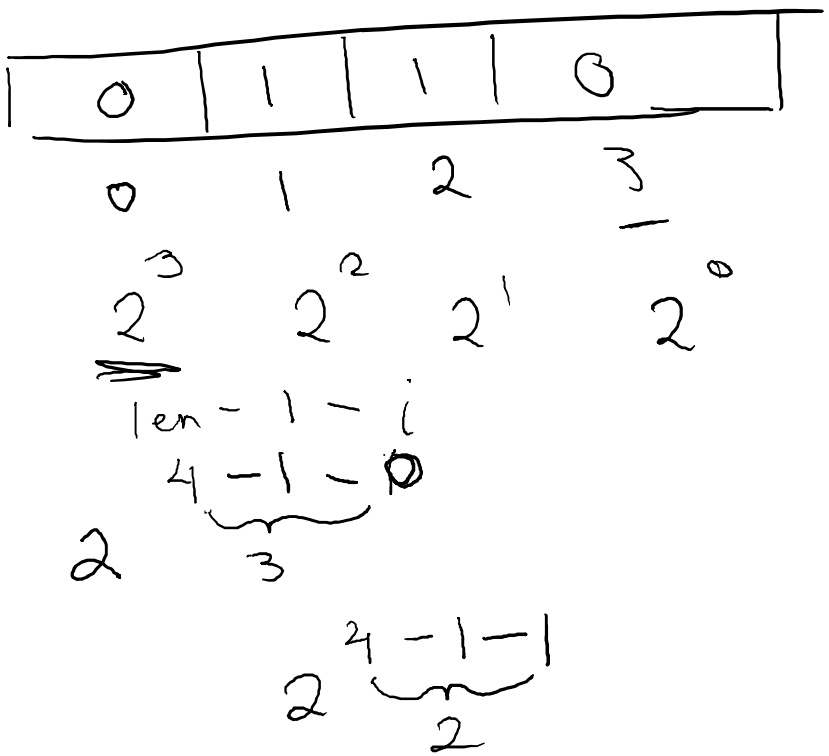
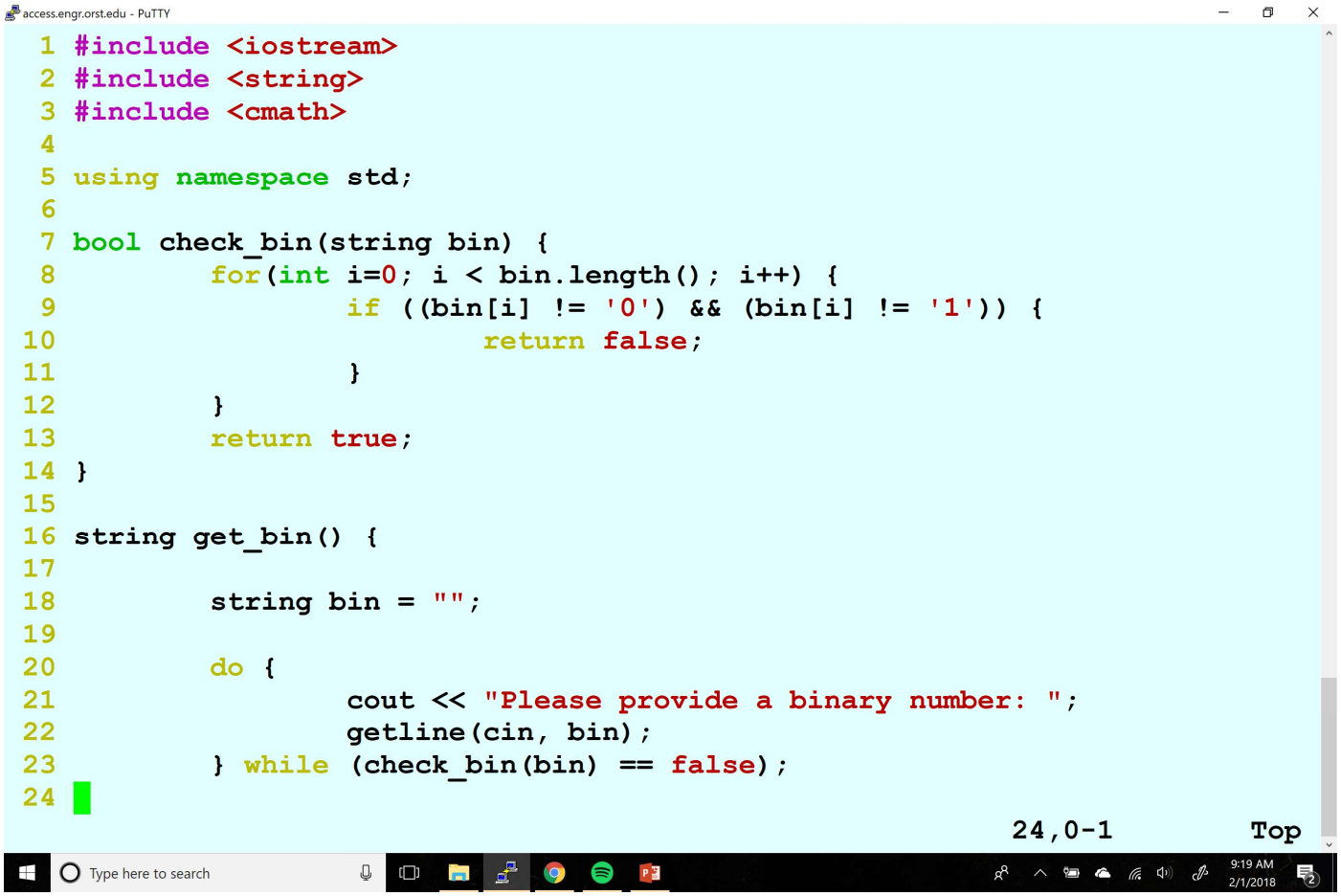
CS 161, Lecture 10: Detailed Functions – 2 February 2018



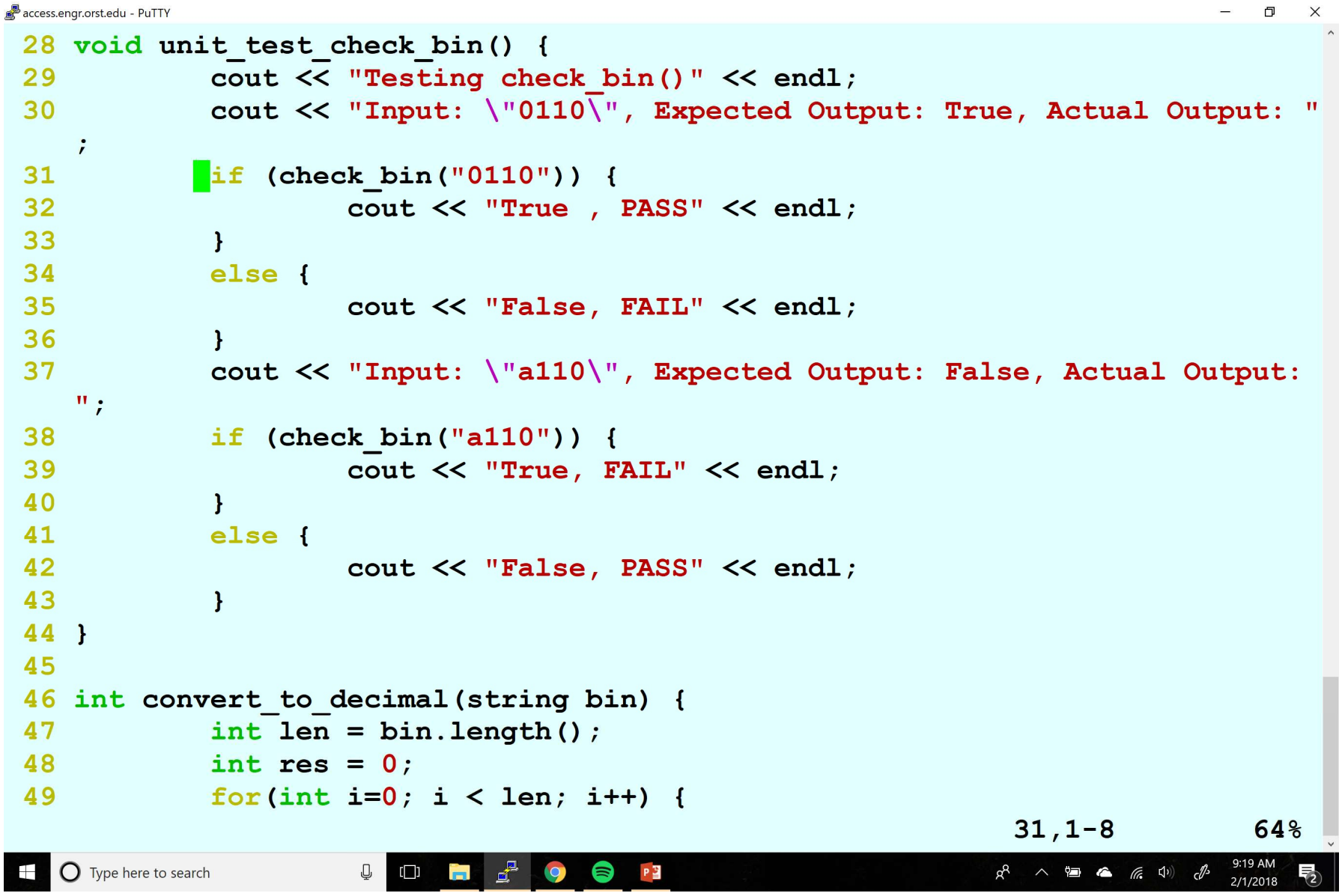
len == 4

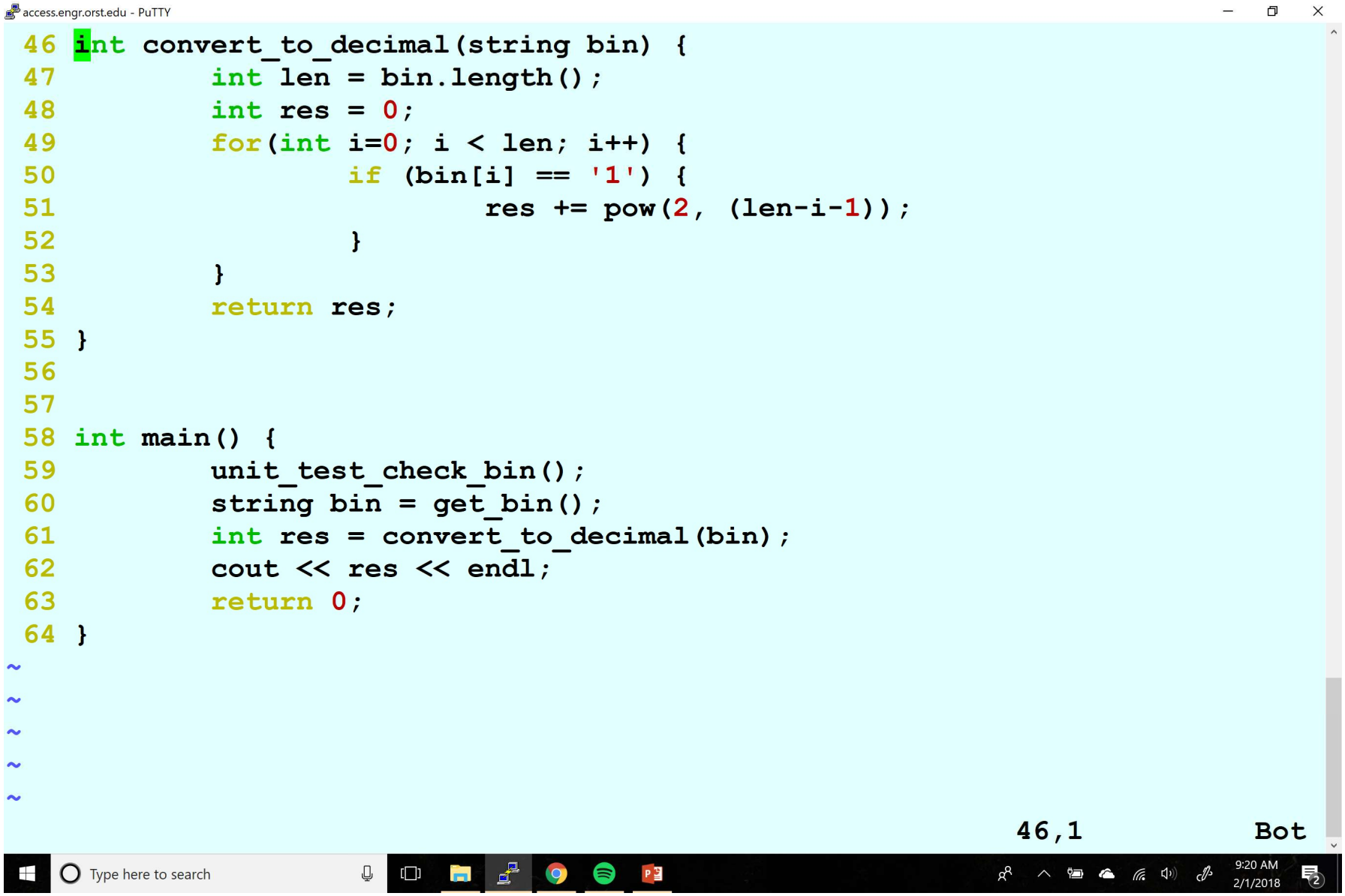
Complete Binary Conversion Program



access.engr.orst.edu - PuTTY

```
16 string get_bin() {
17
18         string bin = "";
19
20         do {
21                 cout << "Please provide a binary number: ";
22                 getline(cin, bin);
23         } while (check_bin(bin) == false);
24
25         return bin;
26 }
27
28 void unit_test_check_bin() {
29         cout << "Testing check_bin()" << endl;
30         cout << "Input: \"0110\", Expected Output: True, Actual Output: "
   ;
31         if (check_bin("0110")) {
32                 cout << "True , PASS" << endl;
33         }
34         else {
35                 cout << "False, FAIL" << endl;
36         }
37         cout << "Input: \"a110\", Expected Output: False, Actual Output:
   ";
                                                        24,0-1          35%
```


access.engr.orst.edu - PuTTY
28 void unit_test_check_bin() {
29 cout << "Testing check_bin()" << endl;
30 cout << "Input: \"0110\", Expected Output: True, Actual Output: "
;
31 if (check_bin("0110")) {
32 cout << "True , PASS" << endl;
33 }
34 else {
35 cout << "False, FAIL" << endl;
36 }
37 cout << "Input: \"a110\", Expected Output: False, Actual Output:
";
38 if (check_bin("a110")) {
39 cout << "True, FAIL" << endl;
40 }
41 else {
42 cout << "False, PASS" << endl;
43 }
44 }
45
46 int convert_to_decimal(string bin) {
47 int len = bin.length();
48 int res = 0;
49 for(int i=0; i < len; i++) {
31,1-8 64%
Type here to search
9:19 AM
2/1/2018


access.engr.orst.edu - PuTTY
int convert_to_decimal(string bin) {
int len = bin.length();
int res = 0;
for(int i=0; i < len; i++) {
if (bin[i] == '1') {
res += pow(2, (len-i-1));
}
}
return res;
}
int main() {
unit_test_check_bin();
string bin = get_bin();
int res = convert_to_decimal(bin);
cout << res << endl;
return 0;
}
46,1 Bot
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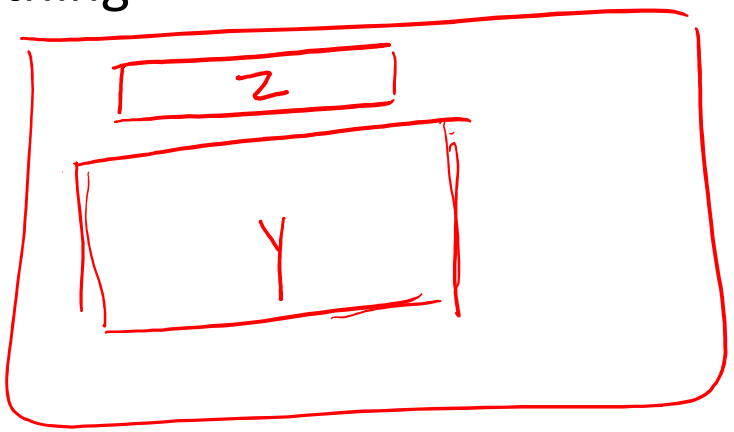
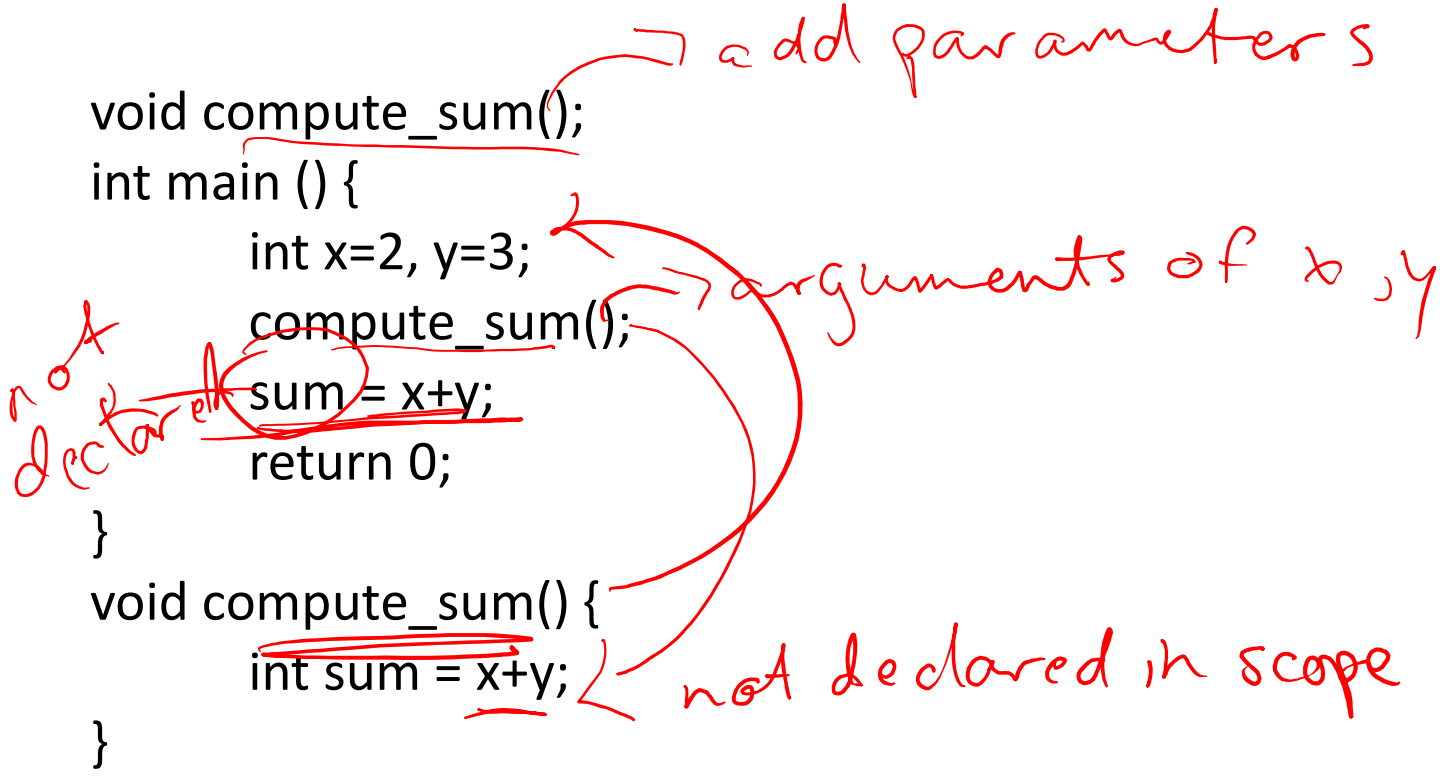
Function Scope

bool checkrange(int u, int l, int t)

- Similar to conditionals and loops, functions have a defined scope
- Local variables: variables declared in a scope only exist with in that scope therefore are of limited accessibility
- Global variables: variables declared in the global scope and therefore accessible by everything



Scope Issues: what is wrong here?




```
void compute_sum();
int main () {
        int x=2, y=3;
        compute_sum();
        sum = x+y;
        return 0;
}
void compute_sum() {
        int sum = x+y;
}
```

Default Arguments

- If an argument is omitted it can be replaced with a default argument
- Only use for call-by-value parameters (more details on week 6 but this is what we are currently doing)
- Default arguments are defined the first time the function is declared or defined, must be in rightmost position

```
int sum (int a, int b = 1);
int sum (int a, int b) {
        return a+b;
}
```

sum (2)

- Assumes omission of rightmost argument

Overloading Functions

- Two or more function definitions for the same name
- Ex:

```
int sum (int a, int b) {
        return a+b;
}
int sum (int a, int b, int c) {
        return a+b+c;
}
```

- In order for the compiler to know the difference:
  - Need different amount of parameters
  - Need different data types on the parameters
  - Different return values will NOT be enough

Overloading Functions Continued

- Compiler decides based on the following:
  - Exact match: if the number and types of arguments exactly match a definition (without any automatic type conversion), then that is the definition used
  - Match using automatic type conversion: if there is no exact match but there is using automatic type conversion, then the match is used
  - Ambiguity:

```
void f (int n, double m);
void f (double n, int m);
f (98, 99);
```

*Savitch, Walter. *Absolute C W/ MyProgrammingLab, 5th Edition* . 5th ed. Boston, MA: Addison-Wesley , 2012.

Demo