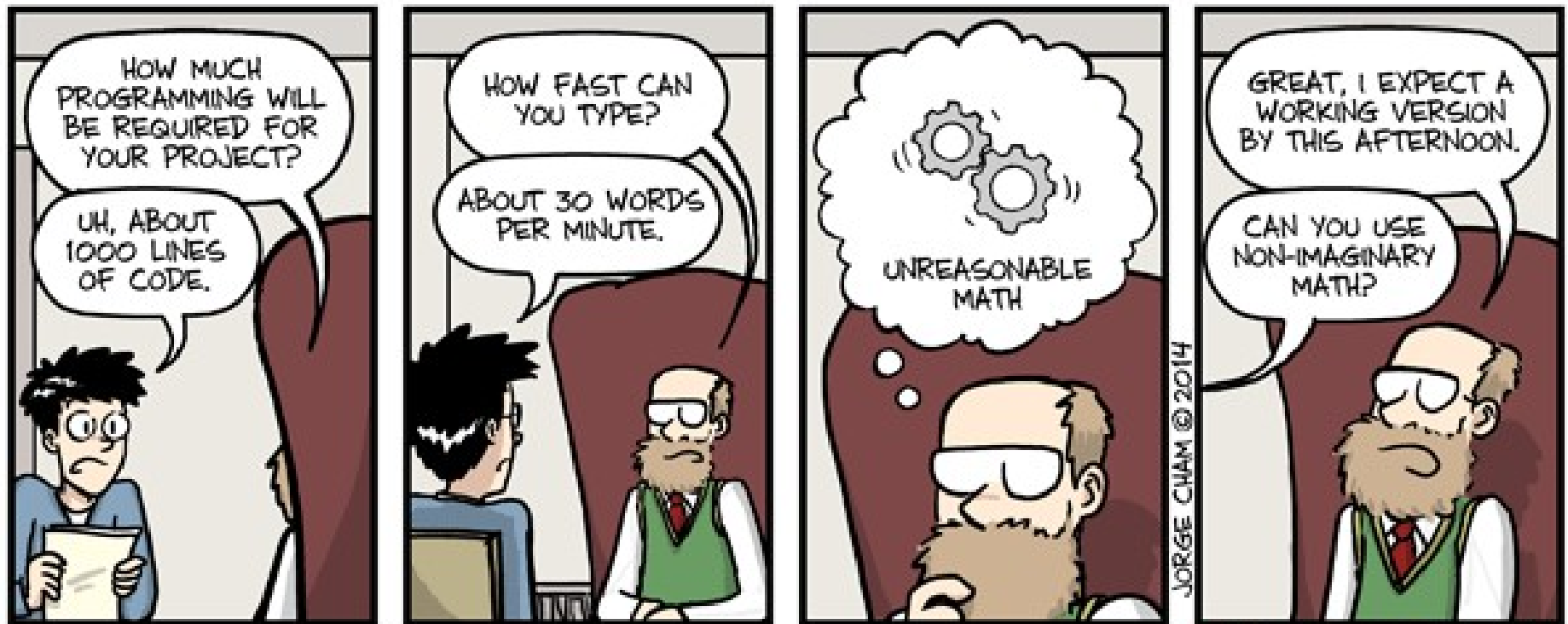


CS 161, Lecture 9: Functions – 31 January 2018



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Revisit Anatomy

1 `int check_length (string input);`

```
2 int check_length(string input) {  
    int len = 0;  
    while (input[len] != '\0') {  
        len++;  
    }  
    return len;  
}
```

3 `int res_length = check_length("hello world");`

Answers:

1. Declaration
Return type, name,
parameter listing
2. Definition
Function header
Function body
3. Function call
name, arguments

Exercise: Binary Conversion

- Recall from recitation one how to convert a binary number to a decimal

for each bit

$$\sum 2^{\text{location}} * \text{val at location}$$

$$\overline{2^7} \quad \overline{2^6} \quad \overline{2^5} \quad \overline{2^4} \quad \overline{2^3} \quad \overline{2^2} \quad \overline{2^1} \quad \overline{2^0}$$

How would we write a program to convert binary to decimal?

- How are you going to take input? *String of 0 and 1*
- What should be the output? *Integer*
- What errors may occur?

Not zero or one

Ex "hello world" "101.1"

*nothing
"8"
"8.1"*

Overflow

Signed or Unsigned

What functions do we need?

- check valid binary number string with only 0's and 1's
- `length()`, `pow()`
- binary converter
- main
- `get_bin()`
 - if valid
 - return
 - otherwise loop

Design your functions

- Each function should have
 - Name
 - Return type
 - Parameter listing
- What are the preconditions for each one? Do they need the results of other functions?

Demo

```
access.engr.orst.edu - PuTTY
1 #include <iostream>
2 #include <cmath>
3 #include <string>
4
5 using namespace std;
6
7 bool check_bin(string bin) {
8     if (bin.length() == 0) {
9         return false;
10    }
11    for (int i=0; i < bin.length(); i++) {
12        if (bin[i] != '0' && bin[i] != '1') {
13            return false;
14        }
15    }
16    return true;
17 }
18
19 string get_bin() {
20     string bin = "";
21     do {
22         cout << "Please give an unsigned binary number: ";
23         getline(cin, bin);
24     } while (check_bin(bin) == false);

```

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```
19 string get_bin() {
20     string bin = "";
21     do {
22         cout << "Please give an unsigned binary number: ";
23         getline(cin, bin);
24     } while (check_bin(bin) == false);
25     return bin;
26 }
27
28 int main () {
29
30     cout << "Test check_bin" << endl;
31     cout << "Input: \"0110\", Expected Output: true, Actual Output: "
32     ;
33     if(check_bin("0110")) {
34         cout << " True, PASS" << endl;
35     }
36     else{
37         cout << "False, FAILS" << endl;
38     }
39     return 0;
40 }
```

24,1-8

Bot