Lab 6: Loops

Java Fundamentals

Lab 6: Loops

Objective

In this lab you'll practise using various looping constructs.

Part 1 – Calculating the grades for 5 students

Step by step

1. Back in the **labs** project which you created in **Lab 1**, add a new package called **lab06**.
2. Create a new class called ***Program*** in this package with a main() method.
3. Add a class called **Lab6** (with no main method).
4. Copy the code for **getInt()** which you wrote in Lab6.
5. Create a method in Lab6 called **part1**():

```
public void part1() {
}
```

6. Create an instance of Lab6 in the main() and call the grades() method to get ready for the rest of this exercise.

```
Lab6  lab6 = new Lab6();
lab6.part1();
```

7. From now on, all your code will go in the part1() method.
   We will revisit the grades() method that you wrote in Lab5, but this time we will process many students rather than just one grade.
8. Copy the code for processing grades() to the Lab6 class.
9. Call grades() from the part1() method.
10. Create an array of 5 names called 'names' at the start of the grades() method.

    Tip: View slides for code.
11. Create an array of 5 integers called **marks** to hold the marks for our 5 students.
12. Create a loop (while or for) to:
    a. get a student name and store it in the **names** array.
    b. get the grade for the student and store it in the **marks[]**.
13. Having stored the names of the students and their grades, create another loop to display each name, the *grade*, *mark* and *grade* (pass/merit…)

Part 2 – How long does it take to double your money?

Assuming an initial investment of say £100, how many years does it take to grow to £200 given an interest rate of 5%?

Step by step

1. Create a new method in account() in the Lab6 class.
2. Create suitable variables to store the initial money, current money (at the end of each year), interest rate (5%), and years (to double the money).
3. Write code to calculate the number of years it takes to get £200.

   Tip: Use a while loop which stops when the current money = £200

Part 3 – Nested Loop Practice

Ensure you can code up nested loops, understanding the full sequence in which everything runs and use the outer and 'inner' loop variables together in a nested loop. In this section you'll produce a multiplication table.

Step by step

1. Create a method called `multiplicationTable() in the Lab6 class`.
2. We want you to produce this output on the console.

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

Tip: Two nested for loops (from 1...10) are best for this.

To print the product of two variables called row and col in 5 spaces, use a statement like:

```
System.out.printf("%5d", col * row);
```

**** End ****