

CSCI 2100: Data Structures

Lab 1: Compiling and running C++ programs

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1. Go to line 7 and insert the characters `//` at the beginning of the line (turning that line into a comment). Now go back to the console and type **make gcd**
What is the compiler's complaint?

```
KratosdeMacBook-Pro:lab1 kratoszack$ vi gcd.cpp
KratosdeMacBook-Pro:lab1 kratoszack$ make gcd
c++    gcd.cpp    -o gcd
gcd.cpp:9:5: error: use of undeclared identifier 'r'
    r = u % v;    // compute remainder
    ^
gcd.cpp:11:9: error: use of undeclared identifier 'r'
    v = r;
    ^
2 errors generated.
make: *** [gcd] Error 1
```

The variable 'r' is not defined before using it.

2. Delete the first `int` that begins line 4 and try to rebuild the program. What is the compiler's complaint?

```
KratosdeMacBook-Pro:lab1 kratoszack$ make gcd
c++    gcd.cpp    -o gcd
gcd.cpp:4:2: error: C++ requires a type specifier for all declarations
gcd(int u, int v) {
^
1 error generated.
make: *** [gcd] Error 1
```

Type of the function 'gcd' is not defined.

3. Go to line 19 and change the characters >> to <<. What is the compiler's complaint?

```
[KratosdeMacBook-Pro:lab1 kratoszack$ make gcd
c++    gcd.cpp    -o gcd
gcd.cpp:19:7: warning: expression result unused [-Wunused-value]
    cin << a;
    ~~~~ ^ ~
1 warning generated.
```

Wrong use for 'cin', so there is no input value for a.

There is no error but warning in my computer with g++ Ver. 4.9.2. There should be error in Ver. 4.8.2.

4. Go to line 8 and remove the { character near the end of the line and try again to make the project. This time, the compiler complains about line 13. Why?

```
[KratosdeMacBook-Pro:lab1 kratoszack$ make gcd
c++    gcd.cpp    -o gcd
gcd.cpp:12:3: warning: control reaches end of non-void function [-Wreturn-type]
    }
    ^
gcd.cpp:13:3: error: expected unqualified-id
    return u;
    ^
gcd.cpp:14:1: error: extraneous closing brace ('}')
}
^
1 warning and 2 errors generated.
make: *** [gcd] Error 1
```

The first error: there should be '{' when while loop begins, it only controls the line before the first ';' after 'while'.

The second error: Should add matcher for extraneous closing brace. If the first '{' is corresponding to the '{' in line 4, so '{' in line 14 should not exist.

5. Comment out line 13 (by prefixing it with // and try to rebuild. This time, the make succeeds. Rerun the resulting executable and recalculate the gcd of 30 and 18. What happened?

```
KratosdeMacBook-Pro:lab1 kratoszack$ make gcd
c++ gcd.cpp -o gcd
gcd.cpp:14:1: warning: control reaches end of non-void function [-Wreturn-type]
}
^
1 warning generated.
KratosdeMacBook-Pro:lab1 kratoszack$ ./gcd
First value: 30
Second value: 18
gcd: 32767
```

Return with no value, it will return the largest number for int variable which is 32767. Maybe because the difference version of g++ in my computer, the results can be different.

6. Finally, recompile and use the program to calculate the greatest common divisor of the values 109376842 and 5603859382. Record the result and submit it through git along with your answers to the previous questions.

Revised Code:

```
1 #include <iostream>
2 #include <math.h>
3 using namespace std;
4
5 double gcd(double u, double v) {
6     /* We will use Euclid's algorithm
7      for computing the GCD */
8     double r;
9     while (v != 0){
10        // r = u % v; // compute remainder
11        r = fmod (u,v);
12        u = v;
13        v = r;
14    }
15    return u;
16 }
17
18 int main() {
19     double a, b;
20     cout << "First value: ";
21     cin >> a;
22     cout << "Second value: ";
23     cin >> b;
24     cout << "gcd: " << gcd(a,b) << endl;
25     return 0;
26 }
```

Result:

```
KratosdeMacBook-Pro:lab1 kratoszack$ ./gcd1
First value: 109376842
Second value: 5603859382
gcd: 2
```