



## Lesson 50 CPP Reference

In c++ we have a reference which is similar to a pointer in c.

Let's first see an old **example** using **pointers** :

```
#include <iostream>
```

```
using namespace std;
```

```
void swap(int *x, int *y) {  
    int t;  
    t = *x;  
    *x = *y;  
    *y = t;  
}
```

*//we defined a function to swap values*

```
int main() {  
    int x = 5, y = 9;  
    cout << x << " " << y << endl;  
    //printing before swap  
    cout << "-----\n";  
    swap(&x, &y);  
    //call by reference  
    cout << x << " " << y << endl;  
}
```



**output:**

5 9

-----

9 5

And here the switch was made after using **&** and pointer in c language,

but in c++ language we can switch by **&** (Reference)

```
#include <iostream>
```

```
using namespace std;
```

```
void swap(int &x, int &y) {
```

```
    //we use refrence
```

```
    int t;
```

```
    t =x;
```

```
    x = y;
```

```
    y = t;
```

```
}
```

```
int main() {
```

```
    int x = 5, y = 9;
```

```
    cout << x << " " << y<<endl;
```

```
    cout << "-----\n";
```

```
    swap(x, y);
```

```
    cout << x << " " << y << endl;
```



```
}
```

**output:**

```
5 9
```

```
-----
```

```
9 5
```

**Notes:**

```
void* p = &x;
```

```
//pointer points to anything int, float, char ..
```

```
void &r = x;
```

```
//wrong we have to know what & points to
```

Pointer can refer to more than one other pointer with different values, unlike a reference if the value changes, the rest change too

**example :**

```
#include<iostream>
```

```
using namespace std;
```

```
int main(){
```

```
    int a = 50;
```

```
    int *p = &a;
```

```
    int **p2 = &p;
```

```
    int ***p3 = &p2;
```

```
    int ****p4 = &p3;
```



```
cout<<"-----"<<endl;
cout<<"Pointers 1: "<<endl;
cout<< (p4) <<endl;
cout<< (*p4) <<endl;
cout<< (**p4) <<endl;
cout<< (**p4) <<endl;
cout<< (***p4) <<endl;
cout<< (****p4) <<endl;
a = 90;
cout<<"-----"<<endl;
cout<<"Pointers 2: "<<endl;
cout<< (p4) <<endl;
cout<< (*p4) <<endl;
cout<< (**p4) <<endl;
cout<< (**p4) <<endl;
cout<< (***p4) <<endl;
cout<< (****p4) <<endl;
a = 50;

int &r = a;
int &r2 = r;
int &r3 = r2;
int &r4 = r3;
cout<<"-----"<<endl;
cout<<"Reference 1: "<<endl;
```



```
cout<< r <<" "<< r2 <<" "<<r3<<" "<< r4<<endl;
a = 90;
cout<<"-----"<<endl;
cout<<"Reference 2: "<<endl;
cout<< r <<" "<< r2 <<" "<<r3<<" "<< r4<<endl;
}
```

**output:**

-----

Pointers 1:

0073FD94

0073FDA0

0073FDAC

0073FDB8

50

-----

Pointers 2:

0073FD94

0073FDA0

0073FDAC

0073FDB8

90

-----

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Reference 1:

50 50 50 50

-----

Reference 2:

90 90 90 90