

## CMPD 244 Programming II

### Lab 3: Part 1 - Pointer and Referencing in C++

In this lesson, you are supposed to know how to differentiate between variable, and pointer. This information is very useful especially when you want to use them in your program.

You can just have a copy of the variable's value, or a copy of the variable's address. If you have a copy of variable's value, any changes that you have made to the copy will not going to affect the original value. If you make the changes to the content of the referenced address (pointer), the modification done will affect the value of the variable.

Below are the lists of program samples for Pointer:-

**Program Sample 1:** The following codes will show the difference between reference by value or address.

```
#include <iostream>
using namespace std;

int main()
{
    int var1;
    int *ptr1;
    cout << "Enter an integer: ";
    cin >> var1;
    ptr1 = &var1;
    cout << "var1 = " << var1 << endl;
    cout << "&var1 = " << &var1 << endl;
    cout << "ptr = " << ptr1 << endl;
    cout << "*ptr = " << *ptr1 << endl;
    return 0;
}
```

**Program Sample 2:** The following codes will show the difference between reference by value or address – applied in user defined function.

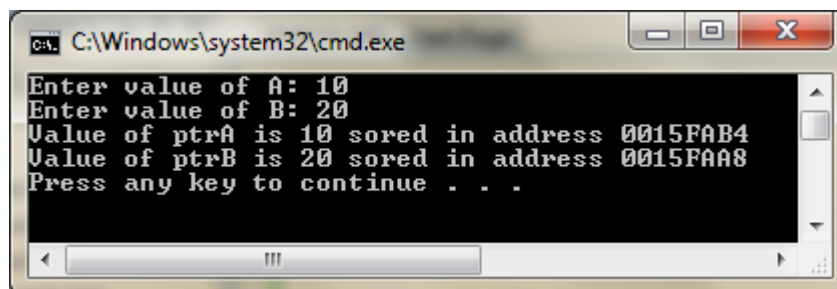
```
#include <iostream>
using namespace std;
void pbValue(int);
void pbReference(int*);
int main()
{
    int var1;
    int *ptr1;
    cout << "Enter an integer: ";
    cin >> var1;
    ptr1 = &var1;
    cout << "-----" << endl;
    cout << "var1 = " << var1 << endl;
}
```

```
cout << "&var1 = " << &var1 << endl;
cout << "ptr = " << ptr1 << endl;
cout << "*ptr = " << *ptr1 << endl;
cout << "-----" << endl;
cout << "Before pbValue function " << endl;
cout << "var1 in main = " << var1 << endl;
cout << "-----" << endl;
pbValue(var1);
cout << "After pbValue function " << endl;
cout << "var1 in main = " << var1 << endl;
cout << "-----" << endl;
pbReference(ptr1);
cout << "After pbReference function " << endl;
cout << "var1 in main = " << var1 << endl;
cout << "-----" << endl;
cout << "End of program" << endl;
return 0;
}
void pbValue(int x)
{
x = x + x;
}
void pbReference(int *y)
{
*y = *y + *y;
}
```

### Exercises:

- 1) Trace the output of program sample 1 and 2 above and observe the results.
- 2) 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.

You may refer to the sample output below:



*Don't forget to submit the screen capture of your output to our Brighten portal with the subject: CMPD244 Lab3 <YourStudentID><Your Full Name> at the end of this lab session. Good Luck!*  
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