



## Lab 2

### Printing - Manual Compilation

### Variables - Arithmetic Operations

## 1 Lab Objectives

- Practicing printing to the screen with different special characters.
- Learning how to write and compile programs without using an IDE.
- Introducing variables and simple arithmetic operations.
- Using input obtained from users in programs.

## 2 Printing

### 2.1 Exercise 1

Write a C program that executes the following statement. Can you guess what the program prints?

```
printf(“*\n**\n***\n****\n”);
```

### 2.2 Exercise 2

Write a C program that does the following:

1. Use one printf statement and use tabs “\t” to print the following shape:

```
*****  
*      *  
*      *  
*      *  
*      *  
*      *  
*****
```



2. Use multiple printf statements to print the following shape:

```
***
 *  *
 *  *
*    *
*    *
*    *
*  *
***
```

## 2.3 Exercise 3

Write a C program that writes the *exact* following text on the screen. (Search online for special characters not mentioned in the session):

“Ahmed said: “I searched online and found that \, ”, new lines ('\n') and tabs ('\t') are among the special characters.”

Mohamed replied: “Great, I also managed to make a beep sound using the special character '\a'. Hear this ..” ”

## 3 Manual Compilation

This part will be illustrated and done in the lab session. **No deliverables are required for this section.**

1. Write the “Hello World” C program in a simple text editor (notepad, gedit, .. etc).
2. Save the file under “<name>.c”, where <name> is any name of your choice.
3. Open the command prompt (Start → Run → cmd).
4. Navigate (using “cd” command) to the directory where you saved your source file.
5. Invoke the compiler manually: gcc <source.c> -o <outputName>
6. Run the generated executable file by typing its name in the command prompt.



## 4 Variables and Arithmetic Operations

### 4.1 Problem 1 - Average Grade

Write a program that prompts the user to enter grades for five students. The program then computes and outputs the average grade.

### 4.2 Problem 2 - Circles

Write a program that reads in the radius of a circle, then uses this radius to print the following (Consider the value of  $\pi=3.14159$ ):

- Circle's diameter ( $2 * \text{radius}$ ).
- Circle's circumference ( $2 * \pi * \text{radius}$ ).
- Circle's area ( $\pi * \text{radius} * \text{radius}$ ).

**Note that** you are required to define  $\pi$  as a named constant "PI" using "#define".

## 5 Notes

- You can prepare the coding exercises at home, or you can write them during the lab session. But you need to try them at home first!
- You are required to implement problems 1 and 2 in section 4 at home, the lab will be for discussion only. You should bring the programs on your laptop or on a flash memory.
- Cheating will be severely penalized (for both parties). So, it is better to deliver nothing than deliver a copy!
- You are encouraged to ask any questions on Piazza, or in person.

**Good Luck isA :)**