

INTRODUCTION TO C

C is a

- 1.It is a high level / middle level programming language.**
- 2.It is a compiler based programming language.**
- 3.It is a procedure oriented programming language [POP].**
- 4.It is a general purpose programming language.**

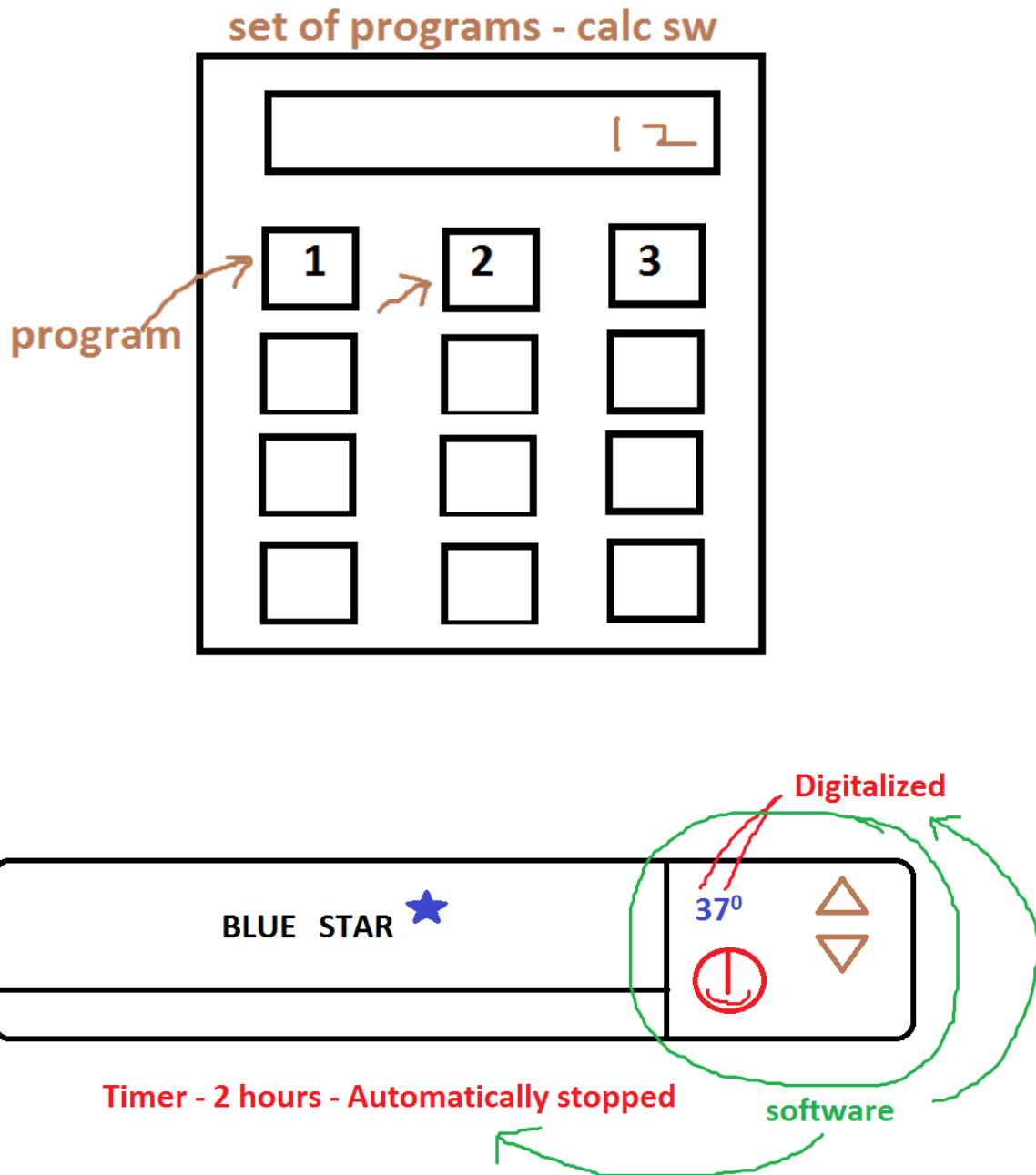
Why C is a high level / middle level language?

What is a program?

Set of instructions is called program.

What is a software?

Set of programs is called software. As per the it industry software is a digitalized and automated process.



We are having 2 type of software.

1. System software

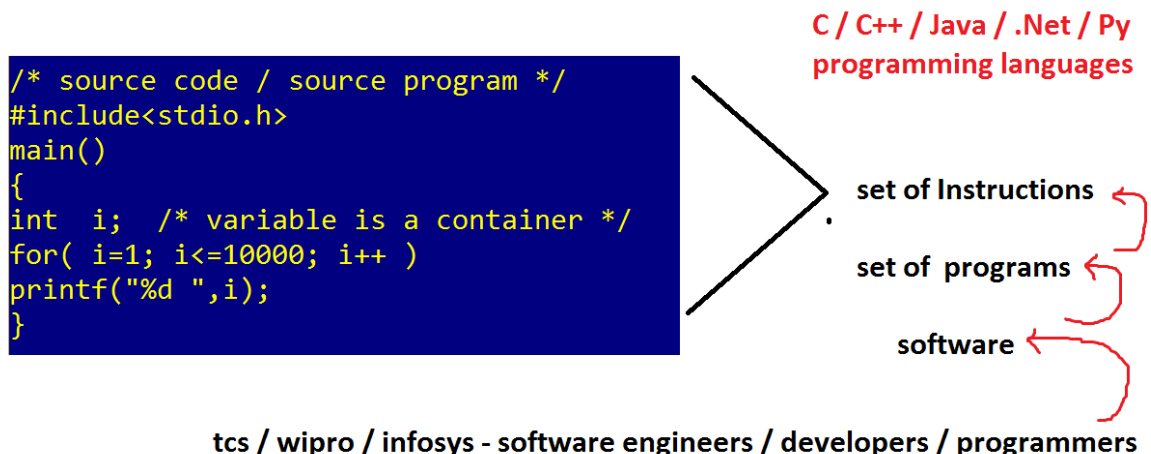
Eg: os, device drivers, translators

2.Application software

Eg: fb, googlepay, phonepe, whatsapp,...

What is a language?

Generally the languages like telugu / English / hindi / Marathi are used to communicate with humans. Hence they are called **human languages**. To communicate with the machines we have to create the **programs [software]** and for this we are using the **computer programming languages** like C / C++ / Java / .Net / Python etc.



Basically the computer languages divided into 3 types.

1. **Machine language**: Created with binary code [0,1]. Hence they are also called binary languages.

Eg: 10001111

2. **Low level / assembly language**: Created with English like shortcuts called **MNEMONICS**.

The screenshot displays the Turbo C++ IDE interface. The top menu bar includes File, Edit, Search, Run, Compile, Debug, Project, Options, Window, and Help. The main editor window shows the source code for a file named ASS.CPP. The code includes a header file <stdio.h> and defines a main function. Inside main, three integer variables are declared: a = 10, b = 20, and c. An assembly block follows, containing instructions to move the values of a and b into the ax and bx registers, respectively, add the values in ax and bx, and then move the result back into the c register. Finally, the program uses printf to output the value of c. The status bar at the bottom of the editor shows the time 9:45. Below the editor, a command prompt window is open, displaying the output 'c= 30' followed by a cursor. The Windows taskbar at the bottom shows various application icons, including the Start button, File Explorer, VLC media player, a calculator, Google Chrome, a folder icon, Zoom, DEV, Word, and Paint. A system tray on the right shows the time as 12:04 PM on 30-May-24. A green banner across the taskbar indicates 'You are screen sharing' with a 'Stop share' button. An 'Activate Windows' watermark is visible in the bottom right corner of the command prompt window.

```
#include<stdio.h>
void main() {
    int a = 10, b = 20, c;

    asm {
        mov ax,a
        mov bx,b
        add ax,bx
        mov c,ax
    }

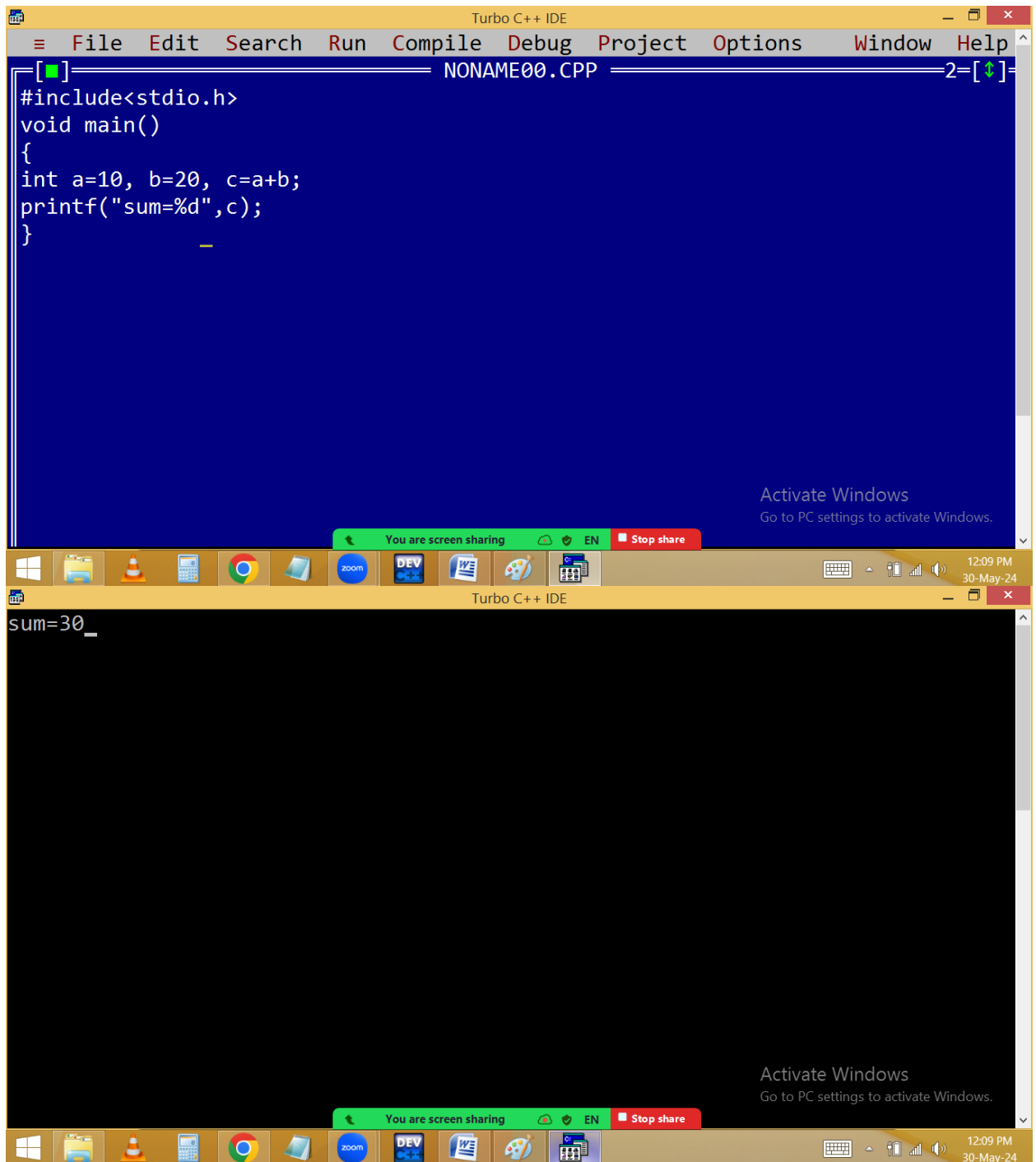
    printf("c= %d",c);
}
```

c= 30_

Eg: gd mrg, add, sub,...

3.High level language: Created with simple English and easy to understand.

Eg: Good morning, addition, subtraction



The image shows a screenshot of the Turbo C++ IDE. The top window, titled 'NONAME00.CPP', contains the following C code:

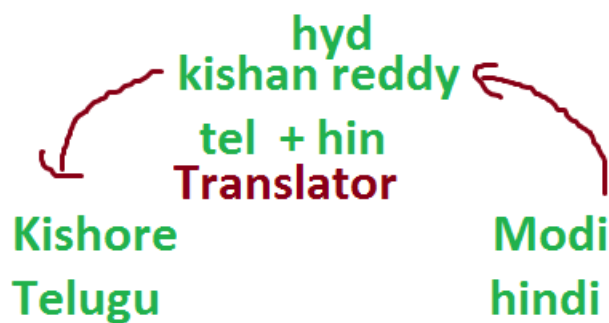
```
#include<stdio.h>
void main()
{
int a=10, b=20, c=a+b;
printf("sum=%d",c);
}
```

The bottom window shows the output of the program: 'sum=30_'. The Windows taskbar at the bottom includes icons for various applications and the system clock showing 12:09 PM on 30-May-24. A green banner across the middle of the IDE windows reads 'You are screen sharing' with a 'Stop share' button.

C is having both low level and high level features. Hence C is a middle level language.

C low level features are used to develop **system software** and **High level features** used to develop **application software**. Hence C is called it is a **multipurpose** programming language

What is a translator?



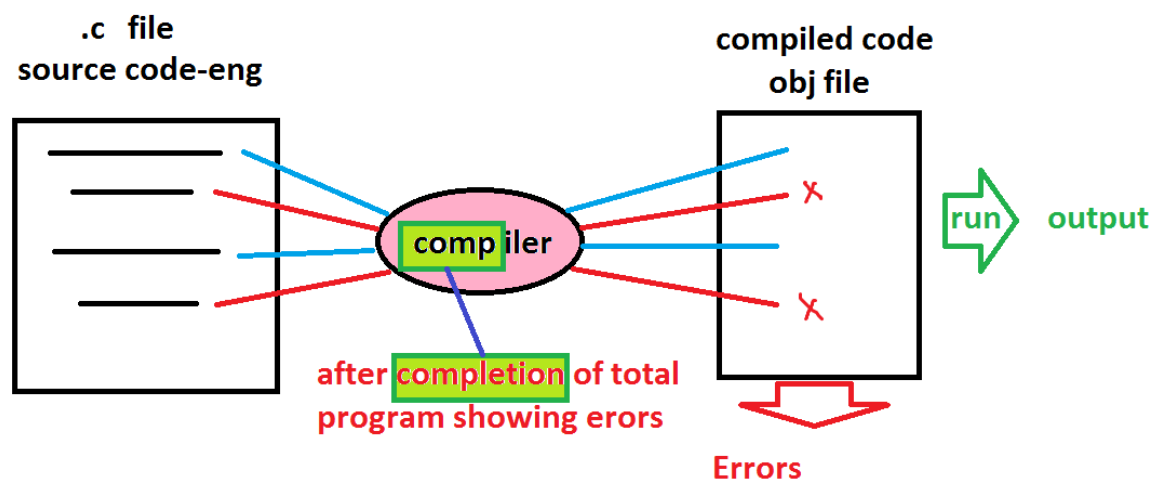
Always the user given input [program] is in English, which is called source code / source program. But the computer is not able to understand English. Due to this we have to convert this source code to binary code and to check the errors [programming mistakes] with the help of translator.

We are having 3 types of translators.

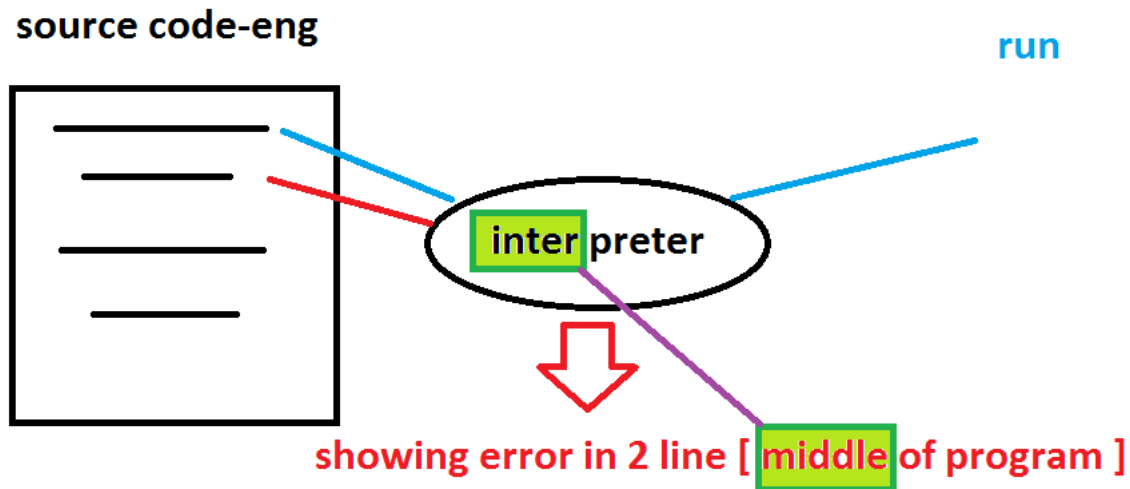
- 1.Compiler
- 2.Interpreter
- 3.Assembler

Compiler and interpreter both used to convert high level languages to binary code.

Compiler converts the total source code into binary code **at once by leaving error lines.**



Interpreter checks **line by line.**



Assembler working style is similar to the compiler.

C and c++ are using compiler. Hence they are called compiler based programming languages.

In java , .net , python we are using both compiler and interpreter. Hence they are called compiler based interpreted languages.

Programming mistakes are called errors and they are of two types.

1. Compile time errors / syntactical errors

2. Runtime errors

What is programming paradigm?

Every programming language comes with certain rules and regulations with a structure, which is technically called programming paradigm.

Before c language the programming languages are using monolithic programming paradigm. In this paradigm the entire program they are creating with single [mono] program. Due to this it is very difficult to identify the errors, takes more memory and due to this performance is low. We can't use part of the program in monolithic program.

The image shows a screenshot of the Turbo C++ IDE. The top window displays the source code for a C program named NONAME00.CPP. The code is as follows:

```
// monolithic programming
#include<stdio.h>
void main()
{
printf("-----\n");
printf("Good morning to all\n");
printf("-----\n");
printf("Welcome to c\n");
printf("-----\n");
printf("Thank you\n");
printf("-----");
}
```

The bottom window shows the output of the program. It displays the text "Good morning to all", "Welcome to c", and "Thank you", each preceded by a line of dashes. The IDE interface includes a menu bar (File, Edit, Search, Run, Compile, Debug, Project, Options, Window, Help), a toolbar, and a status bar. A Windows taskbar is visible at the bottom of the screen, showing various application icons and the system clock (11:37 AM, 03-Jun-24). A green banner at the top of the bottom window indicates "You are screen sharing".

to avoid this problem, they have introduced pop [procedure oriented programming structure]. In

pop a big program is divided into several small sub programs / sub routines / procedures / functions / modules / structures.

POP Advantages:

- 1.Modularity: Dividing a big program into small pieces according to the project requirement**
- 2.Simplicity: easy to read and understand.**
- 3.Reusability: write once, use many times.**
- 4.Efficiency: performance is high.**

The image shows a screenshot of the Turbo C++ IDE. The top window displays the source code for a program named NONAME00.CPP. The code includes a header file, a function to print a dashed line, and a main function that calls this function and prints three messages. The bottom window shows the output of the program, which consists of the three messages followed by dashed lines. The Windows taskbar at the bottom shows the time as 11:46 AM on 03-Jun-24.

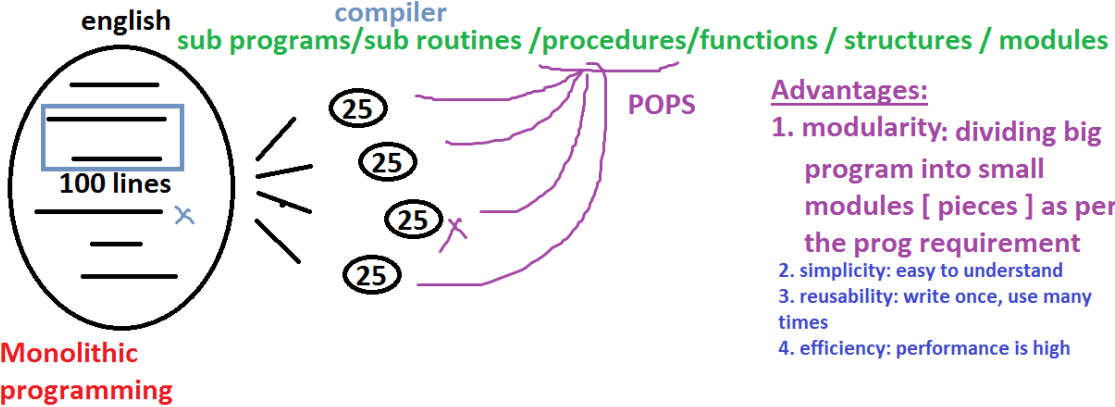
```
// POP programming
#include<stdio.h>
void line()
{
printf("-----\n");
}
void main()
{
line();
printf("Good morning to all\n");
line();
printf("Welcome to c\n");
line();
printf("Thank you\n");
line();
}
```

Good morning to all

Welcome to c

Thank you

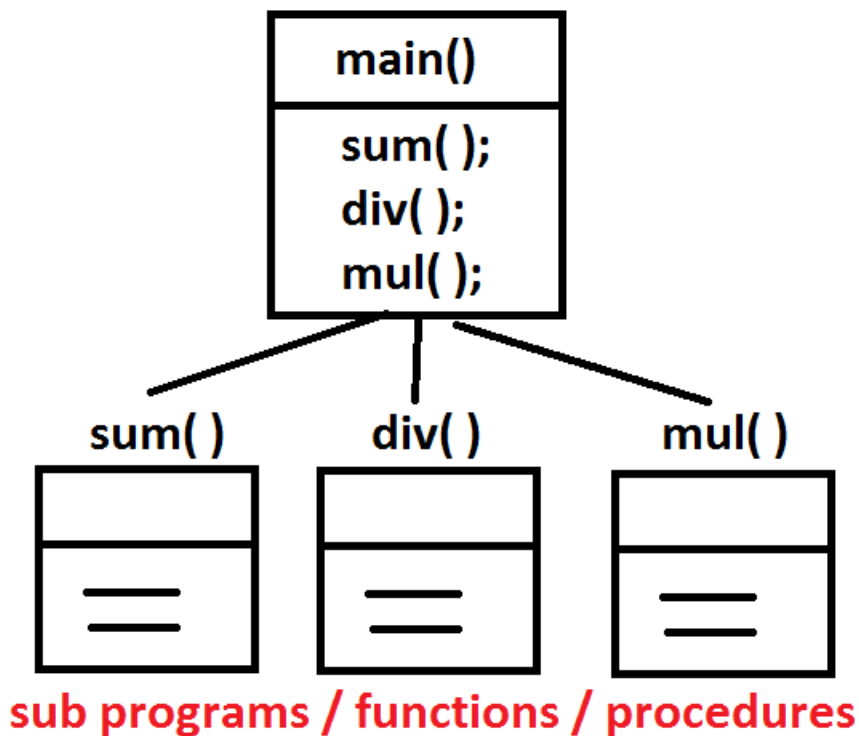
program - source code



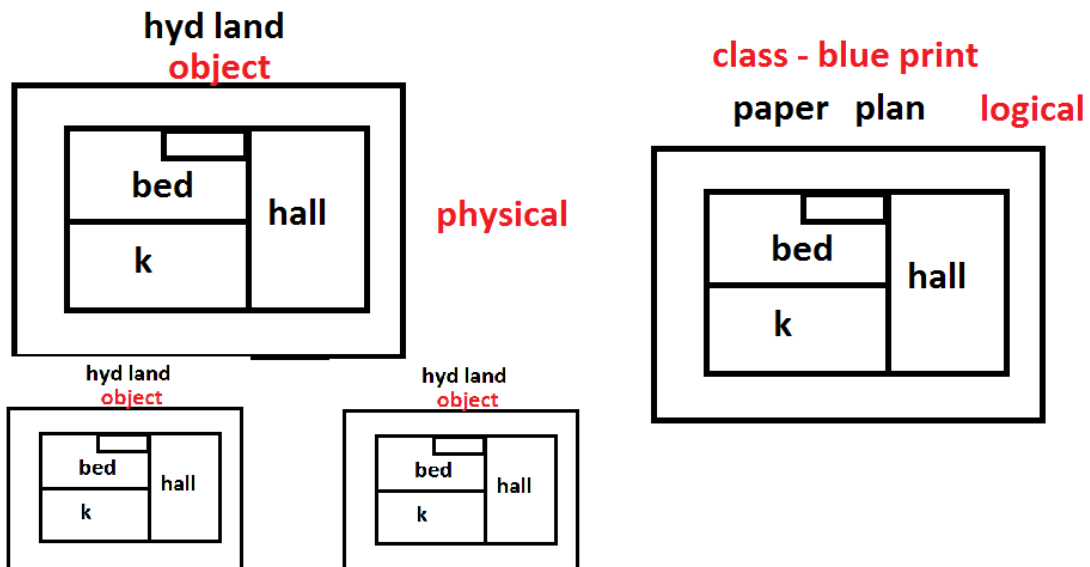
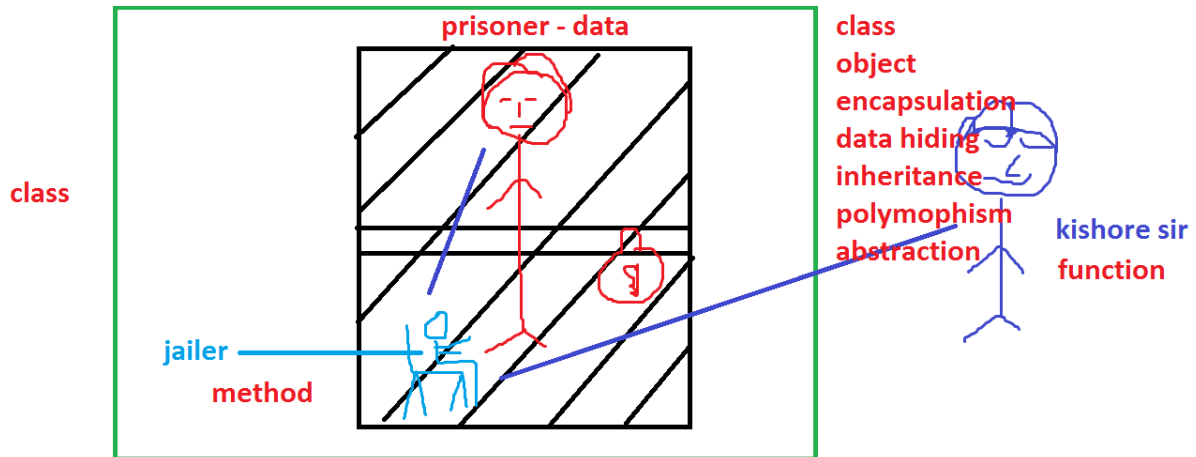
Advantages:

1. modularity: dividing big program into small modules [pieces] as per the prog requirement
2. simplicity: easy to understand
3. reusability: write once, use many times
4. efficiency: performance is high

Function oriented programming structure:



What is OOP's:



Why C is a general purpose language?

Using C language we can develop the applications like

1.Operating systems

Eg: windows, unix, linux, android, mac, ios,...

2.Translators

Eg: compiler, interpreter, assembler

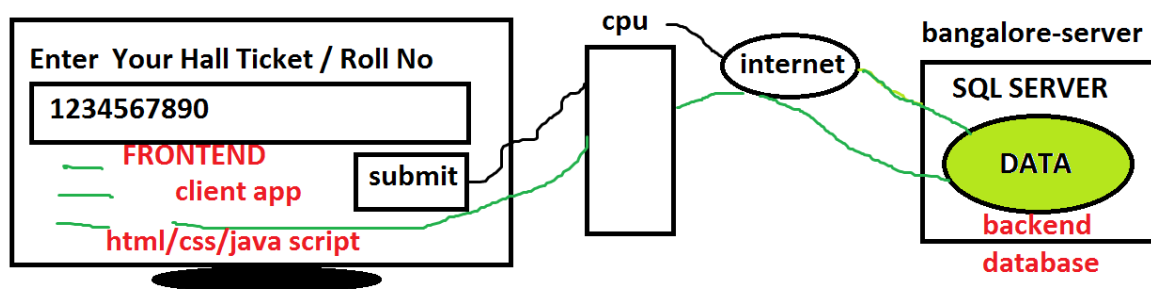
3.Device drivers

Eg: audio / video / usb / printer drivers



4.Data base

Eg: oracle, My SQL, SQL Server, mongodb,...

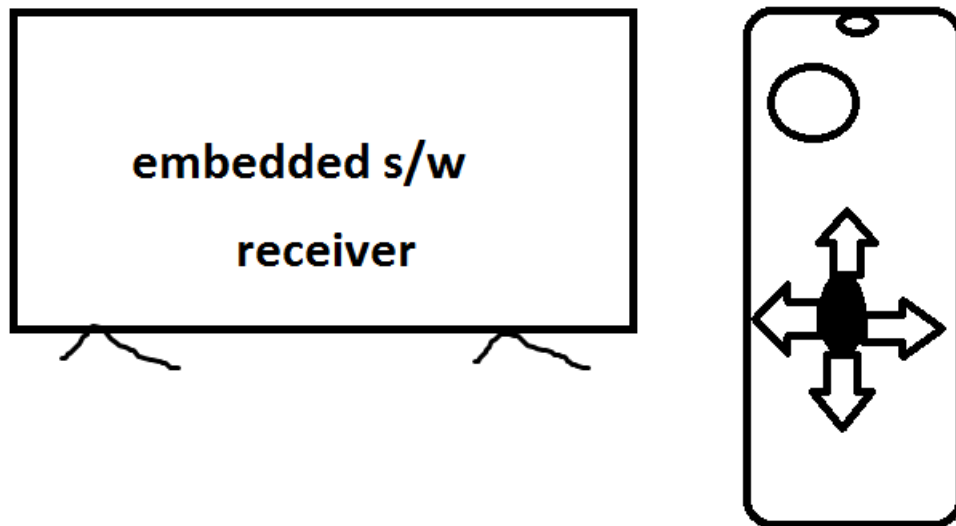


5.Commercial applications

Eg: hotel / super market / college / atm / google pay,.....

6.Embedded applications

Eg:



7. PC & Mobile games

8. Antivirus

Eg: quick heal, macfee, avast,...

9. Media players

Eg: vlc, mx-player, windows media player,...

10. Editors

Eg: ms-word, notepad, wordpad,...

11. Browsers

Eg: chrome, firefox,....

12. Any type of standalone applications.

Eg: ms-office, calendar, calculator

Hence c is also called it is a multipurpose programming language.