# lab01 - Counting Zero

## Task

In this assignment, you are asked to write a program in LC-3 machine language that meets the following conditions:

1. Given n, if n is an odd number, you should count how many 0 are in the binary representation of n.
2. Otherwise, count how many 0 are in the 2's complement code of the negative of n.

## Additional Information

1. The value of **n** will be set manually in **x3100** (Therefore, you can use LD or other instructions to load **n** from memory to register).
2. You may assume that **n** is a positive integer ranging from **0x0000** to **0x7FFF**.
3. You need to count **the whole 16 bits**.
4. You should add the last number of your student ID to the result.
5. The last number of your student ID and the final result should be stored in **x3101** and **x3102** respectively.

## Example

If your the student ID is PB12345678, the result will be like the following form.

| n | odd or even | Binary code | 2's complement code | The number of 0 | The final result |
|---|---|---|---|---|---|
| 5 | odd | 0000 0000 0000 0101 | - | 14 | 14+8=22 |
| 100 | even | 0000 0000 0110 0100 | 1111 1111 1001 1100 | 4 | 4+8=12 |

## Attention

1. Your program should start at memory location **x3000**, and end with **HALT** instruction.
2. Your submission be structured as shown below.

```
PB22******_Name.zip
├── PB22******_Name_report.pdf
└── lab1.bin
```

3. As reference, Your report should contain at least two parts:
    1. the principles or procedure: the steps to complete the task.
    2. the result: the examples used to prove that your code is right.