Lab 2   Variables, data types, and type conversion

Write a simple C++ program with the preprocessing statements and the `main` function. The return type of the main function should be `int` and there should be a `return` statement, i.e.:

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

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

Q1. `int` data type
Complete the following steps, inside the main function:
1. Declare a variable of type `int`, called "num1". Initialize its value to 2147483647.
2. Declare another `int` variable called "num2".
3. Increment num1 by 1 and assign the result to num2.
4. Output the value of num1 and num2 using `cout`.

Hints: The following outputs the value of `num1`.
```cpp
cout << "Value of num1 is " << num1 << "\n";
```

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

Q2. `char` data type
Complete the following steps, inside the `main` function after your code for **Q1**:
1. Declare a variable of type `char`, called "vChar1", and initialize it to store the character A.
2. Declare another `char` variable, called "vChar2", and initialize it to store the character 0 (not the number 0).
3. Output the values of `vChar1` and `vChar2` using `cout` (see Hints for **Q1**).
4. Increment the value of `vChar1` by 1 and save the value still in `vChar1`.
5. Output the value of `vChar1` now.

What is the output for step 3 and 5? Can you explain why the output looks like this? What did you learn from this exercise?

Q3. `double` data type
Complete the following steps, inside the `main` function after your code for **Q2**:
1. Declare a variable of type `double`, called "vFloat1", initialize it to be the result of 22.0 divided by 7 (division in C++ is represented by the "/" operator).
2. Output the value of `vFloat1`.

Q4. sizeof *operator*

Complete the following steps, inside the main function after your code for **Q3**:

1. Output the number of bytes used to store an int variable, using sizeof.
   Hints: You may use the following:
   ```
   cout << "Size of int is " << sizeof(int) << " bytes.\n";
   ```
2. Output the number of bytes used to store a char variable, using sizeof.
3. Output the number of bytes used to store vFloat1, using sizeof.

Q5. Implicit type conversion

Add the following code to the main function after your code for **Q4**. What's the output? Try to think about why.

```
int i = 5;
char a = 'B';
double x = 1.57;
i = i + x;
x = x * a;

cout << i << "\n";
cout << x << "\n";
```

Q6. Explicit type conversion

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 i = 3, j = 2;
double x;
x = i / j;
x = i / double(j);
x = double(i) / j;
x = double(i/j);
x = i / 2;
x = i / 2.0;
```