**24 Coding and Robotics School**

**C++ Programming Course Module (2-Months Plan)**

**Course Duration:** 2 Months (8 Weeks)  
**Days per Week:** 3 Days (e.g., Monday, Wednesday, Friday)  
**Hours per Day:** 2 Hours  
**Total Sessions:** 24 Sessions

### ****Week 1: Introduction to Programming & C++ Basics****

****Day 1:- Introduction TO C++ & Installation Setup****To setup a C++ programming environment on Windows, you'll need two main components:

* ****VS Code****: A text editor to write your code,
* ****MinGW****: A compiler that turns your C++ code into an executable program.

**#include <iostream>**

**using namespace std;**

**int main() {**

**cout << "Hello, World!";**

**return 0;**

**}**

****Output:- Hello, World!****

**#include <iostream>**

**using namespace std;**

**int main() {**

**cout << "My Name is "<< “C++”;**

**return 0;**

**}**

****My Name is C++****

**#include <iostream>**

**using namespace std;**

**int main() {**

**// print Hello World & C++ Course to the screen**

**cout << "Hello World ";**

**Cout<<”C++ Course”;**

**return 0;**

**}**

****Output:- Hello World****

****C++ Course****

****Day 2: Variable, DataType, Input/Output****

****//Variable****

#include <iostream>

Using namespace std;

int main () { **Output: 5 and 2**

{

*// declaring variables:*

int a,

int b;

*// process:*

a = 5;

b = 2;

Cout<< a << “and” << b;

return 0;

}

#include <iostream>

Using namespace std;

int main () { **Output: 5 and 2**

{

*// declaring variables:*

int a, b;

*// process:*

a = 5;

b = 2;

Cout<< a << “and” << b;

return 0;

}  
  
  
// **DataType**

#include <iostream>

Size of char : 1

Size of int : 4

Size of short int : 2

Size of long int : 4

Size of float : 4

Size of double : 8

Size of bool : 1

using namespace std;

int main()

{

cout << "Size of char : " << sizeof(char) << endl;

cout << "Size of int : " << sizeof(int) << endl;

cout << "Size of short int : " << sizeof(short int) << endl;

cout << "Size of long int : " << sizeof(long int) << endl;

cout << "Size of float : " << sizeof(float) << endl;

cout << "Size of double : " << sizeof(double) << endl;

cout << "Size of bool : " << sizeof(bool) << endl;

return 0;

}

#include <iostream>

Spell : A

Name : john

age : 22

Positive: 1000

tempreture : -10

Population : 7000000000

pi : 3.14

price : 14.3456

Answer : true

using namespace std;

int main()

{

char Spell = ‘A’;

String name = “john”;

Int age = 22;

Unsigned int pos = 1000;

Short temp= -10;

Long pop = 7000000000;

Float pi = 3.14

Double price = 14.3456

Bool ans = “true”;

cout << " Spell : " << Spell << endl;

Cout << “ Name : “ << name <<end;

cout << “ age : " << age << endl;

Count << “ positive :” << pos <<endl;

cout << " tempreture : " << temp << endl;

Count << “population : “ <<pop <<endl;

cout << " pi : " << pi << endl;

cout << " price : " << price << endl;

cout << " Answer : " << ans << endl;

return 0;

}

**// Input**

#nclude <iostream>

Using namespace std;

Int man(){

Int num;

Cout<<”enter an integer :”;

Cin >> num;

Cout <<”the number is :“ << num;

Return 0   
}

if input is 4 ***Output:the number is 4***

#include <iostream>

Using namespace std;

int main() {

string name;

int age;

cout << "Enter your name: ";

cin >> name;

cout << "Enter your age: ";

cin >> age;

cout << "Hello " << name << "! You are " << age << " years old.";

return 0;}

**Day 3 : Operators**

1, Arithmetic Operator

#include <iostream>

using namespace std;

int main() {

int a = 8, b = 3;

cout << "a + b = " << a + b << endl;

cout << "a - b = " << a - b << endl;

cout << "a \* b = " << a \* b << endl;

cout << "a / b = " << a / b << endl;

cout << "a % b = " << a % b << endl;

return 0;

}

Outputs:**a + b = 11**

**a - b = 5**

**a \* b = 24**

**a / b = 2**

**a % b = 2**

**2,Relational Operator**

#include <iostream>

using namespace std;

int main() {

int x = 10, y = 5;

cout << (x > y) << endl;

cout << (x < y) << endl;

cout << (x == y) << endl;

cout << (x != y) << endl;

return 0;

}

**Outputs:1**

**0**

**0**

**1**

**3, Logical Operator**

#include <iostream>

using namespace std;

int main() {

bool a = true, b = false;

cout << (a && b) << endl;

cout << (a || b) << endl;

cout << (!a) << endl;

return 0;

};

**Outputs: 0**

**1**

**0**

**4, Incremental and Decremental Operator**

#include <iostream>

using namespace std;

int main() {

int num = 5;

cout << "Pre-increment: " << ++num << endl;

cout << "Post-increment: " << num++ << endl;

cout << "After post-increment: " << num << endl;

cout << "Pre-decrement: " << --num << endl;

cout << "Post-decrement: " << num-- << endl;

cout << "After post-decrement: " << num << endl;

return 0;}

**Outputs: Pre-increment: 6**

**Post-increment: 6**

**After post-increment: 7**

**Pre-decrement: 6**

**Post-decrement: 6**

**After post-decrement: 5**

****# Exercise Question****

1,Write a program that takes two integers from the user and prints:

-Which number is greater

-Whether they are equal  
Output:

Enter first number: 7

Enter second number: 5

7 is greater than 5.

2,Write a program that asks the user to enter two numbers.  
Then print their **sum**, **difference**, **product**, **quotient**, and **remainder.  
Output:  
Enter first numbers: 12**

**Enter second number: 4**

**Sum: 16**

**Difference: 8**

**Product: 48**

**Quotient: 3**

**Remainder: 0**

**Week 2 control Structure**

**Day 1 if-else & Nested if-else**

**// even or odd**

#include <iostream>

using namespace std;

int main() {

Int number;

Cout<< “Enter Number :”;

Cin>>number;

If (number % 2 == 0){

Cout<<number << “is even”<<endl;

}

Else{

Cout<<number<< “ is odd”<<endl;

}

return 0;

}

**Output:- Enter number : 9**

**9 is odd**

**// Pass or Fail**

#include <iostream>

using namespace std;

int main() {

Int score;

Cout<< “Enter Your Grade :”;

Cin>>score;

If (score > 50){

Cout<< “you passed the exam”<<endl;

}

Else{

Cout<<“ you failed, try again”<<endl;

}

return 0;

}

// Nested If-else ... else-if

#include <iostream>

using namespace std;

int main() {

Int number;

Cout<< “Enter Number :”;

Cin>>number;

If (number > 0){

Cout<<number << “Positive”<<endl;

}

Else-if(number < 0){

Cout<<number<< “ is Negative”<<endl;

}

Else{

Cout<<number<<”is Zero”<<endl;

}

return 0;

}  
  
Exercise Question:  
-make Grade report.

**Day 2 For-loop & do…while- loop**

#include <iostream>

Using namespace std;

Int main(){

For( I= 1; I<= 5; I++;){  
cout<< I <<”, “;

}

return 0;

}

**Output : 1, 2,3,4,5**

#include <iostream>

Using namespace std;

Int main(){

Int n, sum= 0;

Cout<< “Enter a Number”;

Cin>> n;

For( i= 1; i<= n; i++;){  
cout<< i <<”, “;

}

return 0;

}

// do…while Loop

#include <iostream>

Using namespace std;

Int main(){

Int choice;

do{

Cout<<”\n1. say Hellow \n”;

Cout<<”2. say How are you \n”;

Cout<<”3. Exit \n”;

Cout<< “enter your choice :”;

Cin>> choice;

If (choice == 1) {

Cout<<”hellow”;

}

Else if(choice == 2){

Cout<<”how are you”;

}

}while (choice != 3);  
return 0 }

**Day 3 Break, Continue, Goto & Switch…case**

*// break loop examp*

#include <iostream>

**10, 9, 8, 7, 6,**

**5, 4, 3,**

**countdown**

**aborted!**

Using namespace std;

int main ()

{

int n;

for (n=10; n>0; n--) {

cout << n << ", ";

if (n==3)

{

cout << "countdown aborted!";

break;

}

}

return 0;

}

*// Continue loop example*

#include <iostream.h>

**10, 9, 8, 7, 6, 4, 3,**

**2, 1, FIRE!**

int main ()

{

for (int n=10; n>0; n--) {

if (n==5) continue;

cout << n << ", ";

}

cout << "FIRE!";

return 0;

}

//goto

#include <iostream.h>

**10, 9, 8, 7, 6, 5, 4, 3,**

**2, 1, FIRE!**

int main (){

int n=10;

loop:

cout << n << ", ";

n--;

if (n>0) goto loop;

cout << "FIRE!";

return 0;

}

// Switch-Statement

#include <iostream>

int main() {

int day = 3; // Variable to be evaluated

switch (day) {

case 1:

cout << "Monday" << endl;

break; // Exits the switch statement

case 2:

cout << "Tuesday" << endl;

break;

case 3:

cout << "Wednesday" << endl;

break;

case 4:

cout << "Thursday" << endl;

break;

case 5:

cout << "Friday" << endl;

break;

case 6:

cout << "Saturday" << endl;

break;

case 7:

cout << "Sunday" << endl;

break;

default: // Executed if no case matches

cout << "Invalid day number" <<endl;

break;

}

return 0;

}

**Week 2 Exercise Question**

1,Write a program that:

-Asks the user to enter a mark (0 to 100).

-If the mark is invalid (less than 0 or greater than 100),

output will be invalid Number

Then classify it as:

90–100: A

80–89: B

70–79: C

60–69: D

< 60: F

Enter your mark: 105

Invalid! Please enter again.

Enter your mark: 88

Grade: B

2,Write a program that shows a simple calculator menu inside a do...while loop.  
The user should enter two numbers and choose an operation:

+, -, \*, /, %

Use switch-case to perform the correct operation.  
Exit the loop only when user enters 0.

**Sample Output:**

Enter first numbers: 8

Enter Second number : 2

Choose operation (+ - \* / %): /

Result: 4

Enter 0 to exit or any other number to continue: 1

...

**Week 3 Functions**

**Day 1: Functions**

*// function example*

**The result is 8**

#include <iostream>

Using namespace std;

int addition (int a, int b)

{

int r;

r=a+b;

return (r);

}

int main ()

{

int z;

z = addition (5,3);

cout << "The result is " << z;

return 0;

}

*/ function example*

#include <iostream.h>

**The first result is 5**

**The second result is 5**

**The third result is 2**

**The fourth result is 6**

int subtraction (int a, int b)

{

int r;

r=a-b;

return (r);

}

int main ()

{

int x=5, y=3, z;

z = subtraction (7,2);

cout << "The first result is " << z << '\n';

cout << "The second result is " << subtraction (7,2) << '\n';

cout << "The third result is " << subtraction (x,y) << '\n';

z= 4 + subtraction (x,y);

cout << "The fourth result is " << z << '\n';

return 0;

}

// passing parameter by reference  
#include <iostream>

using namespace std;

void swap(int &a, int &b) {

int temp = a;

a = b;

b = temp;

}

int main() {

int x = 5, y = 10;

swap(x, y);

cout << "After swap: x = " << x << ", y = " << y;

return 0;

}

**Day 2**

//Multiple Reference Parameter  
#include <iostream>

using namespace std;

void calculate(int a, int b, int &sum, int &product) {

sum = a + b;

product = a \* b;

}

int main() {

int x = 4, y = 6, total, prod;

calculate(x, y, total, prod);

cout << "Sum: " << total << ", Product: " << prod;

return 0;

}  
  
*// overloaded function*

**2**

**2.5**

#include <iostream.h>

int divide (int a, int b)

{

return (a/b);

}

float divide (float a, float b)

{

return (a/b);

}

int main ()

{

int x=5,y=2;

float n=5.0,m=2.0;

cout << divide (x,y);

cout << "\n";

cout << divide (n,m);

cout << "\n";

return 0;

}

*// prototyping*

#include <iostream.h>

void odd (int a);

void even (int a);

int main ()

{

int i;

do {

cout << "Type a number: (0 to exit)";

cin >> i;

odd (i);

} while (i!=0);

return 0;

}

void odd (int a)

{

if ((a%2)!=0) cout << "Number is odd.\n";

else even (a);

}

void even (int a)

{

if ((a%2)==0) cout << "Number is even.\n";

else odd (a);

}

**Day 3 Arrays**

//array

#include <iostream>

Using namespace std;

Int main(){

int nums[3] = {10, 20, 30};

int arr[] = {5, 10, 15};

cout << nums[0];

Cout<< arr[2];

return 0;

}

**10**

**12**

//Array to loop

#include <iostream>  
using namespace std;

Int main(){

int sum = 0,

values[] = {1, 2, 3, 4};

for (int i = 0; i < 4; i++) {

sum += values[i];

}

cout << "Sum: " << sum;

Cout<<” size of value :” <<sizeof(value);

return 0;

}

**10**

**Size of Value:4**

**//Multidimensional Array**

#include <iostream>

using namespace std;

int main() {

// Declare and initialize a 2x3 matrix

int matrix[2][3] = {

{1, 2, 3},

{4, 5, 6}

};

// Access and print a specific element

cout << "Element at [0][2]: " << matrix[0][2]; // **Output:3**

return 0;

}

//multidimensional array wth loop

#include <iostream>

using namespace std;

int main() {

// Declare and initialize a 2x2 matrix

int table[2][2] = {

{10, 20},

{30, 40}

};

// Loop through rows and columns using nested loops

for (int i = 0; i < 2; i++) {

for (int j = 0; j < 2; j++) {

cout << table[i][j] << " "; // Print each element

}

cout << endl; // New line after each row

}

return 0;}

**Week 4 String & pointer & Reference**

**Day 1 String**

//String  
#include <iostream>

using namespace std;

int main() {

// Declare a character array (C-style string)

char name[] = "Yonas";

// Print the string

cout << "Hello, " << name;

return 0;

}

**Hello Yonas**

//concatenating c-Sting

#include <iostream>

#include <cstring> // Required for strcat()

using namespace std;

int main() {

char a[20] = "Hello ";

char b[] = "World!";

// Combine strings

strcat(a, b);

cout << a; // **Output: Hello World!**

return 0;

}

//String Class

#include <iostream>

#include <string>

using namespace std;

int main() {

string name;

// Input full name (with spaces)

cout << "Enter your full name: ";

getline(cin, name);

cout << "Welcome, " << name << "!";

return 0;

}

**Day 2 Pointers**

*#include <iostream>*

*using namespace std;*

*int main() {*

*int x = 10;*

*int\* ptr = &x; // Pointer to x*

*cout << "Value of x: " << x << endl;*

*cout << "Address of x: " << ptr << endl;*

*cout << "Value via pointer: " << \*ptr << endl; // Dereference to get value*

*return 0;*

*}*

**Value of x: 10**

**Address of x: 0x7ffe29ef1ba4**

**Value via pointer: 10**

#include <iostream.h>

**6, 10, 13**

void increase (void\* data, int type)

{

switch (type)

{

case sizeof(char) : (\*((char\*)data))++; break;

case sizeof(short): (\*((short\*)data))++; break;

case sizeof(long) : (\*((long\*)data))++; break;

}

}

int main ()

{

char a = 5;

short b = 9;

long c = 12;

increase (&a,sizeof(a));

increase (&b,sizeof(b));

increase (&c,sizeof(c));

cout << (int) a << ", " << b << ", " << c;

return 0;

}

#include <iostream>

using namespace std;

int main() {

int arr[3] = {10, 20, 30};

int\* p = arr; // Pointer to first element

for (int i = 0; i < 3; i++) {

cout << \*(p + i) << " "; // Access using pointer arithmetic

}

return 0;

}

**10,20,30**

//Pointer with Reference

#include <iostream>

using namespace std;

void swap(int\* a, int\* b) {

int temp = \*a;

\*a = \*b;

\*b = temp;

}

int main() {

int x = 5, y = 10;

swap(&x, &y); // Pass addresses to swap values

cout << "x = " << x << ", y = " << y << endl;

return 0;

}