CS 161
Intro to CS I

What is CS all about?

Odds and Ends

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- Go to Lab this week (laptop required)
- Assignment 1 posted and can upload to Peerceptiv
- Math study: Elise.Lockwood@oregonstate.edu

- Questions?

How to Be Successful

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- Read and listen carefully
- Start assignments early
- Be proactive with absences and issues that arise in the term
- Get help when you need it

Help Hierarchy

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- Reread assignment, lecture slides, labs, syllabus
- Google/Bing/Open a textbook
- Ask a friend
- Ask a TA
- Ask Jennifer

- All Emails Should Include:
  - What your problem is
  - What you have tried
  - What would help you most
  - Section number (if relating to a grade issue)

Computers Are Everywhere

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- Examples:
  - homes, offices, rooms/servers, phones, pacemakers, cars, etc.
- What is the difference b/w these?
  - Complexity
  - Size

What is a computer?

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- A Computational Device
  - It computes (input-> processing -> output)
  - Modern: device that can be programmed to carry out an algorithm.

- What is Computer Science?

What is an algorithm?

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- Step-by-step description of how to accomplish a task, i.e. recipe
- Algorithmic thinking
- Expressed in any language
  - Natural
  - Programming

What is programming?

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- Problem Statement
- Solve the Problem
- Specify Algorithm
- Algorithm -> Computer Language

- Why do we teach programming 1st?

Hardware vs. Software

- Computer: **machine** that manipulates data and carries out **set of instructions**
- Hardware
  - CPU
  - RAM
  - Hard Disk
- Software
  - Programs

Software/Programs

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- Primary piece of software on computer?
- What is its purpose?
- What are applications?

Digital Realm

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- Based on discrete #s
  - Specifically: Circuits
- Binary, i.e. base 2
  - 0 or 1

open / close
on / off
1 / 0

More Binary

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- What is each digit called?
- What is a Byte?
- How many numbers can be expressed in a Byte?

What does this mean for us?

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nibble - 4 bits

- Unsigned positive #s
  - What is the smallest number? 0
  - What is the largest number? $15 = (2^4) - 1$

$2^4 = 16$ possible #s

← because start at 0

1/2 = 8 1/2 = 8

- Signed negative + positive #s because 1st bit is sign (+/-)
  - What is the largest number? 8 positive #s 0-7

$7 = (2^{4-1}) - 1$

  - What is the smallest number? 8 negative #s -1 - -8

$-8 = (-2^{4-1})$

Programming

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- Writing **code** that a computer can **execute**
  - Does that mean we have to write in binary?
- High-level language
  - Translated Continuously during runtime
    - Interpreted
    - Just in time compilation/caching
  - **Translated Prior/Ahead of time to runtime**
    - High-level -> machine language
    - High-level -> intermediate language

Linux commands

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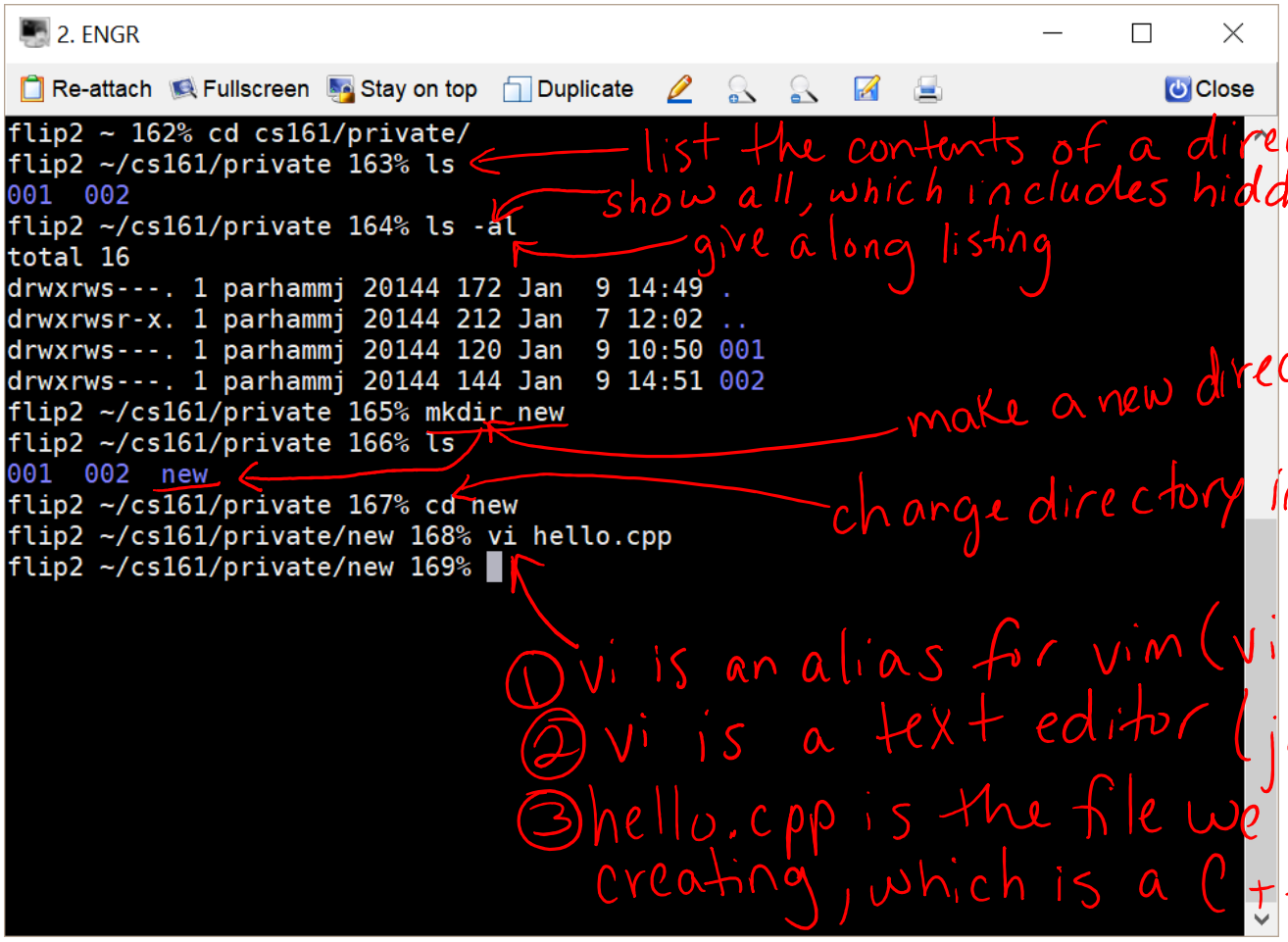

001 Code/002 will finish Friday

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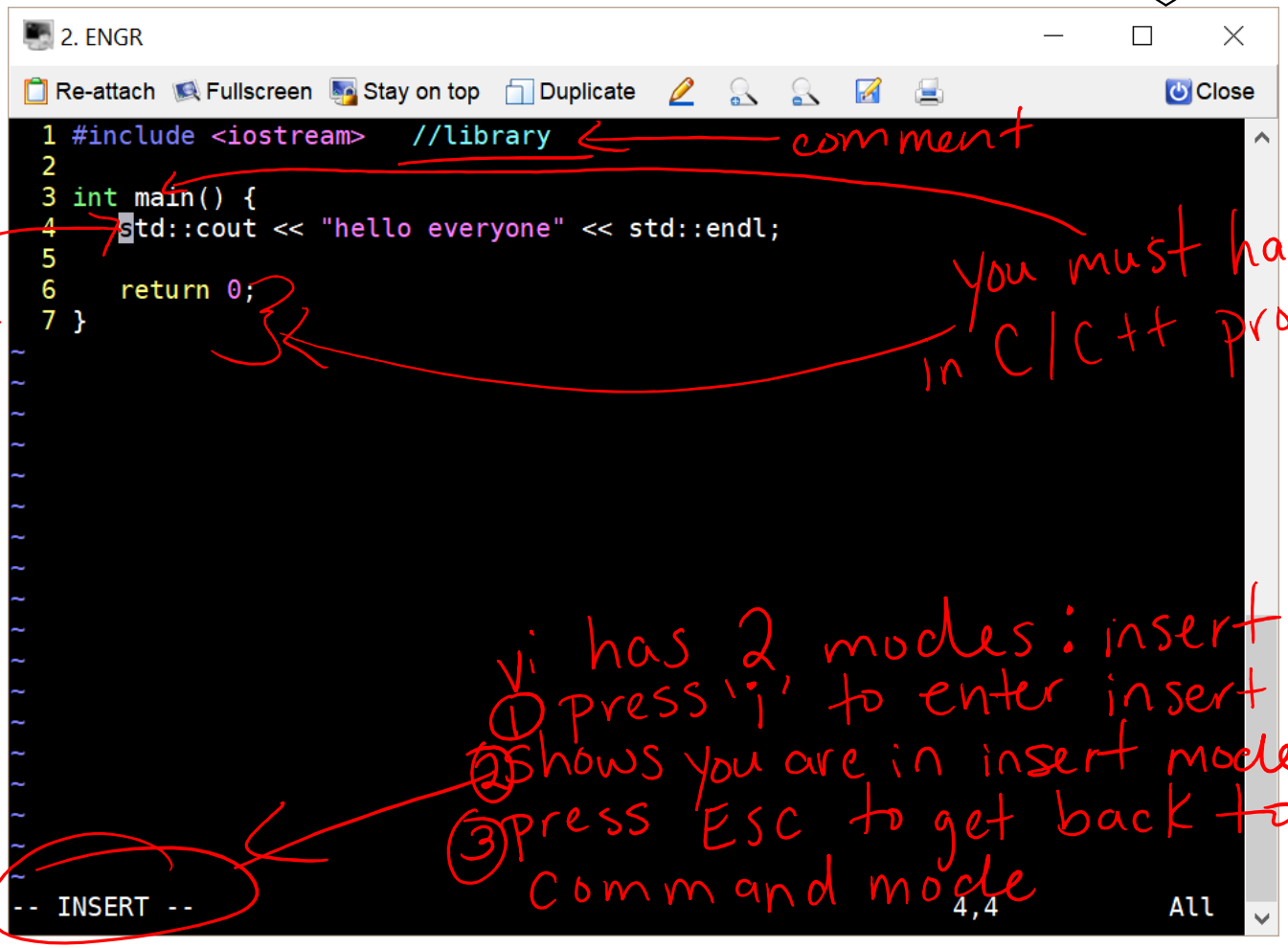

comment

Print to standard out which is the screen

You must have this in C/C++ programs

vi has 2 modes: insert & command
① Press 'i' to enter insert mode to type
② shows you are in insert mode
③ Press Esc to get back to command mode

Compile/Execute C++

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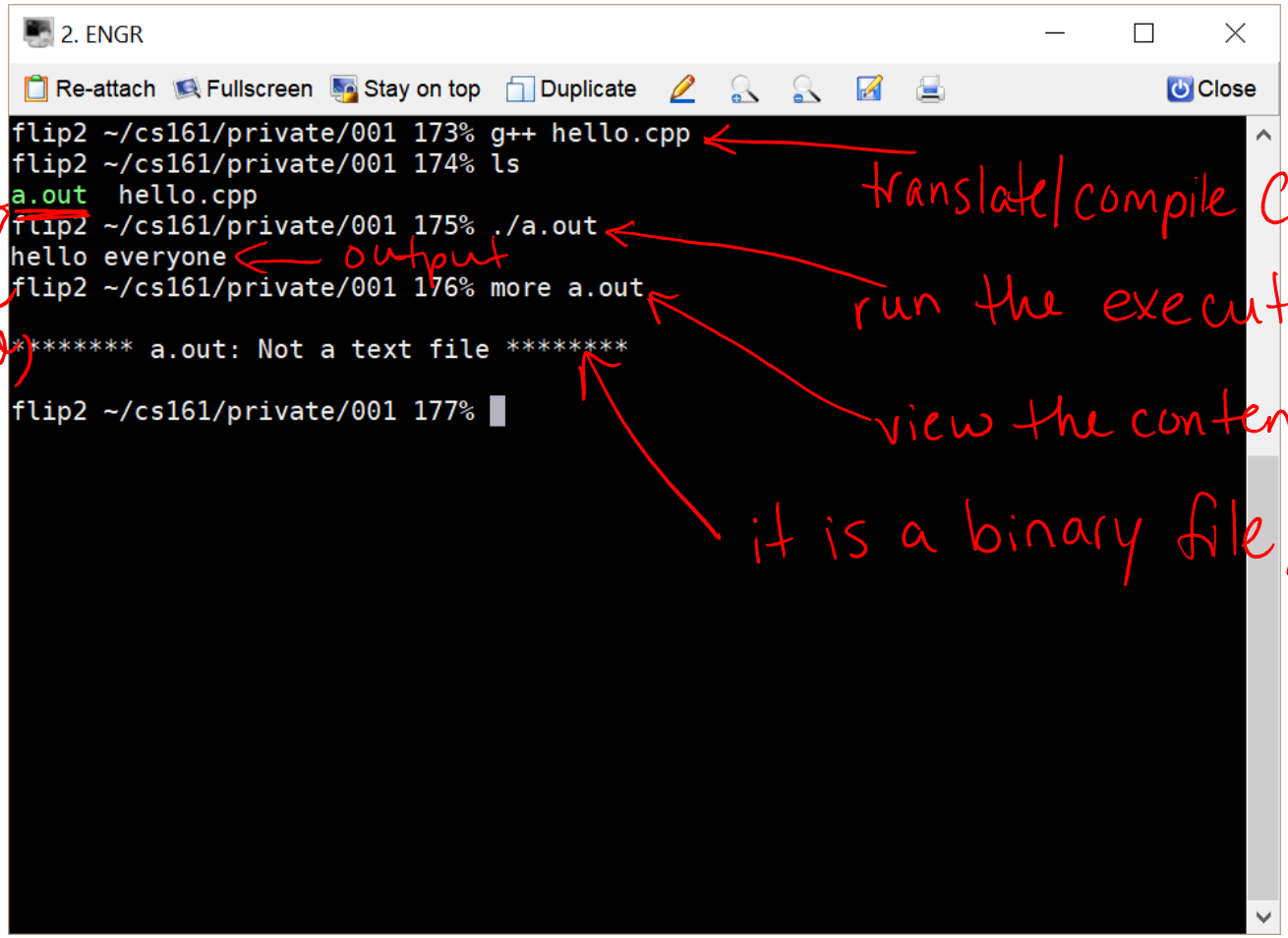

translate/compile C++ to machine code

output

run the executable machine code

view the contents of a.out

it is a binary file/not text file

if you don't use -o to rename the executable the default is a.out

C++ Programming Environment

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- Create a program: **vim hello.cpp**
- Compile program: **g++ hello.cpp –o hello**
- Run program: **./hello**
- Example: **hello.cpp**

```
#include <iostream>
int main() {
        std::cout << “Hello CS 161 Class!!!”;
        return 0;
}
```

Our first C++ program!

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```
#include <iostream>
int main() {
      std::cout << “Hello CS 161 Class!!!”;
      return 0;
}
```

- Libraries
  - Example: #include <iostream>
- Functions
  - Perform particular action/computation
  - Requires special function: **main**
    - int **main**() {….}
- Statements
  - Ended by semicolon

Comments

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- Ignored by compiler
- Comment a block of code: /*…..*/
- Comment one line of code: //
- Why use these?