3. Data type conversions and calculations

- 3.1 data storage: integer vs float

lab3_2.cpp

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

int main(){

    int x=1;
    float y=1;
    cout<<"sizeof x: "<<sizeof(x)<<" byte(s), "
    <<"sizeof y: "<<sizeof(y)<<" byte(s)\n";
    return 0;
}
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS MEMORY

```
ww2@DESKTOP-4NIH4UK:/mnt/c/Users/sustech/Desktop/C_CPP_CODE$ g++ -g -o lab3_2 lab3_2.cpp
ww2@DESKTOP-4NIH4UK:/mnt/c/Users/sustech/Desktop/C_CPP_CODE$
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
sizeof x: 4 byte(s), sizeof y: 4 byte(s)
```

lab3_2.cpp

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

int main(){

    int x=1;
    float y=1;
    cout<<"sizeof x: "<<sizeof(x)<<" byte(s), "
    <<"sizeof y: "<<sizeof(y)<<" byte(s)\n";
    return 0;
}
```

PROBLEMS OUTPUT DEBUG CONSOLE endian

```
-exec x /1xw &x
0x7fffffffddf8: 0x00000001
-exec x /1xw &y
0x7fffffffddfc: 0x3f800000
-exec x /1xw &y
```

3. Data type conversions and calculations

- 3.2 Signed vs Unsigned
- Integer promotions of Implicit conversions

```
#include <stdio.h>

int main(){
    char x=0xff;
    unsigned char y=0xff;
    printf("x: 0x%x, %d , %u\n",x,x,x);
    printf("y: 0x%x, %d , %u\n",y,y,y);

    printf("x>>2: 0x%x, %d , %u\n",x>>2,x>>2,x>>2);
    printf("y>>2: 0x%x, %d , %u\n",y>>2,y>>2,y>>2);
    return 0;
}
```

```
x: 0xffffffff, -1 , 4294967295
y: 0xff, 255 , 255
x>>2: 0xffffffff, -1 , 4294967295
y>>2: 0x3f, 63 , 63
```

https://en.cppreference.com/w/c/language/conversion