Unit-1

Course Name: BCA

Subject Code : 1CS1010101

Subject Name: FUNDAMENTALS OF COMPUTER PROGRAMMING

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Types of Programming languages

There are three types of programming languages.

- Machine language.
- Assembly language.
- High-level language.

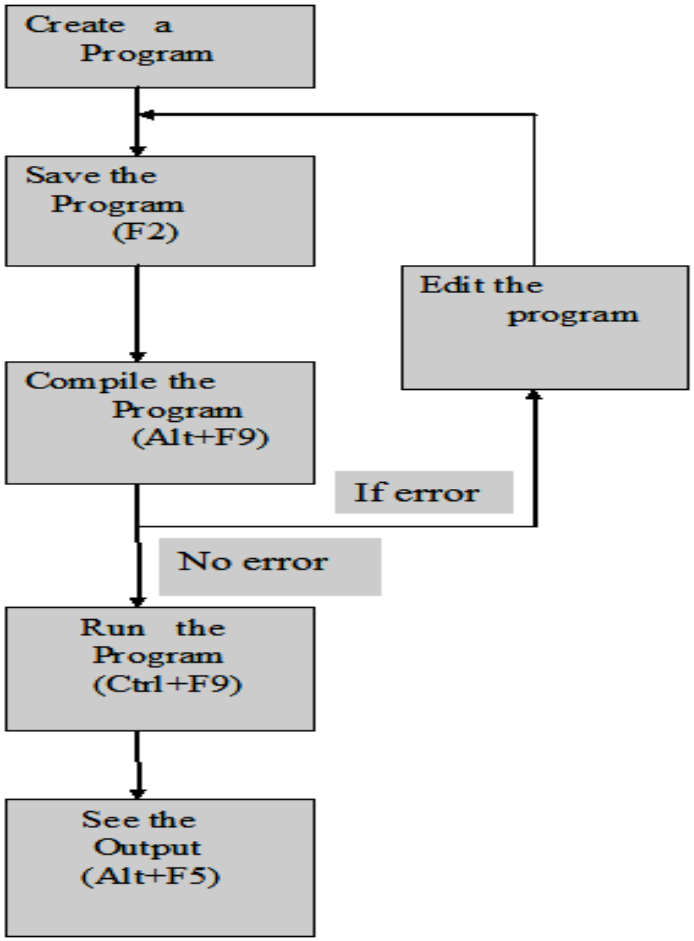
Definition of C Language.

- C is a procedure oriented, high level programming language. It follows top-down approach of programming.

History of C Language

- C language was developed by 'DENNIS RITCHIE" at the Bell laboratory, New Jersey, America in 1972.
- In 1967 Martin Richards developed a language called BCPL (Basic Combined Programming Language).
- In 1970 Ken Thompson created language using many features of the BCPL. This language is called B language after that newer version of B language is created by Dennis Ritchie that is called C language.

How to Create, Compile and Run the Program in C Language.



Shortcut Key in Turbo C++ editor is as below.

- Ctrl+N → New File
- F2 → Save
- Alt+F3 → Close
- Alt+F9 → Compile
- Ctrl+F9 → Run
- F3 → Open File
- Ctrl+Ins → Copy
- Shift+Ins → Paste
- Shift+Del → Cut
- Ctrl+Del → Clear
- Alt+X → Quit

What is Program?

- Program is a set of instruction that executed sequentially one by one.

Language Converters.

- The program that converts one language code into another level language code is called language converter.

Some Language Converters are:-

- **Compiler:** Compiler is a one type of program or software that converts high level code into machine level language code.
- **Assembler:** Assembler is the program that converts assembly language code into machine level language code.
- **Interpreter:** Interpreter is the program that converts high level language code into machine level language code but it converts it step by step.

Sample Program
(Program to print Simple massage on Screen)

```
#include<stdio.h>
#include<conio.h>
void main( )
{

   clrscr( );
   printf("Hello C Language");
   getch( );
}
```

OUTPUT:-

Hello C Language

Sample Program
(Program to print Name, Address, City, Pin code on Screen)

```
#include<stdio.h>
#include<conio.h>

void main()
{
clrscr();
printf("Name :  Ronak Patel \n");
printf("Address : Vaishali Soc.\n");
printf("City : Mehsana \n ");
printf("Pin : 384002");
getch();
}
```

OUTPUT:-

Name : Ronak Patel
Address : Vaishali Soc.
City : Mehsana
Pin : 384002

Variable

- Variable is a data name that is used for store a value.

Declaration of variable

- The general syntax for declaration of variable is as below.

Datatype var1, var2, var3,.....varn ;

- **e.g :→**

  int x, y, total;

  float radious, area;

- Here int and float are called datatype.
- x, y, tota,radious and area are variable name

Assign a value to variable

- The general syntax for assign a value to the variable is as below.

Var name = value;

```
int  x, y;          (declaration)
x=5;                (Assign value to variable)
y=10;               (Assign value to variable)
```

Sample program
(Program to implement the concept of variable)

```
#include<stdio.h>
#include<conio.h>

void main( )
{
int x,y;
clrscr( );
x=10;
y=20;
printf("Value of x = %d \n", x);
printf("Value of y = %d \n", y);
getch( );
}
```

OUTPUT:-

```
Value of x = 10
Value of y = 20
```

Sample Program
(Program to calculate the sum of two variables)

```
#include<stdio.h>
#include<conio.h>
void main()
{
   int x,y,sum;
   clrscr();
   x=1000;
   y=2000;
   printf("_____\n");
   printf("The value of x = %d\n",x);
   printf("The value of y = %d\n",y);
   printf("_____\n");
   sum=x+y;
   printf("The value of sum=%d\n",sum);
   printf("_____\n");
   getch();
}
```

Output:

The value of x = 1000

The value of y = 2000

The value of Sum = 3000

printf( ) function

- printf( ) function is a predefine function.
- It is used for printing a massage on output screen .
- It is used for output parpose .

- The general syntax of printf( ) statement is as below.

printf(“Control String”,var1,var2….varn);

scanf( ) function

- scanf( ) is a predefine function.
- It is used for getting a value of variable using key-bord. That means If user want to give value to the variable through key-bord. He can use scanf() statement.
- So It is used for input purpose.
- The general syntax of scanf( ) function is as below.

scanf("control string",&var1,&var2.....&varn);

Sample program
(Program to implement the concepts of printf() and Scanf() function)

```
#include<stdio.h>
#include<conio.h>
 void main( )
{
int x,y;
clrscr( );
printf("Enter the two values :\n");
scanf("%d %d",&x,&y);
printf\(values of x = % d\n",x);
printf\(values of y = % d\n",y);
getch( );
}
```

OUTPUT:-

```
Enter two values
100
200
value of  x = 100
value of  y = 200
```

Sample Program
(Program to implement the concepts of printf() and Scanf() function)

```
#include<stdio.h>
#include<conio.h>
void main(void)
{
int x,y,sum;
clrscr();
printf("Enter values of x and y using keyboard\n");
scanf("%d%d",&x,&y);
sum=x+y;
printf("x=%d\ny=%d\n",x,y);
printf("sum=%d\n",sum);
getch();
}
```

Output:

Enter values of x and y using keyboard

10

20

x=10

Y=20

Sum=30

Sample Program
(Program to implement Arithmetic calculation)

```
#include<stdio.h>
#include<conio.h>
void main(void)
{
long int x,y,sum,sub,mul,div,rem;
clrscr();
printf("Enter any two values from keyboard\n");
scanf("%ld%ld",&x,&y);
sum=x+y;
sub=x-y;
mul=x*y;
div=x/y;
rem=x%y;
printf("Sum=%ld\n",sum);
printf("Sub=%ld\n",sub);
printf("Mul=%ld\n",mul);
printf("Div=%ld\n",div);
printf("Rem=%ld\n",rem);
getch();
}
```

Output:

```
Enter any two values from keyboard
200
100
Sum=300
Sub=100
Mul=20000
Div=2
Rem=0
```

Sample Program
(program to calculate area of rectangle)

```
#include<stdio.h>
#include<conio.h>
void main(void)
{
  int l,b,a;
  clrscr();
  printf(“Enter length and breath of rectangle\n");
  scanf("%d%d",&l,&b);
  a=l*b;
  printf("area of rectangle=%d\n",a);
  getch();
}
```

Output:

```
Enter length and breath of rectanle
5
6
area of rectangle=30
```

Sample Program
(Program to calculate area of square)

```
#include<stdio.h>
#include<conio.h>
void main(void)
{
  int l,a;
  clrscr();
  printf(“Enter length  of square\n");
  scanf("%d",&l);
  a=l*l;
  printf(“Area of square=%d\n",a);
  getch();
}
```

Output:

Enter length of square

5

Area of square==25

Sample Program
(program to calculate area of circle)

```
#include<stdio.h>
#include<conio.h>
#define PI 3.14
void main(void)
{
  float r,a;
  clrscr();
  printf("Enter the radius of circle\n");
  scanf("%f",&r);
  a=PI*r*r;
  printf("Area of Circle=%f\n",a);
  getch();
}
```

Output:

```
Enter the radius of circle
4
Area of Circle=50.240002
```

Sample Program
(program to calculate simple interest)

```
#include<stdio.h>
#include<conio.h>
void main(void)
{
float p,r,n,si;
clrscr();
printf("Enter the value of p, r and n\n");
scanf("%f%f%f",&p,&r,&n);
si=p*r*n/100;
printf("Simple interest=%f\n",si);
getch();
}
```

Output:

```
Enter the value of p, r and n
5000
10
5
Simple interest=2500.000000
```

Sample Program
(program to calculate area and volume of sphere)

```
#include<stdio.h>
#include<conio.h>
#define PI 3.14
void main(void)
{
  float a,v,r;
  printf(“Enter radios of Sphere\n");
  scanf("%f",&r);
  a=4*PI*r*r;
  v=4*PI*r*r*r/3;
  printf("Area of Sphere=%f\n",a);
  printf("Volume of Sphere=%f\n",v);
  getch();
}
```

Output:

```
Enter radios of Sphere
4
Area of Sphere=200.960007
Volume of Sphere=267.946655
```

Sample Program
(program to calculate area of rectangle, triangle and cube)

```
#include<stdio.h>
#include<conio.h>
void main(void)
{
 float ar,l,w,at,h,b,lc,ac;
 clrscr();
 printf("Enter l and w of rectangle\n");
 scanf("%f%f",&l,&w);
 ar=l*w;
 printf("Area of rectanle=%f\n",ar);
 printf("Enter h and b of tringle\n");
 scanf("%f%f",&h,&b);
 at=h*b/2;
 printf("Area of tringle=%f\n",at);
 printf("Enter length of cube\n");
 scanf("%f",&lc);
 ac=lc*lc*lc;
 printf("Area of cube=%f\n",ac);
 getch();
}
```

Output:

```
Enter l and w of rectangle
3
4
Area of Rectanle=12.000000
Enter h and b of tringle
4
5
Area of Tringle=10.000000
Enter  length of  cube
4
Area of  cube=64.000000
```

Basic structure of C program

- There are six section in the basic structure of C program.

1. Documentation Section
2. Link Section
3. Definition Section
4. Global Declaration Section
5. Main() function section
    a. Declaration Part
    b. Executable Part
6. Sub-Program Section.

Documentation Section

- Documentation section is used for comment line.
- If programmers want use author name , program title or other details in a program then he can use comment line for it.
- This section is used for documentation purpose. Comments are part of program but it is not executed by the compiler.
- So, even though it is exist in your program but it is not consider by compiler.
- There are two types of comment.
  1. **Single line comment**
  2. **Multi line comment**

Single line comment

- Single line comment is given by // (double slash). This comment is used for only single line.

- **e.g.→**

// The author name is Ronak Patel

// It is a program for calculating area of circle

Multiline comment

- Multi line comment: it is used for more than one line. it is represented by /*.....*/
- e.g. /* this is a program for area of circle
  this program is made by Dr.Ronak Patel*/

Link section

- **In this section header files are included in our program.**
- **This header file contains some predefined library functions. If we want to use those predefined functions in our program then we have to add header file in our program**

Header Files Example

HEADER FILE	LIBRARY FUNCTION
stdio.h	printf(), scanf()
conio.h	clrscr(),getch()
string.h	strcpy(),strcat(),strcmp(),strlen() etc
math.h	sqrt(),cbrt(),sin(),cos(),pow(),log() etc
graphics.h	line(),rectangle() etc

Definition section

- **This section is used for defining symbolic constant.**
- **Constant means those value that does not change during the execution of program.**
- **The general syntax of symbolic constant is as below.**

#define Constant_name Constant_value

e.g. #define PI 3.14

#define X 5

Global declaration section

- **It is used for declaring global variable**

```
#include <stdio.h>
#include <conio.h>
int g;
 void main(void)
            {
              int x;
               .
                  .
               .
            }
```

- **here, “g” is a global variable and “x” is a local variable**

Main program section

- **In this section main() function is define.**
- **This section has two parts**
  - **Declaration part:**

    In this part variable are declared.

    e.g. int x,y:

    float r,area;

  - **Executable part:**
    - **After variable declaration other statements are executed in a main() function.**

Sub program section

- **In a C language you can define a user define function as per your requirement in a program.**
- **These user define functions are written in a sub program section.**

<table>
<tr><td colspan="2">/*This is a program for area of circle. This program is made by Dr. Ronak Patel on 20-08-2020 *\</td><td>Documentation section</td></tr>
<tr><td colspan="2">#include<stdio.h>
#include<conio.h></td><td>Link section</td></tr>
<tr><td colspan="2">#define PI 3.14</td><td>Definition section</td></tr>
<tr><td colspan="2">int g;</td><td>Global declaration section</td></tr>
<tr><td colspan="2">void main(void)
{</td><td rowspan="3">Main program section</td></tr>
<tr><td>float r, area;</td><td>Declaration part</td></tr>
<tr><td>clrscr()
r=5
area= PI*r*r
printf(“area=%f\n”,area);
getch();
}</td><td>Execution part</td></tr>
<tr><td colspan="2">void printline(void)
{
printf(“\n_____\n”)
}</td><td>Sub program section</td></tr>
</table>

Important / Advantage of C Language

- It has rich set of built-in functions and operators that can be use to write a complex program.
- Programs written in C are efficient and fast.
- There are only 32 keywords.
- C is highly portable means C programs written for one computer that can be run on another computer with little or no modification.
- C language is well suited for structured programming, thus requiring the user to think of a problem in terms of function or modules or blocks.
- Another feature of C is its ability to extend itself. A C program is basically a collection of function that is supported by the C library.