# Gebze Techical University
# Department of Computer Engineering
# CSE 241/505
# Object Oriented Programming
# Fall 2016
# Homework # 1
# Your First C++ Program
# Due date Oct 9th 2016

You will write a C++ program that will simulate a very simple CPU. Your CPU has only 5 registers (R1, R2, R3, R4, R5) and no other memory. Your CPU has a small set of instructions as decribed below.

Move instructions
**`MOV reg, reg`**
**`MOV reg, constant`**
For example MOV R1, R2 copies the value of register 1 to register 2
and MOV R1, 100 puts the value of 100 to register 1

Addition and Subtraction insructions
**`ADD reg, reg`**
**`ADD reg, constant`**
**`SUB reg, reg`**
**`SUB reg, constant`**
For example, ADD R1, R2 adds the value of register 2 to register 1
and ADD R1, 100 adds the value of 100 to register 1

Jump instruction
**`JMP reg, lineAdress`**
**`JMP lineAddress`**
For example, JMP R1, 32 jumps to line 32 of the program if the value of R1 is zero. JMP 23 jumps to line 23 directly.

Print instructions
**`PRN reg`**
**`PRN constant`**
For example, PRN R3 will print the value of register 3 to the screen, after each print a new line should be inserted.

Other instructions
**`HLT`**
halts the program and prints on the screen the contents of all registers.

Following is a program file that prints numers from 10 down to 0 to the screen

```
MOV R1, 10      ; line 1, load value 10 to the register 1
PRN R1          ; line 2, print register 1
SUB R1, 1       ; line 3, decrement R1
JMP R1, 6       ; line 4, if R1 is 0 then go to line 6
JMP 2           ; line 5, go to line 2
HLT             ; finish the program
```

As seen above, you may have comments after each instruction after the ; sign. Each line of your program file shoud contain a single instruction, so the line numbers will correspond to the instruction numbers.

Your program will run using the command line parameters. The format for the command line parameters is as follows

**`yourProg filename option`**

yourProg is the name of your executable file, file name is the text file that contains your simple CPU instructions, option a number and the defines the how your program runs as follows

- if option is 0, your program will run and finish by executing each instructions
- if option is 1, your program will execute each instruction after displaying the instruction first. It also will print the contents of all the registers such as

  MOV R1, 10 – R1=10, R2=0, R3=0, R4=0, R5=0

Important Notes:

- Write a CPU program that adds the squares of integers between 1 and 10. The result should be printed on the screen. Include your CPU program with your submission
- With your submission, include the results of a few runs of your program with different programs and run opitons.
- Do not use any functions from the standard C library (like **`printf`**), you will use << and >> operators to print and write strings
- Your program should have only functions and no classes.
- Do not forget to indent your code and provide comments.
- You should submit your work to the moodle page. You should strictly follow the submission instructions which will be available shortly.