

Det er muligt at chekce følgende opg. i CodeJudge: 2.1 – 2.7 og 2.12 – 2.14

Exercise 1:

Skriv en for-løkke, som producerer følgende output:

```
1
4
9
16
25
36
```

Bonusopgave: Modificer dit program, så det ikke benytter multiplikation. *Hint:* Betragt forskellen mellem to på hinanden følgende tal.

_____ End of Exercise 1 _____

Exercise 2: Løs nedenstående opgave. Det er *Exercise 2* fra bogens kapitel 2.

Write a for loop that produces the following output:

```
1 4 9 16 25 36 49 64 81 100
```

_____ End of Exercise 2 _____

Exercise 3: Løs nedenstående opgaver. Det er *Exercise 12*, *Exercise 13* og *Exercise 14* fra bogens kapitel 2.

1. Write nested for loops that produce the following output.

```
000111222333444555666777888999
000111222333444555666777888999
000111222333444555666777888999
```

2. Modify the code so that it now produces the following output.

```
99999888887777766666555554444433333222221111100000
99999888887777766666555554444433333222221111100000
99999888887777766666555554444433333222221111100000
99999888887777766666555554444433333222221111100000
99999888887777766666555554444433333222221111100000
```

3. Modify the code so that it now produces the following output.

```
999999999888888888877777766666555554444333221
999999999888888888877777766666555554444333221
999999999888888888877777766666555554444333221
999999999888888888877777766666555554444333221
```

_____ End of Exercise 3 _____

Exercise 4: Løs nedenstående opgave. Det er delvis *Exercise 3* fra bogens kapitel 2.

- a) The Fibonacci numbers are a sequence of integers in which the first two elements are 1, and each following element is the sum of the two preceding elements. The mathematical definition of each k th Fibonacci number is the following:

$$F(k) = \begin{cases} F(k-1) + F(k-2) & \text{if } k > 2 \\ 1 & \text{if } k \leq 2 \end{cases}$$

The first 12 Fibonacci numbers are:

1 1 2 3 5 8 13 21 34 55 89 144

Write a **for** loop that computes and prints the first 12 Fibonacci numbers.

- b) Write a **for** loop that computes and prints the first 50 Fibonacci numbers. If the output is not as expected, explain why, and then, fix it.

End of Exercise 4

Exercise 5: Løs nedenstående opgave. Det er *Exercise 15* fra bogens kapitel 2.

Write a method called `printDesign` that produces the following output. Use **for** loops to capture the structure of the figure.

```
-----1-----  
----333----  
---5555---  
--777777--  
-99999999-
```

End of Exercise 5

Fortsættes næste side.

Exercise 6:

Løs nedenstående opgave. Det er *Programming Project 4* fra bogens kapitel 2.

Write a program that produces the following output. Use a class constant to make it possible to change the number of stairs in the figure.

```

          o  *****
            /|\ *   *
            / \ *   *
          o  ***** *
            /|\ *   *
            / \ *   *
        o  ***** *
          /|\ *   *
          / \ *   *
      o  ***** *
        /|\ *   *
        / \ *   *
    o  ***** *
  /|\ *   *
  / \ *   *
o  ***** *
/|\ *   *
/ \ *   *
*****

```

End of Exercise 6

Exercise 7: Write a program with a single for loop which produces the following output:

```
10 0 9 1 8 2 7 3 6 4 5 5
```

End of Exercise 7

Exercise 8:

a) What is the result printed by the following code snippet? Determine the result, before running the program.

```

1      int a = 0;
2
3      for (int i = 0; i < 21; i++) {
4          for (int j = 0; j <= 16; j++) {
5              for (int k = 0; k < 4; k++) {
6                  a++;
7              }
8          }
9      }
10     System.out.println("Final value of a is "+a);

```

b) What is the result when one replaces all three upper bounds 21, 17 and 4 by 2000? Determine the result, before running the program.

End of Exercise 8

Exercise 9: What is printed after the following program with two loops? First inspect and analyse the code. Then type it in an run it. Explain the results.

```
1 public class WeiredLoops {
2
3     public static final int BOUND = 1000;
4
5     public static void main(String[] args) {
6         loop1();
7         loop2();
8     }
9
10    public static void loop1() {
11        int j = 0;
12        for (int i = 0; j < BOUND; i++) {
13            j = j + 7;
14        }
15        System.out.println("Loop1 value of j = "+j);
16    }
17
18    public static void loop2() {
19        int j = 0;
20        for (int i = 0; j != BOUND; i++) {
21            j = j + 19;
22        }
23        System.out.println("Loop2 value of j = "+j);
24    }
25 }
```

End of Exercise 9

Exercise 10: Analyse the three for-loops in the following code and determine what they will do **before** running the code.

```
public class StrangeForLoops {

    public static void main(String[] args) {
        loop1();
        loop2();
        loop3();
        loop4();
    }

    public static void loop1() {
        int k = 27;
        for (; k + 100 > 2 * k; k++) {
            System.out.println("k=" + k);
        }
    }
}
```

```

public static void loop2() {
    for (int k = 11; k != 100; k = k + 2) {
        System.out.println("k=" + k);
    }
}

public static void loop3() {
    for (int k = 1; k < 10; k++) {
        k = k / 2;
        System.out.println("k=" + k);
    }
}

public static void loop4() {
    for (int k = 1;;) {
        System.out.println("k=" + k);
    }
}
}

```

End of Exercise 10

Exercise 11: Analyse the program listed below, determine what is “bad” about it and improve it.

```

1 public class WriteNumbers_Bad {
2
3     public static void main(String[] args) {
4         badExample();
5     }
6
7     public static void badExample() {
8         System.out.println("Write some numbers ...");
9         for (int i = 11; i < 31 ; i += 3) {
10            System.out.print(i+" ");
11        }
12        System.out.println("\n... and backwards.");
13        for (int i = 29; i >= 11; i -= 3) {
14            System.out.print(i+" ");
15        }
16        System.out.println();
17    }
18 }

```

End of Exercise 11

Exercise 12: Write a class `DiagonalMatrix` which produces the following 6×6 output

```
0 1 2 3 4 5
1 0 1 2 3 4
2 1 0 1 2 3
3 2 1 0 1 2
4 3 2 1 0 1
5 4 3 2 1 0
```

Hint: Use a class constant, so that you can print the same scheme with a n rows and columns, where n is between 1 and 10,

_____ End of Exercise 12 _____

Exercise 13: I denne øvelse laver vi to løkker, der skriver samme output, nemlig:

```
3 5 7 9 11 13 15 17
```

Første løkke foretager beregningen i *løkkens krop*, dvs:

```
1 int k;
2 for (int i = 0; i < 8; i++) {
3     k = // put your code here
4     System.out.print(k+" ");
5 }
```

Anden løkke foretager beregningen i løkkens *hoved*, og kroppens eneste funktion er at udskrive. Dvs:

```
1 for (int i = /* put your code here */) {
2     System.out.print(i+" ");
3 }
```

_____ End of Exercise 13 _____

Exercise 14: Write a class `Summing` with a method `public static void sumit()`. The method computes the sum of all numbers between 1 and 200 which are divisible by 7 and prints the result in the form

The sum is NUMBER

where NUMBER is the sum.

_____ End of Exercise 14 _____

Fortsættes næste side.

Anden del: Interaktive programmer

Exercise 15: Rediger følgende program, så det omregner temperaturer fra Celsius til Fahrenheit (dvs. ganger med $\frac{9}{5}$ og lægger 32 til), og skriver resultatet.

```
1 import java.util.*;
2 public class Temperatur {
3     public static void main(String[] ar){
4         Scanner console = new Scanner(System.in);
5         System.out.println("Indtast temperatur i Celsius ");
6         int cel = console.nextInt();
7         System.out.print(cel+" grader Celsius svarer til ");
8         System.out.println(0+" grader Fahrenheit ");
9     }
10 }
```

End of Exercise 15

Exercise 16:

- a) Inspireret af eksemplet i bogens kapitel 2.2, skriv et program til at udregne kropsmasseindekset (bmi) baseret på indtastede data. (Hint: kig på forrige opgave.)

For eksempel:

```
Indtast hoejde i cm
185
Indtast vaegt i kg
80
BMI: 23 kg/m^2
```

- b) (*) Brug *if-statements* til at afgøre om pågældende bmi er indenfor normalområdet (18.5 til 25), og udskrive information derom til brugeren.
- c) (*) Udskriv information om, hvor mange kg klienten er fra grænserne for hhv. under- og overvægt.

End of Exercise 16