



ASSIGNMENT # 01

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Roll no : FA21-BCS-008

Subject : DSA Lab

TASK 1:

```
#include <iostream>

using namespace std;

int main(){

int n1=100;

int *ptr;

ptr=&n1;


cout<<&n1; //print address of variable n1
cout<<endl;
cout<<n1;//print value of variable n1
cout<<endl;
//.....

cout<<ptr; //print address of variable n1 stored in ptr variable
cout<<endl;
cout<<&ptr;//print address of ptr
cout<<endl;
cout<<*ptr; //print value of variable n1 stored in ptr variable

}
```

AMMAR.cpp

```
1 #include <iostream>
2 using namespace std;
3 int main(){
4     int n1=100;
5     int *ptr;
6     ptr=&n1;
7
8     cout<<&n1; //print address of valriable n1
9     cout<<endl;
10    cout<<n1; //print vale of valriable n1
11    cout<<endl;
12    //.....
13    cout<<ptr; //print address of valriable n1 stored in ptr variable
14    cout<<endl;
15    cout<<&ptr; //print address of ptr
16    cout<<endl;
17    cout<<*ptr; //print value of valriable n1 stored in ptr variable
18
19 }
```

C:\Users\Ammar\Desktop\AMMAR.exe

```
0x78fe1c
100
0x78fe1c
0x78fe10
100
```

```
-----
Process exited after 0.1925 seconds with return value 0
Press any key to continue . . .
```

TASK 2 :

```
#include <iostream>
```

```
using namespace std;
```

```
int main(){
```

```
float n1;
```

```
n1=15.5;
```

```
float* ptr;
```

```
ptr=&n1;
```

```
cout<<&n1; //print address of valriable n1
```

```
cout<<endl;
```

```
cout<<n1; //print vale of valriable n1
```

```
cout<<endl;
```

```
//.....
```

```
cout<<ptr; //print address of valriable n1 stored in ptr variable
```

```
cout<<endl;
```

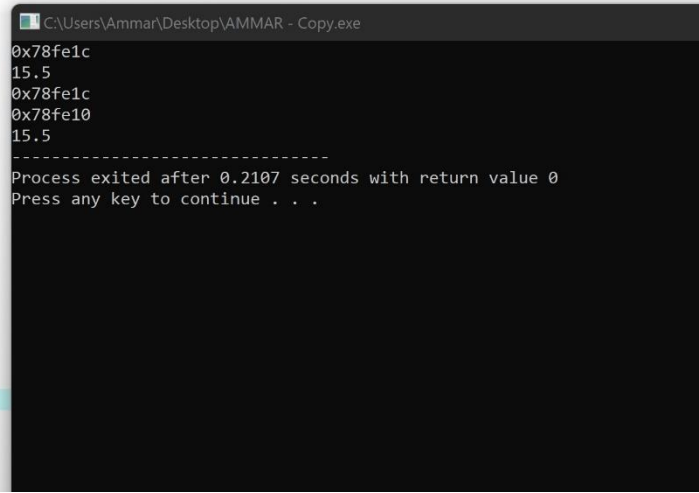
```
cout<<&ptr; //print address of ptr
```

```
cout<<endl;
```

cout<<*ptr; //print value of valriable n1 stored in ptr variable

}

```
1 #include <iostream>
2 using namespace std;
3 int main()
4 {
5     float n1;
6     n1=15.5;
7     float* ptr;
8     ptr=&n1;
9
10
11     cout<<&n1; //print address of valriable n1
12     cout<<endl;
13     cout<<n1; //print vale of valriable n1
14     cout<<endl;
15     //.....
16     cout<<ptr; //print address of valriable n1 stored in ptr variable
17     cout<<endl;
18     cout<<&ptr; //print address of ptr
19     cout<<endl;
20     cout<<*ptr; //print value of valriable n1 stored in ptr variable
21
22 }
```



```
C:\Users\Ammar\Desktop\AMMAR - Copy.exe
0x78fe1c
15.5
0x78fe1c
0x78fe10
15.5
-----
Process exited after 0.2107 seconds with return value 0
Press any key to continue . . .
```

TASK 3:

#include <iostream>

using namespace std;

int main(){

string st;

st="AMMAR";

string* ptr;

ptr=&st;

cout<<&st; //print address of valriable n1

cout<<endl;

cout<<st; //print vale of valriable n1

cout<<endl;

```
//.....
```

```
cout<<ptr; //print address of valriable n1 stored in ptr variable
```

```
cout<<endl;
```

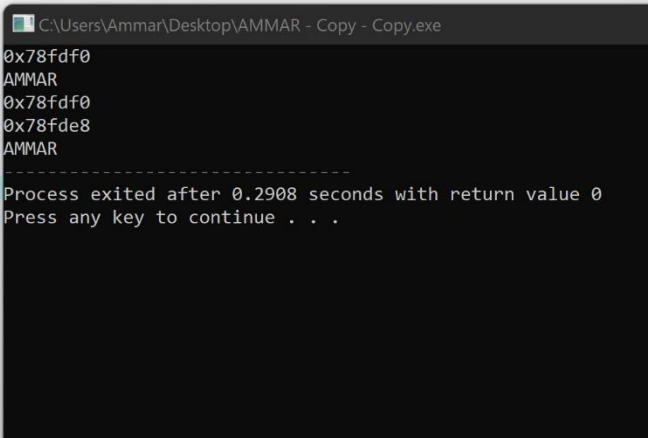
```
cout<<&ptr; //print address of ptr
```

```
cout<<endl;
```

```
cout<<*ptr; //print value of valriable n1 stored in ptr variable
```

```
}
```

```
1 #include <iostream>
2 using namespace std;
3 int main(){
4     string st;
5     st="AMMAR";
6     string* ptr;
7     ptr=&st;
8
9
10
11     cout<<&st; //print address of valriable n1
12     cout<<endl;
13     cout<<st; //print vale of valriable n1
14     cout<<endl;
15     //.....
16     cout<<ptr; //print address of valriable n1 stored in ptr variable
17     cout<<endl;
18     cout<<&ptr; //print address of ptr
19     cout<<endl;
20     cout<<*ptr; //print value of valriable n1 stored in ptr variable
21
22 }
```



```
C:\Users\Ammar\Desktop\AMMAR - Copy - Copy.exe
0x78fdf0
AMMAR
0x78fdf0
0x78fde8
AMMAR
-----
Process exited after 0.2908 seconds with return value 0
Press any key to continue . . .
```

TASK 4:

```
#include <iostream>
```

```
using namespace std;
```

```
int main(){
```

```
int n1=999;
```

```
int *ptr;
```

```
ptr=&n1;
```

```
cout<<&n1; //print address of valriable n1
```

```
cout<<endl;
```

```
cout<<n1; //print vale of valriable n1
```

```

cout<<endl;

//..... { MODIFY value through pointer }.....

*ptr=555;

cout<<ptr; //print address of valriable n1 stored in ptr variable

cout<<endl;

cout<<&ptr; //print address of ptr

cout<<endl;

cout<<*ptr; //print value of valriable n1 stored in ptr variable

}

```

```

1  #include <iostream>
2  using namespace std;
3  int main(){
4      int n1=999;
5      int *ptr;
6      ptr=&n1;
7
8      cout<<&n1; //print address of valriable n1
9      cout<<endl;
10     cout<<n1; //print vale of valriable n1
11     cout<<endl;
12     //..... { MODIFY value through pointer }.....
13
14     *ptr=555;
15     cout<<ptr; //print address of valriable n1 stored in ptr variable
16     cout<<endl;
17     cout<<&ptr; //print address of ptr
18     cout<<endl;
19     cout<<*ptr; //print value of valriable n1 stored in ptr variable
20
21 }

```

```

C:\Users\Ammar\Desktop\AMMAR.exe
0x78fe1c
999
0x78fe1c
0x78fe10
555
-----
Process exited after 0.01937 seconds with return value 0
Press any key to continue . . .

```

TASK 5:

```

#include <iostream>

using namespace std;

int main(){

int a=10;

int* ptr1;

```

```

ptr1=&a; //ptr1 stores address of variable a
int** ptr2; //to store address of another variable
*ptr2=ptr1; //ptr2 stores value of ptr1 which is address of 'a'.
cout<<&a; //print address of a
cout<<endl;
cout<<*ptr1; //print value of address stores in ptr1
cout<<endl;
cout<<*ptr2; //print value of ptr2 which is address of ptr1

}

```

```

#include <iostream>
using namespace std;
int main(){

    int a=10;
    int* ptr1;
    ptr1=&a; //ptr1 stores address of variable a
    int** ptr2; //to store address of another variable
    *ptr2=ptr1; //ptr2 stores value of ptr1 which is address of 'a'
    cout<<&a; //print address of a
    cout<<endl;
    cout<<*ptr1; //print value of address stores in ptr1
    cout<<endl;
    cout<<*ptr2; //print value of ptr2 which is address of ptr1

}

```

```

C:\Users\Ammar\Desktop\AMMAR - Copy - Copy - Copy - Copy.exe
0x78fe0c
10
0x78fe0c
-----
Process exited after 0.2027 seconds with return value 0
Press any key to continue . . .

```

TASK 6:

```
#include<iostream>
```

```
using namespace std;
```

```
int main(){
```

```
int a,b;
```

```
cout<<"Enter two numbers\n";
```

```
cin>>a>>b;
```

```
int* p1=&a; //stores address of a
```

```
int* p2=&b; //stores address of b
```

```
int sum;
```

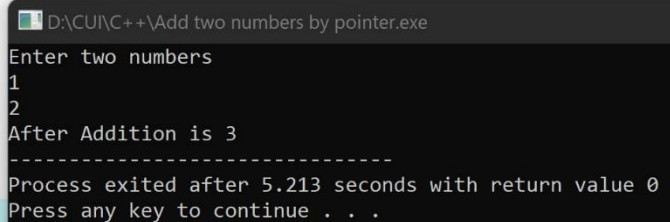
```
sum=*p1+*p2; // *p1 means value of address in p1
```

```
cout<<"After Addition is "<<sum;
```

```
}
```

```
#include<iostream>
using namespace std;
int main(){
    int a,b;
    cout<<"Enter two numbers\n";
    cin>>a>>b;
    int* p1=&a; //stores address of a
    int* p2=&b;  //stores address of b
    int sum;
    sum=*p1+*p2; // *p1 means value of address in p1

    cout<<"After Addition is "<<sum;
}
```



```
D:\CUI\C++\Add two numbers by pointer.exe
Enter two numbers
1
2
After Addition is 3
-----
Process exited after 5.213 seconds with return value 0
Press any key to continue . . .
```

TASK 7:

```
#include<iostream>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
int a,b;
```

```
cout<<"Enter 1st value...";
```

```
cin>>a;
```

```
cout<<"Enter 2nd value...";
```

```
cin>>b;
```

```
//.....{ Swap using pointer }....
```

```
int *p1,*p2;
```

```
int c;
```

```
p1=&a; //stores address of a
```

```
p2=&b;  // stores address of b
```

```
c=*p1; //stores value of a
```

```
*p1=*p2;  //transfer value of b to a address
```



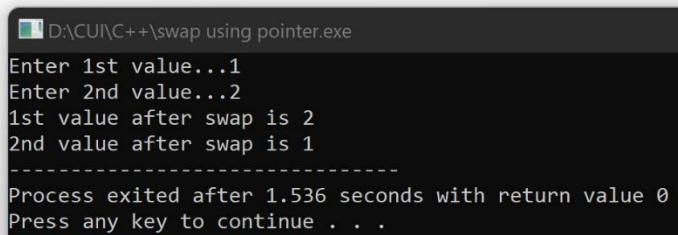
```
*p2=c;    //transfer value of c to b address
```

```
cout<<"1st value after swap is "<<a<<endl;
```

```
cout<<"2nd value after swap is "<<b;
```

```
}
```

```
1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     int a,b;
6     cout<<"Enter 1st value...";
7     cin>>a;
8     cout<<"Enter 2nd value...";
9     cin>>b;
10    //.....{ Swap using pointer }....
11    int *p1,*p2;
12    int c;
13    p1=&a; //stores address of a
14    p2=&b; // stores address of b
15    c=*p1; //stores value of a
16    *p1=*p2; //transfer value of b to a address
17    *p2=c; //transfer value of c to b address
18
19    cout<<"1st value after swap is "<<a<<endl;
20    cout<<"2nd value after swap is "<<b;
21
22
23 }
```



```
D:\CUI\C++\swap using pointer.exe
Enter 1st value...1
Enter 2nd value...2
1st value after swap is 2
2nd value after swap is 1
-----
Process exited after 1.536 seconds with return value 0
Press any key to continue . . .
```

TASK 8:

```
#include<iostream>
```

```
using namespace std;
```

```
int main(){
```

```
int size;
```

```
cout << "Enter Size of Array : ";
```

```
cin >> size;
```

```
int *arr = new int[size];
```

```
for (int i = 0; i < size; i++)
```

```
{
```

```
    cout << "Enter [" << i << "] index Element in Array ";
```

```
    cin >> arr[i];
```

```

}

cout << "Array at Run-Time " << endl;

cout << "{ ";

for (int i = 0; i < size; i++)
{
    cout << arr[i]<<" ";
}

cout << " }";

delete[]arr;

system("pause");
}

```

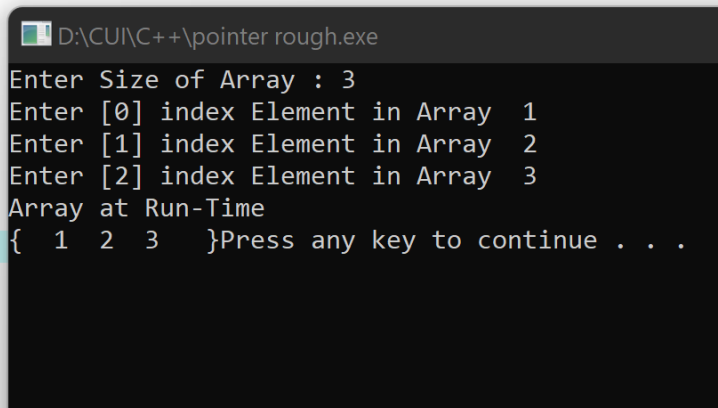
```

#include<iostream>
using namespace std;
int main(){

    int size;
    cout << "Enter Size of Array : ";
    cin >> size;
    int *arr = new int[size];
    for (int i = 0; i < size; i++)
    {
        cout << "Enter [" << i << "] index Element in Array ";
        cin >> arr[i];
    }
    cout << "Array at Run-Time " << endl;
    cout << "{ ";
    for (int i = 0; i < size; i++)
    {
        cout << arr[i]<<" ";
    }
    cout << " }";
    delete[]arr;

    system("pause");
}

```



```

D:\CUI\C++\pointer rough.exe
Enter Size of Array : 3
Enter [0] index Element in Array 1
Enter [1] index Element in Array 2
Enter [2] index Element in Array 3
Array at Run-Time
{ 1 2 3 }Press any key to continue . . .

```

TASK 9:

```

#include <iostream>

using namespace std;

int sum(int* ,int*);

```

```

int main(){
    int n1,n2,s;
    cout<<"Enter two numbers\n ";
    cin >>n1>>n2;
    // .....Sum using pointer with function...
    s=sum(&n1,&n2);
    cout<<"Sum = "<<s;
}

int sum(int * a,int *b){
    int sum;

    sum = *a+*b;

    return sum;
}

```

The screenshot shows a C++ program in a code editor and its execution in a terminal window. The code defines a function `sum` that takes two integer pointers and returns their sum, and a `main` function that prompts the user for two numbers, calls `sum`, and prints the result. The terminal output shows the user entering '1' and '2', the program calculating the sum as 3, and then displaying a message about the process exit time and a prompt to press any key to continue.

```

#include <iostream>
using namespace std;
int sum(int* ,int*);

int main(){
    int n1,n2,s;
    cout<<"Enter two numbers\n ";
    cin >>n1>>n2;
    // .....Sum using pointer with function...
    s=sum(&n1,&n2);
    cout<<"Sum = "<<s;
}

int sum(int * a,int *b){
    int sum;
    sum = *a+*b;
    return sum;
}

```

C:\Users\Ammar\Desktop\AMMAR.exe

```

Enter two numbers
1
2
Sum = 3
-----
Process exited after 1.181 seconds
Press any key to continue . . .

```

TASK 10:

```

#include <iostream>

using namespace std;

int sum(int* ,int*);

int main(){

```

```

int n1,n2;

cout<<"Enter two numbers\n ";

cin >>n1>>n2;

// .....find large number using pointer ...


int *p1,*p2;

p1=&n1;

p2=&n2;


if(*p1>*p2)

cout<<"\n ==> First number is greater ";

if(*p1<*p2)

cout<<"\n ==> Second number is greater ";

else if(*p1==*p2)

cout<<"\n ==> Both are Equal ";

}

```

```

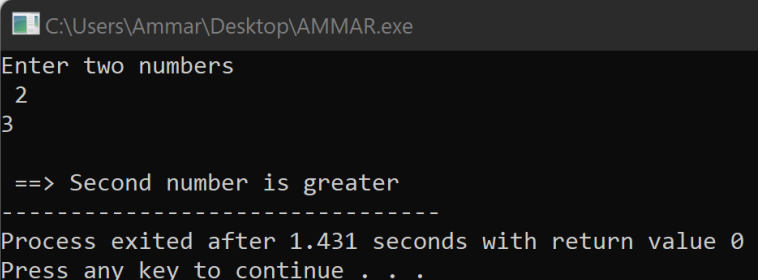
#include <iostream>
using namespace std;
int sum(int* ,int*);

int main(){
    int n1,n2;
    cout<<"Enter two numbers\n ";
    cin >>n1>>n2;
    // .....find large number using pointer ...

    int *p1,*p2;
    p1=&n1;
    p2=&n2;

    if(*p1>*p2)
        cout<<"\n ==> First number is greater ";
    if(*p1<*p2)
        cout<<"\n ==> Second number is greater ";
    else if(*p1==*p2)
        cout<<"\n ==> Both are Equal ";
}

```



```

C:\Users\Ammar\Desktop\AMMAR.exe
Enter two numbers
2
3
==> Second number is greater
-----
Process exited after 1.431 seconds with return value 0
Press any key to continue . . .

```

TASK 11:

```
#include <iostream>

using namespace std;

int main() {

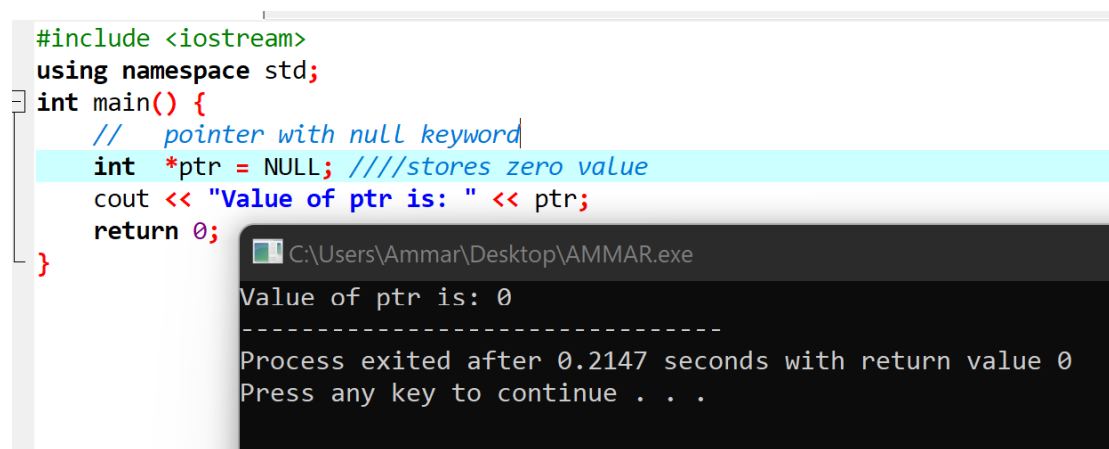
    // pointer with null keyword

    int *ptr = NULL; ////stores zero value

    cout << "Value of ptr is: " << ptr;

    return 0;

}
```



The screenshot shows a C++ IDE with the code for Task 11. The code is as follows:

```
#include <iostream>
using namespace std;
int main() {
    // pointer with null keyword
    int *ptr = NULL; ////stores zero value
    cout << "Value of ptr is: " << ptr;
    return 0;
}
```

The output of the program is shown in a terminal window:

```
C:\Users\Ammar\Desktop\AMMAR.exe
Value of ptr is: 0
-----
Process exited after 0.2147 seconds with return value 0
Press any key to continue . . .
```

TASK 12 :

```
#include<iostream>

using namespace std;

int main()

{

    float a,b;

    char choice;

    float *p1,*p2;

    p1=&a;

    p2=&b;

    cout<<"Enter two Numbers:"<<endl;

    cin>>a>>b;
```

```
cout<<"Press + for Addition: \n";
cout<<"Press - for Subtraction: \n";
cout<<"Press * for Multiplication: \n";
cout<<"Press / for Division: \n";
cin>>choice;
switch(choice){
    case '+':
        cout<<"Addition = "<<*p1+*p2<<endl;
        break;

    case '-':
        cout<<"Subtraction = "<<*p1-*p2<<endl;
        break;
    case '*':
        cout<<"Multiplication = "<<*p1 * *p2<<endl;
        break;
    case '/':
        cout<<"Division = "<<*p1/ *p2<<endl;
        break;
    default:
        cout<<"Invalid Choice"<<endl;
}

cout<<"...END...";
}
```

```

1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     float a,b;
6     char choice;
7     float *p1,*p2;
8     p1=&a;
9     p2=&b;
10    cout<<"Enter two Numbers:"<<endl;
11    cin>>a>>b;
12    cout<<"Press + for Addition: \n";
13    cout<<"Press - for Subtraction: \n";
14    cout<<"Press * for Multiplication: \n";
15    cout<<"Press / for Division: \n";
16    cin>>choice;
17    switch(choice){
18        case '+':
19            cout<<"Addition = "<<*p1+*p2<<endl;
20            break;
21        case '-':
22            cout<<"Subtraction = "<<*p1-*p2<<endl;
23            break;
24        case '*':
25            cout<<"Multiplication = "<<*p1 * *p2<<endl;
26            break;
27        case '/':
28            cout<<"Division = "<<*p1/ *p2<<endl;
29            break;
30        default:
31            cout<<"Invalid Choice"<<endl;
32    }
33    cout<<"...END...";
34 }

```

```

C:\Users\Ammar\Desktop\AMMAR.exe
Enter two Numbers:
2
2
Press + for Addition:
Press - for Subtraction:
Press * for Multiplication:
Press / for Division:
/
Division = 1
...END...
-----
Process exited after 3.494 seconds with return code 0
Press any key to continue . . .

```

TASK 13:

```

#include<iostream>

using namespace std;

string C_Name(string *);

int main()
{
    string str;

    getline(cin,str);

    cout<<"I am writing this message to inform you that Rehan will be retiring from
"<<C_Name(&str)<<","\n";

    cout<<"effectice March 1,2022.Rehan has been a dedicated employee of
"<<C_Name(&str)<<","serving more\n";

    cout<<"than three decades with the company ("<<C_Name(&str)<<"),eight of them as vice
president \nof sales.";

```

```

}

string C_Name(string* s)

{

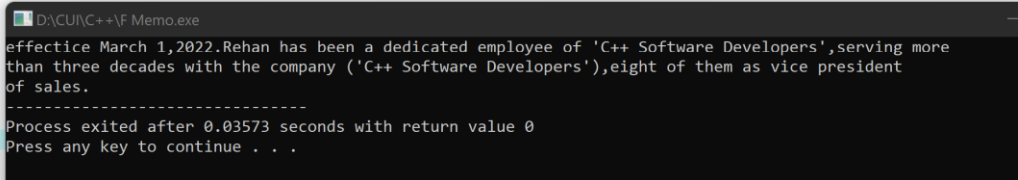
*s="C++ Software Developers";

return *s;

}

#include<iostream>
using namespace std;
string C_Name(string *);
int main()
{
    string str;
    getline(cin,str);
    cout<<"I am writing this message to inform you that Rehan will be retiring from "<<C_Name(&str)<<","<<endl;
    cout<<"effective March 1,2022.Rehan has been a dedicated employee of "<<C_Name(&str)<<","<<servng more<<endl;
    cout<<"than three decades with the company ("<<C_Name(&str)<<"),eight of them as vice president \nof sales.";
}
string C_Name(string* s)
{
    *s="C++ Software Developers";
    return *s;
}

```



TASK 14:

```
#include <iostream>
```

```
using namespace std;
```

```
void test(int*, int*);
```

```
int main() {
```

```
int a = 5, b = 5;
```

```
cout << "Before changing:" << endl;
```

```
cout << "a = " << a << endl;
```

```
cout << "b = " << b << endl;
```

```
// ..... { Change value of variables with pointer using function }...
```

```
test(&a, &b);
```

```
cout << "\nAfter changing" << endl;
```

```
cout << "a = " << a << endl;
```



```
cout << "b = " << b << endl;

return 0;

}
```

```
void test(int* n1, int* n2) {

*n1 = 10;

*n2 = 11;

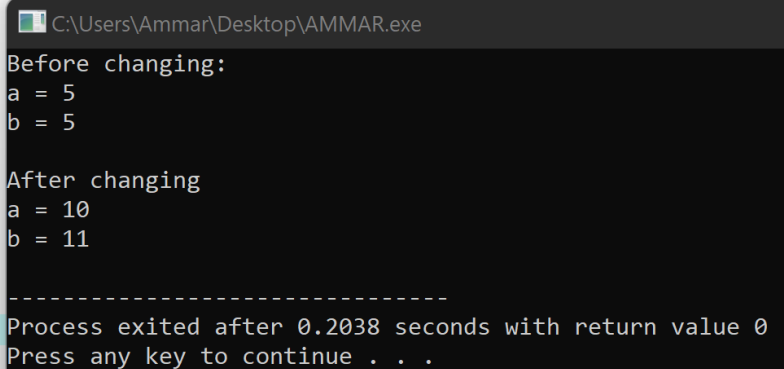
}
```

```
#include <iostream>

using namespace std;
void test(int*, int*);
int main() {
    int a = 5, b = 5;
    cout << "Before changing:" << endl;
    cout << "a = " << a << endl;
    cout << "b = " << b << endl;
    // ..... { Change value of variables with pointer using function }...
    test(&a, &b);

    cout << "\nAfter changing" << endl;
    cout << "a = " << a << endl;
    cout << "b = " << b << endl;
    return 0;
}

void test(int* n1, int* n2) {
    *n1 = 10;
    *n2 = 11;
}
```



```
C:\Users\Ammar\Desktop\AMMAR.exe
Before changing:
a = 5
b = 5

After changing
a = 10
b = 11

-----
Process exited after 0.2038 seconds with return value 0
Press any key to continue . . .
```

TASK 15 :

```
#include <iostream>
```

```
class MyClass {

public:

    int data;
```

```
// Constructor
MyClass(int value) {
    data = value;
}

// Member function to double the data using a pointer
void doubleData() {
    int* ptr = &data; // Pointer to the data member
    *ptr *= 2;        // Double the value through the pointer
}

};

int main() {
    // Create an instance of MyClass
    MyClass myObject(10);

    // Print the initial value
    std::cout << "Initial data: " << myObject.data << std::endl;

    // Call the doubleData method to double the value
    myObject.doubleData();

    // Print the updated value
    std::cout << "Updated data: " << myObject.data << std::endl;

    return 0;
}
```

```

#include <iostream>

class MyClass {
public:
    int data;

    // Constructor
    MyClass(int value) {
        data = value;
    }

    // Member function to double the data using a pointer
    void doubleData() {
        int* ptr = &data; // Pointer to the data member
        *ptr *= 2;          // Double the value through the pointer
    }
};

int main() {
    // Create an instance of MyClass
    MyClass myObject(10);

    // Print the initial value
    std::cout << "Initial data: " << myObject.data << std::endl;

    // Call the doubleData method to double the value
    myObject.doubleData();

    // Print the updated value
    std::cout << "Updated data: " << myObject.data << std::endl;

    return 0;
}

```

C:\Users\Ammar\Desktop\AMMAR.exe

```

Initial data: 10
Updated data: 20

-----
Process exited after 0.2223 seconds with return value 0
Press any key to continue . . .

```