

# Exercise 1

## Code

```
1 class Database {
2     private static Database instance = null;
3
4     private String name;
5
6     private Database(String name) {
7         this.name = name;
8     }
9
10    public static Database getInstance(String name) {
11        if (instance == null) {
12            instance = new Database(name);
13        }
14        return instance;
15    }
16
17    public void getConnection() {
18        System.out.println("You are connected to the database " + name);
19    }
20
21    public String getName() {
22        return name;
23    }
24 }
25
26 public class Exo1 {
27     public static void main(String[] args) {
28         Database db1 = Database.getInstance("ProductionDB");
29         Database db2 = Database.getInstance("TestDB");
30
31         System.out.println("Testing db1:");
32         db1.getConnection();
33
34         System.out.println("\nTesting db2:");
35         db2.getConnection();
36
37         System.out.println("db1 name: " + db1.getName());
38         System.out.println("db2 name: " + db2.getName());
39         System.out.println("Are they the same instance? " + (db1 == db2)
40             );
41     }
42 }
```

## Output

```
Testing db1:
You are connected to the database ProductionDB

Testing db2:
You are connected to the database ProductionDB
db1 name: ProductionDB
db2 name: ProductionDB
```

```
Are they the same instance? true
```

## Exercice 2

### Code

```
1 interface Program {
2     void go();
3 }
4
5 class Program1 implements Program {
6     public Program1() {
7     }
8
9     @Override
10    public void go() {
11        System.out.println("Je_suis_le_traitement_1");
12    }
13 }
14
15 class Program2 implements Program {
16     public Program2() {
17     }
18
19     @Override
20    public void go() {
21        System.out.println("Je_suis_le_traitement_2");
22    }
23 }
24
25 class Program3 implements Program {
26     public Program3() {
27     }
28
29     @Override
30    public void go() {
31        System.out.println("Je_suis_le_traitement_3");
32    }
33 }
34
35 class Program4 implements Program {
36     public Program4() {
37     }
38
39     @Override
40    public void go() {
41        System.out.println("Je_suis_le_traitement_4");
42    }
43 }
44
45 class ProgramFactory {
46     public static Program createProgram(int programNumber) {
47         switch (programNumber) {
48             case 1:
49                 return new Program1();
50             case 2:
51                 return new Program2();
52             case 3:
53                 return new Program3();
54             case 4:
```

```

55         return new Program4();
56     default:
57         throw new IllegalArgumentException("Invalid program
58             number: " + programNumber);
59     }
60 }
61
62 public class Client {
63     public static void main1() {
64         Program p = ProgramFactory.createProgram(1);
65         System.out.println("I am main1");
66         p.go();
67     }
68
69     public static void main2() {
70         Program p = ProgramFactory.createProgram(2);
71         System.out.println("I am main2");
72         p.go();
73     }
74
75     public static void main3() {
76         Program p = ProgramFactory.createProgram(3);
77         System.out.println("I am main3");
78         p.go();
79     }
80
81     public static void executeProgram(int programNumber) {
82         Program p = ProgramFactory.createProgram(programNumber);
83         System.out.println("I am main" + programNumber);
84         p.go();
85     }
86
87     public static void main(String[] args) {
88         main1();
89         System.out.println();
90         main2();
91         System.out.println();
92         main3();
93         System.out.println();
94
95         System.out.println("Using executeProgram:");
96         executeProgram(1);
97         System.out.println();
98         executeProgram(4);
99     }
100 }

```

## Output

```

I am main1
Je suis le traitement 1

I am main2
Je suis le traitement 2

```

```
I am main3
Je suis le traitement 3

Using executeProgram:
I am main1
Je suis le traitement 1

I am main4
Je suis le traitement 4
```