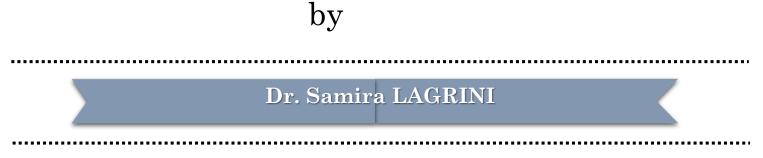


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Course 4: C programming language basic concepts



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What is a program/ programming language?

❖ A program is a sequence of instructions that a computer follows to solve a problem

❖ A programming language is a set of words and symbols and codes that enables human to write a computer program.

C programming language

- C is a programming language initially developed by Dennis Ritchie in 1972
- C is a compiled language (as opposed to interpreted languages). Thus, the source code is converted into a machine code that the processor can execute using the compiler.
- To program with a compiled language such as C, it is necessary to first install the compiler for that language,
- Example of C compiler: **Turbo C**, Turbo C++, Dev c++, Borland C...

General Structure of a C program

```
Example:
#include <stdio.h>
 main()
{ float x, Y;
 printf("entrez un nombre réel ");
 scanf("%f", &x);
 Y=2*x;
 printf("son double = \%f\n",Y);
```

Basic elements of a C program

- a C program consists generally of the following elements:
- > Identifiers
- > The key words
- > The constants
- > The variables
- > Input/output functions
- > Comments
- **>...**

1. Identifiers

- Identifiers refers to name given to entities such as variables, functions, structures etc.
- Identifiers are created to identify an entity during the execution of the program.
- Identifier names must be different from keywords

* Rules for naming identifiers

- 1. A valid identifier can have letters (both uppercase and lowercase letters), digits and underscores (_).
- 2. The first letter of an identifier should be either a letter or an underscore, but not a degit
- 3. Identifiers are case-sensitive: x1 and X1 are considered 2 different identifiers,

2. The Keywords

- Keywords are reserved words used in programming that have special meanings to the compiler.
- Keywords are part of the syntax and they cannot be used as an identifier
- In C, there are 32 keywords:
- double- float- int- short- struct- unsigned-break- continue -else forlong- signed- switch- void-case- default- enum — goto - registersizeof- typedef- volatile-char- do- extern- if- return- static —unionwhile- Auto- const.

3. The variables

- A variable is a memory cell called an object to which a name is assigned in order to identify it among all others.
- His statement is as follows:

Type name-variable;

- ☐ A variable must be declared before its use.
- ☐ A variable can only hold one value at a time. Assigning a value to a variable that already has a value amounts to modifying it.

```
Example int x; float y=23.5,
```

Predefined types in C

- ☐ The type of an object (variable, constant or function) defines how it is represented in the memory.
- ☐ It allows you to specify the range of values that the variable can take as well as the operations that can be performed with it.
- ☐ The basic types in C are:

Type	its meaning
_bool	an integer that can take two values: 0 or 1
int	
short	an integer. The most significant bit is its sign
long	
unsigned	An unsigned integer
char	a character
float	Floating point real numbers. They correspond to the different
double	possible precisions.
Long double	

4. The Constants

- A constant is an object containing a value that can never be changed.
- Its statement in C:

define name value

Example:

define X 100

Example: Calculate perimeter of a circle

```
# include <stdio.h>
# Define pi 3,14 /* declaration of a constant pi */
  main()
 float R1, P; /* declaration of two variables*/
 printf("enter the length of the radius"); /* displaying a message */
  scanf("%f", &R1); /* reading the variable R1*/
  P=2*pi*R1; /* calculate the perimeter of a circle */
  printf(" the perimeter of the circle = \%f\n", P);
```

C Input/Output (I/O)

5. C Output

printf() is one of the main output function. The function sends formatted output to the screen.

- printf prints:
- > Astring inside quotations: printf ("hollo")
- A value in a specified format. Its syntax is as follows:

```
printf ("format specifier", X);
```

Example:

```
printf ( " mon programme en C");
printf ( "la surface= %f " , X);
```

5. C Output 'printf()'

- □ Format specifiers are (%d, %f, %c, %s,)
- ☐ They designate the printing format.

Format	Conversion to
%d	int
%f	float
%c	char

C Output 'printf()'

Escape Sequence in C

sequence	meaning
\n	New line
\t	horizontal tab
\v	Vertical tab
\r	a return to the start of the current line.
\\	The character \

Example:

```
#include <stdio.h>
main()
int i = 23;
char c = A';
Printf (" print of i: n");
printf("%d n", i);
Printf (" print of C: n");
printf("%c \t %d ", c, c);
```

This program prints on the screen:

23
print of C:
A 65

6. C input 'scanf'

- □ scanf() is one of the commonly used function to read formatted input from the keyboards.
- □scanf statment is as follows:

scanf(" format specifier", &X);

• As for printf, the format field can be (%d, %f,% c ,% s)

Example

```
#include <stdio.h>
 main()
{ float x;
 printf("enter a number x = ");
 scanf("%f", &x);
 printf("x = \%f \t", x);
```

7. Comments

- Comments in a program are messages that explain parts of the source code.
- comments can be placed anywhere in the program.
- A comment is written either between /* and */ or after two slashes

```
/* This is a comment that can be
    heard on several lines */
// This is another comment
```