Lab session 3: POINTERS

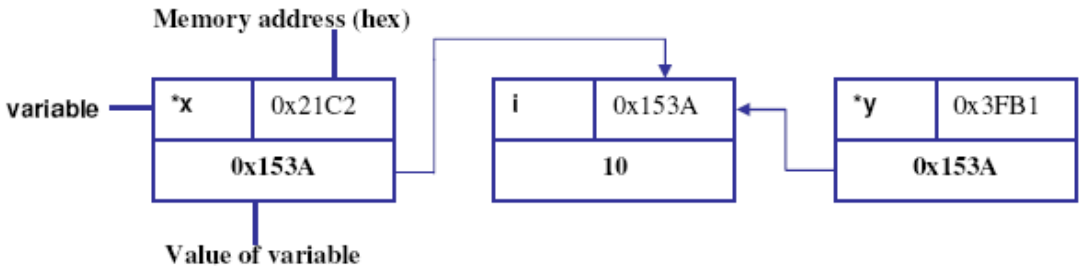
Objective

The objective of **lab session 3** is

- To declare and use a single pointer
- To use a pointer in array
- To use a pointer in structure
- To use a pointer in a function

Pre-lab Exercise

1. Which of the following is true about pointers
    a. A pointer is a variable which stores the address of another variable.
    b. The * operator gives us the address of a variable.
    c. The actual data type of the value of all pointers, whether integer, float, character, or otherwise, is the same, a long hexadecimal number that represents a memory address.
    d. The & operator gives us the value of a variable at a specified address.
2. A below diagram illustrate the relationships between 3 variables x, i and y. Each variable has a name, a memory address and value.



    a. What is the value of &x, x and *x respectively
    b. What is the value of &i and i
    c. What is the value of &y, y and *y respectively

3. Explain the error for the below fragment of code

```
char c= ‘A’;
double *p = &c;
```

4. Assume the below definitions and initializations:

```
char c = 'T', d = 'S';
char *p1 = &c;
char *p2 = &d;
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;
cout << "*p3 = " << *p3 << endl;   // (1)
p3 = p1;
cout << "*p3 = " << *p3 << ", p3 = " << p3 << endl;  // (2)
*p1 = *p2;
cout << "*p1 = " << *p1  << ", p1 = " << p1 << endl;  //(3)
```

5. Write a statement to access structure members using the pointer ptr

```
struct Distance
{
   int feet;
   float inch;
};
…
Distance *ptr;
```

6. Write block of code that take an input from the user and display the same value using pointer.
7. Write a program that asks the user to enter integers as inputs to be stored in the variables 'a' and 'b' respectively. There are also two integer pointers named ptrA and ptrB. Assign the values of 'a' and 'b' to ptrA and ptrB respectively, and display them.

In-lab Exercise

8. Write a C++ program to accept five integer values from keyword and print the elements of the array in reverse order using a pointer.
9. Write a function **countEven(int*, int)** which receives an integer array and its size, and returns the number of even numbers in the array.
10. Write two functions **void cubeByPtr1 (int * numPtr)** and **void cubeByPtr2 (int & numPtr)** which returns a cube of a number.

Post-lab Exercise

11. What are the basic differences between normal variable and pointer variable?
12. Discus with example about pointer arithmetic in C++.