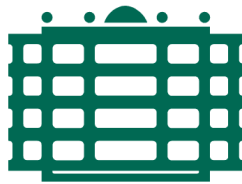


Software Engineering and Programming Basics - WS2021/22

Exercise 5: Java Stack and References



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Task 1

Create a class called **Bird** with the attribute **name**. Don't forget to create a constructor. Once a bird is in the air, it can soar, dive, or fly in a loop.

Create the public member method **takeOff()** that calls the private method **soar()**.

soar() calls another private member method **loop()**.

loop() calls the third private member method **dive()**.

dive() calls **soar()** again.

You can let each method print a distinct string to the console, so you know what the bird is doing right now, e.g. "\$name is soaring through the sky" for **soar()**.

Now let your bird take off and watch him fly forever!

What happens?

What error message did you get?

Try to explain what happened by drawing how the stack looks after you let your bird take off!

Task 2

Create a class called **Matrix** which has an attribute **numbers** of the type `int[][]`.

1.

Create a constructor with a parameter *size* that creates **numbers** with the dimensions `size*size`. The constructor should also initialize **numbers**. The first row should have the numbers from 1 to *size*. The columns then should always multiply the numbers above by 2.

Example: *size* = 3

Expected output:

```
[1][2][3]
[2][4][6]
[4][8][12]
```

2.

Create a second Constructor that creates an object of the type **Matrix** using another Matrix *toCopy*.

Each number in this **numbers** should be double the amount in the corresponding field of *toCopy*.**numbers**. For example if *toCopy*.**numbers**[0][0] = 2; expected output for this **numbers**[0][0] is 4.

3.

Create a method **print()** that prints each number in **numbers**.

In your main method, create one object of the type **Matrix** with the size you want. Then create a second object of the type Matrix with the first one (use your second constructor). Print both. The contents of the two matrixes should be different.