CS 31 Discussion

Week 1
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Discussion session (1A):
BOELTER 9436 / Friday / 10:00am-11:50am

Office hours:
BOELTER 2432 Thursday 9:30-11:30am
Outline

Introduction to Programming

Compile Errors and Logic Errors

Project 1
Introduction to Programming

- Natural language:
  “Hello!”

- Programming:
  C++: cout << “Hello!” << endl;

- Machine code:
  011001110101...
“Hello World” in C++

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

int main () {
    cout << "Hello World!" << endl;
}
```

- `// filename: hello.cpp` (comment line)
- `#include <iostream>` (use I/O library for print statement)
- `using namespace std;` (the context we are using)
- `int main () {` (print new line)
- `cout << "Hello World!" << endl;` (function boundaries)
- `}` (just a template for you to follow (more details later))
- `;` (print to standard output)
Compilation

- Compiled languages must be turned into executable computer instructions
- Translate the program directly into machine code
- Compiled language: C++, C, Java, ...

Source code (Hello.cpp) ➔ Compiler (Visual C++/clang++/g++) ➔ Executable (hello)
Environment Setup

Windows: Visual C++

Mac: Xcode

Linux: g++
Errors

Compile error (Syntax error)

Errors in which the programmer has violated a portion of the language syntax

Compile error will prevent source code from compiling into executable

Runtime error (Logic error)

Errors that someone might make that, while not preventing a successful build, causes the program when it runs to produce incorrect results from reasonable input
Examples

Missing semicolons at ends of statements
Missing brackets around blocks
Missing namespace or #include definitions
Misspelled variables or names
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Missing brackets around blocks

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Compile Errors
Example

Division by 0

Overflow (e.g. trying to hold a really big number in an int variable that exceeds its bounds)

Int range: -2,147,483,648 — 2,147,483,647 (32-bit)
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Project 1

a. get the environment set up

b. original.cpp — get the demo cpp program working

c. logic_error.cpp — modify the code such that it compiles but gives the wrong output

d. compile_error.cpp — introduce two distinct types of errors which make the code fail to compile

e. write your report
Project 1

Time due: 9:00 PM Tuesday, July 3rd

A compressed file in zip format:

original.cpp, logic_error.cpp, compile_error.cpp, report.doc (docx, txt)

Do not include anything else in the zip file

Make sure your report is less than 1 page
Example

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

int main () {
    int worldPopulation = 75000000000;
    cout << "The world population is ";
    cout << worldPopulation << endl;
}
```
```cpp
#include <iostream>
using namespace std;

int main () {
    double PI = 3.14;
    int r, h;
    cout >> "Enter values of r and h: "
    cin >> r, h;
    v = PI * r * r * h;
    cout << "Volume = " << v;
}
```
Example

```cpp
#include <iostream>
using namespace std;
int main () {
    double PI = 3.14;
    int r, h;
    cout << "Enter values of r and h: ";
    cin >> r >> h;
    double v = PI * r * r * h;
    cout << "Volume = " << v;
}
```