

Structured Programming Language

Introduction

Prepared by-

Poly Bhoumik

Lecturer

Dept. of CSE, DIIT

Contents

- Objective
- Computer Programming Language
- Structured Programming
- C Programming Language
- History of C language
- Advantages and Disadvantages
- C structural blocks
- First C Program

Objective

- Increase the ability to learn new programming languages
- Increase the capacity to express programming concepts and choose among alternative ways to express things
- Simulate useful features in languages that lack them
- Improve the background for choosing appropriate programming languages for certain classes of programming problems
- Be able in principle to program in an imperative (or procedural), an object-oriented, a functional, and a logical programming language
- Understand the significance of an implementation of a programming language in a compiler or interpreter
- Be able in principle to design a new programming language
- Make good use of debuggers and related tools

Computer Programming Language

- Low level language
- High level Language

Computer Programming Language

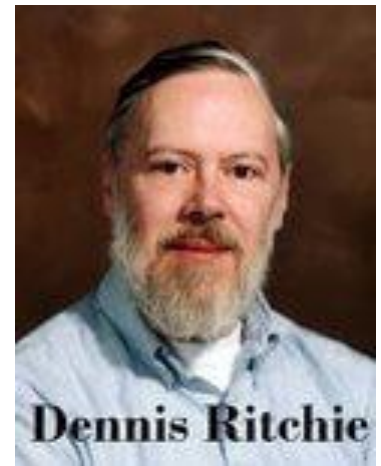
- Low level language
 - Form of 0 and 1
 - Program written by means of the memory and registers available on the computer
 - Thus it is machine dependent language
 - 2 types
 - Machine language
 - Assembly language

Machine Language

- Based on binary numbers
- All instructions are given or written in binary
- Directly executable by computer without translation
- Thus very fast execution
- Assembly Language
- 2nd generation language

History of C

- **C programming language** was developed in 1972 by Dennis Ritchie at bell laboratories of AT&T (American Telephone & Telegraph), located in the U.S.A.
- **Dennis Ritchie** is known as the **founder of the c language**.
- It was developed to overcome the problems of previous languages such as B, BCPL, etc.
- Initially, C language was developed to be used in **UNIX operating system**. It inherits many features of previous languages such as B and BCPL.



Structured Programming

Structured programming is a [programming paradigm](#) aimed at improving the clarity, quality, and development time of a [computer program](#) by making extensive use of the structured control flow constructs of selection ([if/then/else](#)) and repetition ([while](#) and [for](#)), [block structures](#), and [subroutines](#).

It emerged in the late 1950s with the appearance of the [ALGOL 58](#) and [ALGOL 60](#) programming languages,^[1] with the latter including support for block structures. Contributing factors to its popularity and widespread acceptance, at first in academia and later among practitioners, include the discovery of what is now known as the [structured program theorem](#) in 1966,^[2] and Dutch computer scientist [Edsger W. Dijkstra](#), who coined the term "structured programming".^[3]

-Wikipedia

C Programming Language

C is called a structured programming language because to solve a large problem, C programming language divides the problem into smaller structural blocks each of which handles a particular responsibility. These structural blocks are –

- Decision making blocks like if-else-elseif, switch-cases,
- Repetitive blocks like For-loop, While-loop, Do-while loop etc
- subroutines/procedures - functions

The program which solves the entire problem is a collection of such structural blocks. Even a bigger structural block like a function can have smaller inner structural blocks like decisions and loops.

Advantages

- C structured programming is simple and easy to understand and implement.
- It is well suited for small size implementation. However this is not restricted. A good design can extend it to large size implementation.
- Programmers do not require to know complex design concepts to start a new program.

Disadvantages

- Data and methods are not bound together in a module.
- Polymorphism and inheritance are not available.
- Complex design and full object oriented design cannot be implemented.
- Programmers generally prefer object oriented programming language over structured programming language when implementing a complex gaming applications or front end business applications.

C- structural blocks

Statements and conditions:

```
if (<condition>)  
{  
    <statements>;  
}  
else  
{  
    <statements>;  
}
```

EQuestionAnswers

```
if (<condition>)  
{  
    <statements>;  
}  
else if(<condition>)  
{  
    <statements>;  
}  
else  
{  
    <statements>;  
}
```

EQuestionAnswers

```
goto label;  
    <statements>;  
    <statements>;  
label:  
    <statements>;  
  
switch (x)  
{  
    case <1>:  
        break;  
    default:  
}
```

C- structural blocks

Loops:

```
for (i = 0; i < max; i++)  
{  
    <statements>;  
}
```

```
while(<condition>)  
{  
    <statements>;  
}
```

EQuestionAnswers

```
do  
{  
    <statements>;  
}  
while(<condition>);
```

C- structural blocks

Functions and procedures:

```
int function ()  
{  
    return 0;  
}  
  
void procedure (void)  
{  
    return 0;  
}  
  
int main()  
{  
    return 0;  
}
```

EQuestionAnswers

First C program

- write, compile and run the C program

```
#include<stdio.h>
int main() {
    printf("Hello World!!!");
    return 0;
}
```

- `#include <stdio.h>` : includes the standard input output library functions. The printf() function is defined in stdio.h.
- `int main()` : The main() function is the entry point of every program in c language.
- `printf()` : The printf() function is used to print data on the console.
- `return 0` : The return 0 statement, returns execution status to the OS. The 0 value is used for successful execution and 1 for unsuccessful execution.

First C program

- write, compile and run the C program
 - To compile and run by menu, click on the compile menu then compile sub menu to compile the c program, then click on the run menu then run sub menu to run the c program.
 - To compile and run by shortcut, press ctrl+f9 keys compile and run the program directly.
 - We will see the output on user screen.
 - Press Esc to return to the code editor console.

The End