



CS221 - Lab 7 : Pointers

Objective(s)

1. Solving problems with pointers.
2. Using pointers with functions.

Tool(s)/Software

DevC++.

Description

Tasks/Assignments(s)

Task- 1: Trace and Answer

A. Consider the following statements:

```
int *p;  
int i;  
int k;  
i = 42;  
k = i;  
p = &i;
```

After these statements, which of the following statements will change the value of i to 75?

- a) `k = 75;`
- b) `*k = 75;`
- c) `p = 75;`
- d) `*p = 75;`
- e) Two or more of the answers will change i to 75.

B. Explain the error.

```
char c = 'A';  
double *p = &c;
```

p pointer data type must be as same as the c variable's data type.

Task- 2: Simple Pointers and Variables

Introduce **int** variables **x** and **y** and **int*** pointer variables **p** and **q**. Set **x** to 2, **y** to 8, **p** to the address of **x**, and **q** to the address of **y**. Then print the following information:

- (1) The address of **x** and the value of **x**.
- (2) The value of **p** and the value of ***p**.
- (3) The address of **y** and the value of **y**.
- (4) The value of **q** and the value of ***q**.
- (5) The address of **p** (not its contents!).
- (6) The address of **q** (not its contents!).

Sample Run:

```
the address of x and the value of x  0x720ee77ab858  2
the value of p and the value of *p  0x720ee77ab858  2

the address of y and the value of y  0x720ee77ab85c  8
the value of q and the value of *q  0x720ee77ab85c  8

the address of p      0x720ee77ab860
the address of q      0x720ee77ab868
```

Task- 3: Find the Output

Assume the definitions and initializations:

```
char c = 'T', d = 'S';
char *p1 = &c; //T (6940)
char *p2 = &d; // S (9772)
char *p3;
```

Assume further that the address of **c** is 6940, the address of **d** is 9772, and the address of **e** is 2224. What will be printed when the following statements are executed sequentially?

```
p3 = &d; // (9772) S
cout << "p3 = " << *p3 << endl;    // (1) //S

p3 = p1; // T (6940)

cout << "p3 = " << *p3              // (2) //T
    << ", p3 = " << p3 << endl;    // (3) //6940

*p1 = *p2; //S(6940)
cout << "p1 = " << *p1              // (4) //S
    << ", p1 = " << p1 << endl;    // (5) //6940
```

Task- 4 : update variables using pointers

Write two functions update1 and update2 that has no return and shall update the value of two numbers x and y as following:

- update1 : subtracting 10 from x and adding 50 to y.
- update2: multiplying x by 2 and dividing y by 10.

Write those two functions in two diverse ways: once using & operator and once using * operator. Then call both functions inside the main method and compare between the usage of both functions.

Answer Key

```
#include<iostream>
using namespace std;
void update1(int*x,int *y);
void update2(int &x,int &y);
int main(){
    int x = 4, y = 7;

    update1(&x,&y); // pass by refrence with pointer
    cout<<"Updating Values 1 "<<" X="<<x<<" Y ="<<y << endl;
    update2(x,y); // passing by refence with refrence
    cout<<"Updating Values 2 "<<" X="<<x<<" Y ="<<y << endl;;

    return 0;
}
void update1(int *x, int *y){
    *x=*x-10;
    *y=*y+50;
}

void update2(int &x, int &y){
    x*=2;
    y/=10;
}
```