

C++ Programming

Basics

Introduction :

C++ is an object oriented programming language. It is an extension of C programming language.

C++ is a powerful general purpose programming language. It can be used to develop operating system, browsers, games and so on.

C++ supports different way of programming like procedural, object-oriented, functional and so on. This makes C++ powerful as well as flexible.

Basic syntax :

```
# include <iostream>
using namespace std;
// main method. where the program execution
// starts.
int main() {
    // This is where you write your code
    return 0;
}
```

Output in C++ :

```
Cout << "HelloWorld!";
```

Cout is used to print anything which is written inside " " on the screen.

Input in C++ :

```
Cin >> value;
```

Cin is used to take input and store it in variable.

comments in C++:

single line comment:

// this is single line comment

multi-line comment

/* this is multiline comment.
Span multiple line.

*/

conditions and if statement :

```
if (Condition) {  
    // Block of Code  
}
```

C++ if Statement tests the condition. it is executed if the condition is true:

example: int a = 20;

```
if (a > 15) {  
    cout << "a is greater than 15";  
}
```

python, C, Java, HTML Handwritten
notes uploaded on telegram (link in Bio)

if-else statement :

the C++ if-else statement also tests the condition. it executes if block if condition is true otherwise else block is executed.

```
if (s > 7) {  
    cout << "s is greater than 7";  
}  
else {  
    cout << "7 is greater than s";  
}
```

else-if statement:

the C++ if-else ladder statement executes one condition from multiple statements.

```
if (s > 7) {  
    cout << "s is greater than 7";  
}  
elseif (s == 7) {  
    cout << "s is equal to 7";  
}  
else {  
    cout << "7 is greater than s";  
}
```

Switch Case Statement :

A switch statement allows you to test an expression against a variety of cases. If the match is found, the code within begins to run. A case can be ended

switch (grade) {

{

Case A:

cout << "expert";
break;

case B:

cout << "intermidiator";
break;

case C:

cout << "Beginner";
Break;

default:

cout << "Invalid In";
break;

}

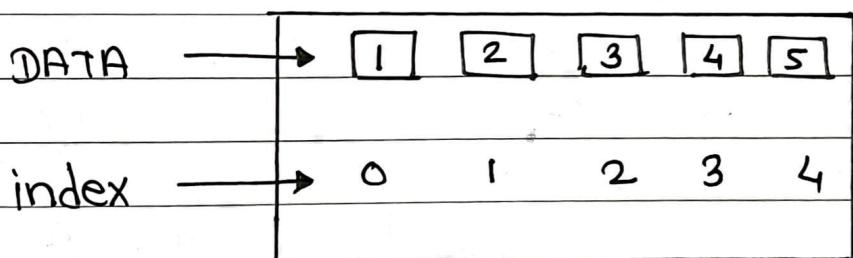
Arrays :

Arrays :

array in C++ is a group of similar type of elements that have contiguous memory location

In C++ `std::array` is a container that encapsulates fixed size arrays. In C++, array index start from 0.

We can store fixed set of element in C++ array.



example : program to print an array

```
#include <iostream>
using namespace std;
int main () {
    string str[3] = {"Apple", "Banana", "mango"};
    for (int i=0; i<4; i++)
    {
        cout << str[i] + " ";
    }
    return 0;
}
```

functions :

The functions in c++ language is also known as procedure or subroutine in other programming languages.

every function has a name that is used to refer to it when it is called. A function typically contains the following parts:

- Return value
- parameters
- Declaration

example:

```
#include <iostream>
using namespace std;
int sum(int a, int b) { → Declaration
    return a+b;
}
int main() {
    int num1 = 10;
    int num2 = 30;
    sum(num1, num2); → calling a function
}
```

C++ BASIC PROGRAMS

I) Fibonacci Series in C++

```
→ #include<iostream>
using namespace std;
int main()
{
    int n1, n2, n3, i, number;
    n1 = 0;
    n2 = 1;
    cout << "enter the number of elements : ";
    cin >> number;
    cout << n1 << n2 << " ";
    // printing 0 & 1
    for(i=2 ; i<number ; i++)
    {
        n3 = n1+n2;
        cout << n3 << " ";
        n1 = n2;
        n2 = n3;
    }
    return 0;
}
```

Output :

enter the numbers of element : 10

0 1 1 2 3 5 8 13 21 34

2) prime number program in C++.

```
→ #include <iostream>
using namespace std;
int main()
{
    int n, i, m=0, flag=0;
    cout << "enter number to check prime : ";
    cin >> n;
    m = n/2;
    for(i = 2; i <= m; i++)
    {
        if(n % i == 0)
        {
            cout << "number is not prime." << endl;
            flag = 1;
            break;
        }
    }
    if(flag==0)
    {
        cout << "number is prime." << endl;
    }
    return 0;
}
```

output:

enter a number to check prime : 20
number is not prime

enter a numbers to check prime: 17
number is prime

3)

palindrome numbers in C++

the palindrome number is same after reverse.

example: 121, 32123, 2372732

→ #include <iostream>

using namespace std;

int main()

{

int n, r, sum = 0, temp;

cout << "enter the number = ";

cin >> n;

temp = n;

while(n > 0)

{

r = n % 10;

sum = (sum * 10) + r;

n = n / 10

}

```
if (+temp == sum)
    cout << "number is palindrome." ;
else
    cout << "number is not palindrome." ;
return 0;
}
```

Output :

```
enter the number = 12321
Number is palindrome
```

```
enter the number = 120
number is not palindrome
```

4) Factorial program in C++

```
→ #include <iostream>
using namespace std;
int main()
{
    int i, fact, number;
    cout << "enter any number:" ;
    cin >> number;

    for (i = 1; i <= number; i++)
    {
        fact = fact * i;
    }
    cout << "factorial of " << number << " is: "
        << fact << endl;
    return 0;
}
```

Output :

enter any number: 5
factorial of 5 is: 120

Q) C++ Program to swap two numbers without using third variable:

```
→ #include<iostream>
using namespace std;
int main()
{
    int a=20, b=50;
    cout << "Before swap a = " << a << " b = " << b;
    a = a+b || a=70 (20+50)
    b = a-b || b=20 (70-50)
    a = a-b || a=50 (70-20)
    cout << "After swap a = " << a << " b = " << b;
    return 0;
}
```

Output :

Before swap a = 20, b = 50
After swap b = 20, a = 50
after swap a = 50, b = 20

Q) C++ program to print half star pyramid pattern:

```
#include <iostream>
using namespace std;
int main()
{
    int n, i;
    cout << "enter the number of rows:";
    cin >> n;
    for (i=1; i<=n; i++)
    {
        for (j=1, j<=i, j++)
            cout << "* ";
        cout << "\n";
    }
    return 0;
}
```

Output:

enter number rows: 5

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

7) C++ program for full * pyramid

```
→ #include <iostream>
using namespace std;

int main()
{
    int rows, i, j, spaces;

    cout << "enter number rows : ";
    cin >> rows;

    for(i=1; i<=rows; i++)
    {
        for (spaces = 1; spaces < rows;
             spaces++)
        {
            cout << " ";
        }

        for (j=1; j<=2*(i-1); j++)
        {
            cout << "*";
        }

        cout << "\n";
    }

    return 0;
}
```

8) **output :**

enter number of rows : 7

```

    *
   * *
  * * *
 * * * *
* * * * *
* * * * * *
* * * * * * *

```

8) **Sum of digit program C++;**

```

→ #include <iostream>
using namespace std;
int main()
{
    int n, sum = 0, m;
    cout << "enter a numbers : ";
    cin >> n;

    while (n > 0)
    {
        m = n % 10;
        sum = sum + m;
        n = n / 10;
    }
    cout << "sum is = " << sum << endl;
    return 0;
}

```

Output:

enter a number = 55

sum is 10