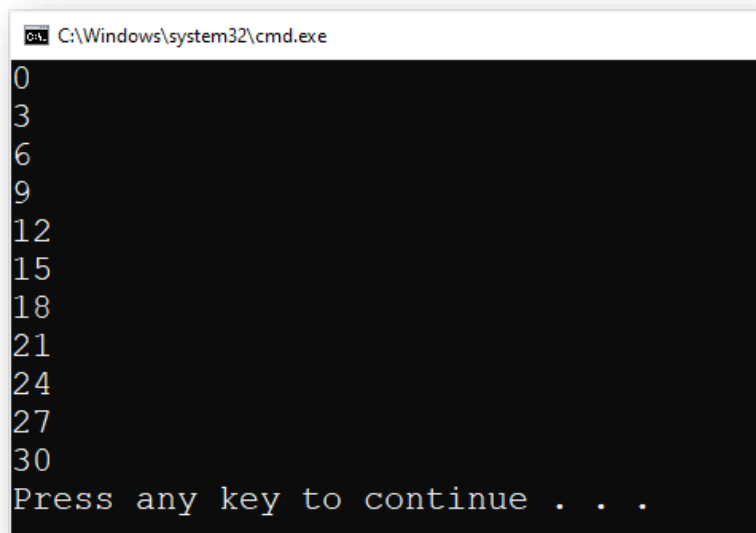


```
C:\Windows\system32\cmd.exe
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
Press any key to continue . . .
```

## Exercise 4

**Goal: Create a program in Java using a for loop**

Create a new Java program called JavaFor4. The program should output every third number between 0 and 30 by changing the update section of the loop to  $i = i + 3$ . For example:



```
C:\Windows\system32\cmd.exe
0
3
6
9
12
15
18
21
24
27
30
Press any key to continue . . .
```

## Exercise 5

**Goal: Create a program in Java using a for loop**

Create a new Java program called JavaFor5. The program should prompt the user to enter a number where it will count up to, after beginning counting from zero. Your output should be similar to as shown below:

```
C:\Windows\system32\cmd.exe
Counter Program
This program will count from zero up to whatever number you enter.

Enter a number to count up to: 12
0
1
2
3
4
5
6
7
8
9
10
11
12
Press any key to continue . . .
```

*or*

```
C:\Windows\system32\cmd.exe
Counter Program
This program will count from zero up to whatever number you enter.

Enter a number to count up to: 7
0
1
2
3
4
5
6
7
Press any key to continue . . .
```

## Exercise 6

**Goal: Create a program in Java using a for loop that generates a multiplication table**

Create a new program in Java called JavaFor6 that will display the multiplication table from 1 to 10 of an integer that has been provided by the user. Your output should be similar to as shown below:

```
C:\Windows\system32\cmd.exe
Multiplication Table

Enter a number to generate multiplication tables for: 15
15 times 1 is 15
15 times 2 is 30
15 times 3 is 45
15 times 4 is 60
15 times 5 is 75
15 times 6 is 90
15 times 7 is 105
15 times 8 is 120
15 times 9 is 135
15 times 10 is 150
Press any key to continue . . . _
```

or

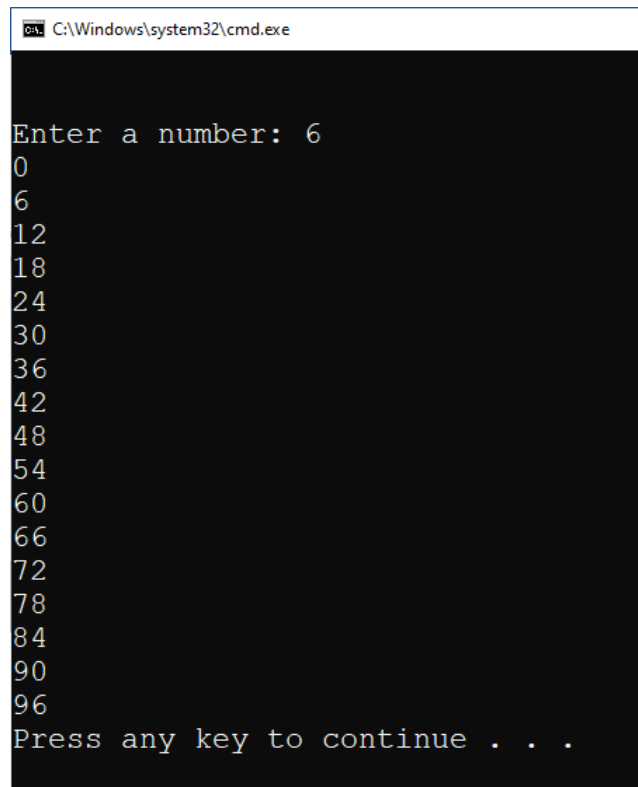
```
C:\Windows\system32\cmd.exe
Multiplication Table

Enter a number to generate multiplication tables for: 4
4 times 1 is 4
4 times 2 is 8
4 times 3 is 12
4 times 4 is 16
4 times 5 is 20
4 times 6 is 24
4 times 7 is 28
4 times 8 is 32
4 times 9 is 36
4 times 10 is 40
Press any key to continue . . . _
```

## Exercise 7

**Goal: Create a program in Java using a for loop that skips a specified number**

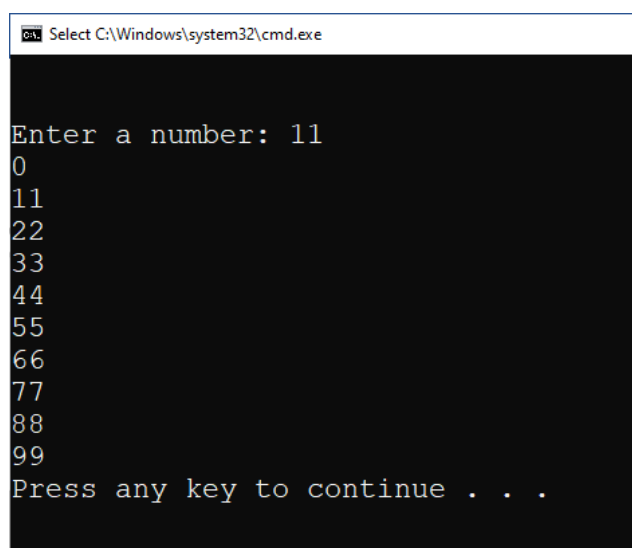
Create a new program in Java called JavaFor7 that will output every *Nth* number between 0 and 100. The user will be asked to input a number - for example, if the user enters the number 6, then the program will output every 6th number between 0 and 100. Your output should be similar to as shown below



```
cmd C:\Windows\system32\cmd.exe

Enter a number: 6
0
6
12
18
24
30
36
42
48
54
60
66
72
78
84
90
96
Press any key to continue . . .
```

or



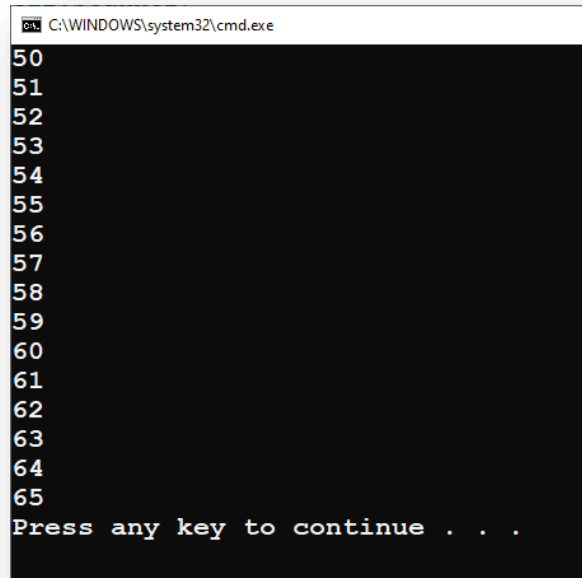
```
cmd Select C:\Windows\system32\cmd.exe

Enter a number: 11
0
11
22
33
44
55
66
77
88
99
Press any key to continue . . .
```

## Exercise 8

**Goal:** Create a program in Java using a for loop

Create a program in java using a for loop that will count from 50 to 65, similar to as shown below:

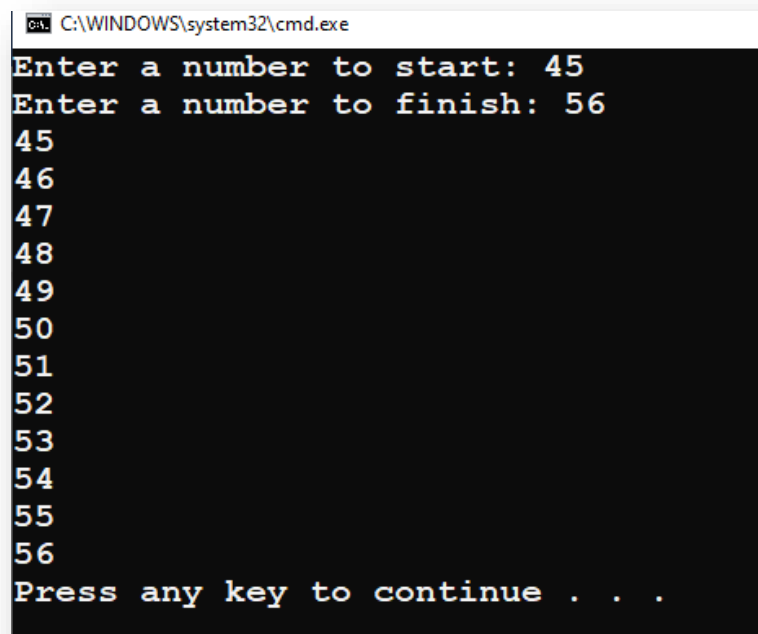


```
C:\WINDOWS\system32\cmd.exe
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
Press any key to continue . . .
```

## Exercise 9

**Goal:** Create a program in Java using a for loop

Create a program called JavaFor9 that will produce the output shown below. The user should be prompted for 2 numbers – a number to start counting from, and a number to finish counting to.



```
C:\WINDOWS\system32\cmd.exe
Enter a number to start: 45
Enter a number to finish: 56
45
46
47
48
49
50
51
52
53
54
55
56
Press any key to continue . . .
```

## Exercise 10

**Goal:** Create a program in Java using a for loop

Create a program called JavaFor10 using a for loop. The user should be prompted to enter 1 number – where the loop should start counting from. The program will then count from that number to plus 25 numbers after, for example:

```
C:\WINDOWS\system32\cmd.exe
Enter a number to start: 45
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
Press any key to continue . . .
```

```
C:\WINDOWS\system32\cmd.exe
Enter a number to start: 1563
1563
1564
1565
1566
1567
1568
1569
1570
1571
1572
1573
1574
1575
1576
1577
1578
1579
1580
1581
1582
1583
1584
1585
1586
1587
1588
Press any key to continue . . .
```

```
C:\WINDOWS\system32\cmd.exe
Enter a number to start: -267
-267
-266
-265
-264
-263
-262
-261
-260
-259
-258
-257
-256
-255
-254
-253
-252
-251
-250
-249
-248
-247
-246
-245
-244
-243
-242
Press any key to continue . . .
```

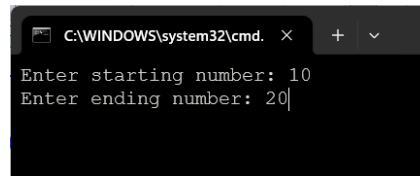


# Exercise 11

**Goal: Create a program in Java using two for loops**

Write a Java program named CountUpCountDown that sequentially performs a count-up and a count-down. The program should:

Prompt the user to enter two integers: a starting number and an ending number.



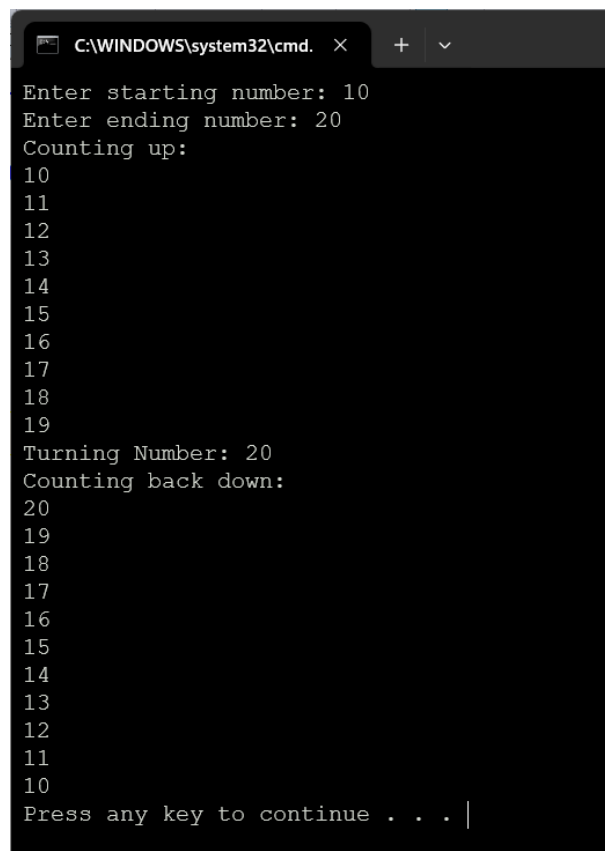
```
C:\WINDOWS\system32\cmd. x + v
Enter starting number: 10
Enter ending number: 20|
```

Count up from the starting number, printing each number.

After reaching the ending number, print it out as a "turning number."

Then, count back down from this turning number to the starting number, printing each number.

Ensure that the program prints each number on a separate line and includes clear prompts for the user inputs. The counting sequences and the turning number should be displayed as distinct sections in the output.



```
C:\WINDOWS\system32\cmd. x + v
Enter starting number: 10
Enter ending number: 20
Counting up:
10
11
12
13
14
15
16
17
18
19
Turning Number: 20
Counting back down:
20
19
18
17
16
15
14
13
12
11
10
Press any key to continue . . . |
```

Amend your program so that the user must enter a positive number as the starting number, and the second ending number must be greater than the first.

## Exercise 12

**Goal:** Create a program in Java using two for loops

Write a Java program named *EvenOddSequences* that separates and prints even and odd numbers within a given range. The program should:

- Prompt the user to enter two integers: a start number and an end number to define the range.
- Use one for loop to iterate through the range and print all even numbers in the range on the same line, separated by commas.
- Use another for loop (not nested within the first loop) to iterate through the same range and print all odd numbers in the range on the same line, also separated by commas.
- The even and odd numbers should be printed in two separate sections. Your output should be similar to as shown below:

```
C:\WINDOWS\system32\cmd. X + v
Enter start number: 10
Enter end number: 25
Even numbers:
10, 12, 14, 16, 18, 20, 22, 24,

Odd numbers:
11, 13, 15, 17, 19, 21, 23, 25,

Press any key to continue . . . |
```

Your program should also ensure that the end number entered is greater than the start number, and continue to prompt the user until this is the case:

```
C:\WINDOWS\system32\cmd. X + v
Enter start number: 45
Enter end number: 22
Enter end number: 40
Enter end number: 65
Even numbers:
46, 48, 50, 52, 54, 56, 58, 60, 62, 64,

Odd numbers:
45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65,

Press any key to continue . . . |
```