

## Lab 1 Data types, type conversion, scope, pointer

Write a simple C++ program with the preprocessing statements and the main function, i.e.

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

void main()
{
    // your code
}
```

If you use Linux/Mac OS X, the return type of the main function should be int and there should be a return statement, i.e.:

```
int main()
{
    // your code
    return 0;
}
```

### Q1. int data type and pointer

Complete the following steps, inside the main function:

1. Declare a variable of type int, called “num1”. Initialize its value to 2147483646.
2. Declare a pointer of type int, called “p”, which points to num1.
3. Output the address stored in p and the value of variable pointed by p.
4. Declare another int variable called “num2”.
5. Increase num1 by 2, and assign the result to num2.
6. Output the value of num1 and num2 using cout.

Hints:

The following outputs the value of num1.

```
cout << "Value of num1: " << num1 << endl;
```

The following outputs the address stored in p.

```
cout << "Address stored in p: " << p << endl;
```

The following outputs the value of variable pointed by p.

```
cout << "Value of variable pointed by p: " << *p << endl;
```

*What is the output? Why does the output look like this? What did you learn from this exercise?*

**Q2. Type conversion**

Add the following code to the main function. What's the output? Try to think about why.

```
int i = 5;
char a = 'A';
double x = 1.23;
i = i - x;
x = x*a;

cout << "Value of i is " << i << "\n";
cout << "Value of x is " << x << "\n";
```

**Q3. Implicit conversion between integers and floating-point numbers**

Add the following code to the main function. What's the value of x at each step? Observe if your answer is correct by adding necessary cout statements. Think about why.

```
int j=3, k=2;
double y;
y = j/k;
y = j/double(k);
y = double(j)/k;
y = double(j/k);
y = j/2;
y = j/2.0;
```

**Q4. Scope**

Create a new file and run the following code. What's the output at each scope? Try and think about why.

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

namespace level1 {
    int a = 0;
    namespace level2 {
        int a = 1;
    }
}

int main()
{
    int a = 90;
    cout << a << "\n";
    cout << level1::a << "\n";
    cout << level1::level2::a << "\n";
    return 0;
}
```