As a programming course, it needs to start with zero:)

Lecture 0: Introduction

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* Part of the materials are inspired or borrowed from the course CS 106B at Stanford

Outline of Today's Class

- A bit on myself
- Why take this course
- Course logistics
- Why C++
- Where to code

A bit on myself

Research, teaching and more…

- **Education**
  - Ph.D. The Ohio State University, 2020.
- **Research**📚
  - Machine Learning —Reinforcement Learning, Online Learning
  - Data Privacy — Differential Privacy
  - Stochastic Systems — Load Balancing, Cloud Computing
- **Teaching** 👩‍🏫
  - ECE 4050 — Algorithms and Data Structures
  - ECE 2050 — Object-Oriented Programming for ECE
- **Others** 👨🏻‍💻
  - Machine learning engineer intern at Meta (Facebook)
  - Research intern at Alibaba, USA

A follow-up course for ECE 2050

A new course !

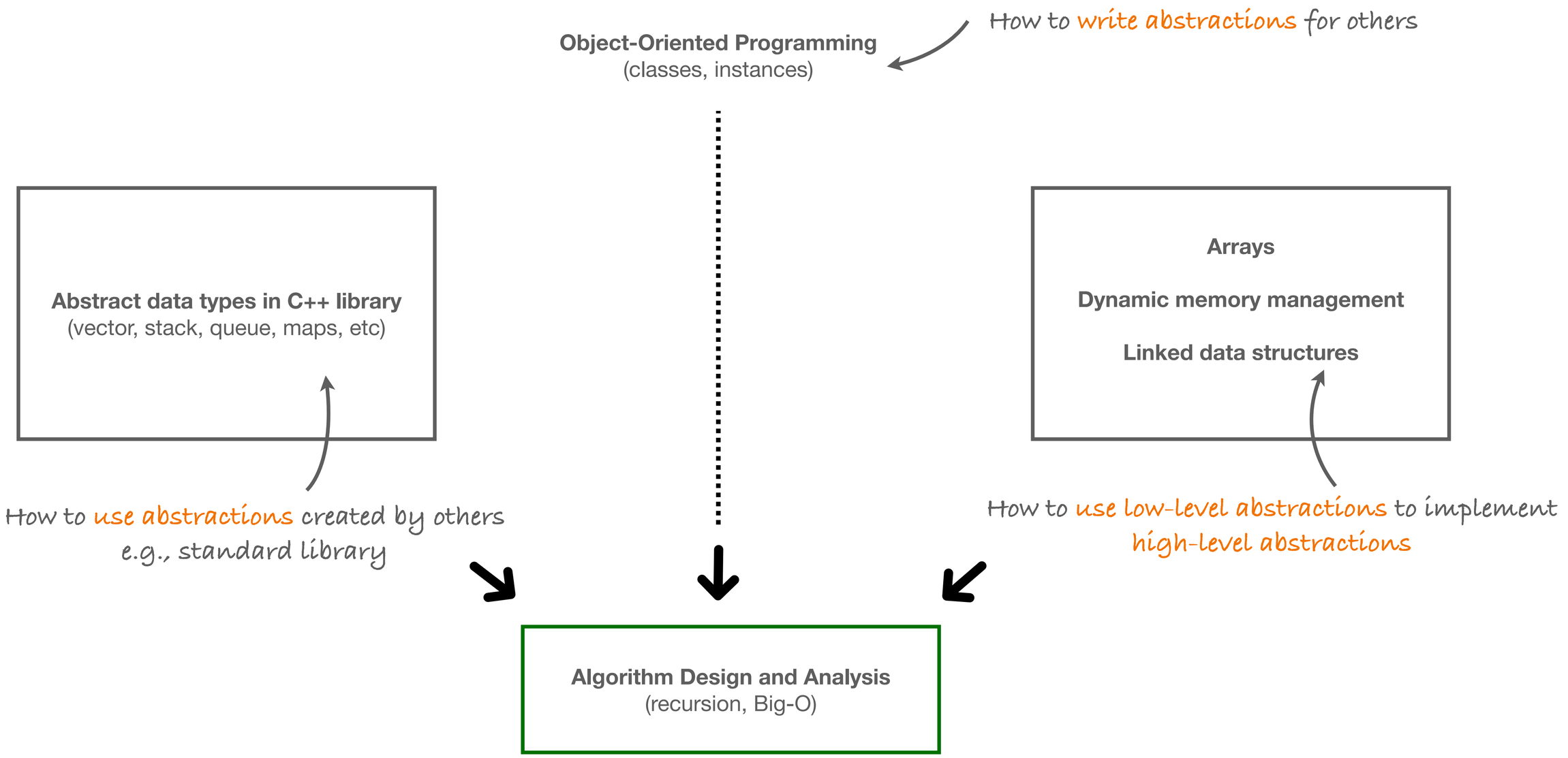
* More info can be found at my website: http://xingyuzhou.org/

Why take ECE 2050?

What the course *is*

- A course that will give you practice with computational thinking via C++
- A course that will lead you through common abstract data types (ADTs)
- A course that will touch upon one key concept — recursion
- A course that will introduce object-oriented programming (OOP)
- A course that will cover how to write our own ADTs via OOP
- A course that will cover how to analyze various algorithms

How the course *organized*



Learning goals

After the course, I can …

- **High-level conceptual goals**
  - Use programming to solve real-world problems outside class
  - Understand common abstractions
  - Break down complex problems into smaller subproblems by applying my algorithmic reasoning and recursive problem-solving skills
  - Evaluate design tradeoffs when creating data structures and algorithms or utilizing them to implement technological solutions
- **More practical goals**
  - **Successfully** pass tech-interview of coding including Google, Apple, Meta, LinkedIn

What the course *is not*

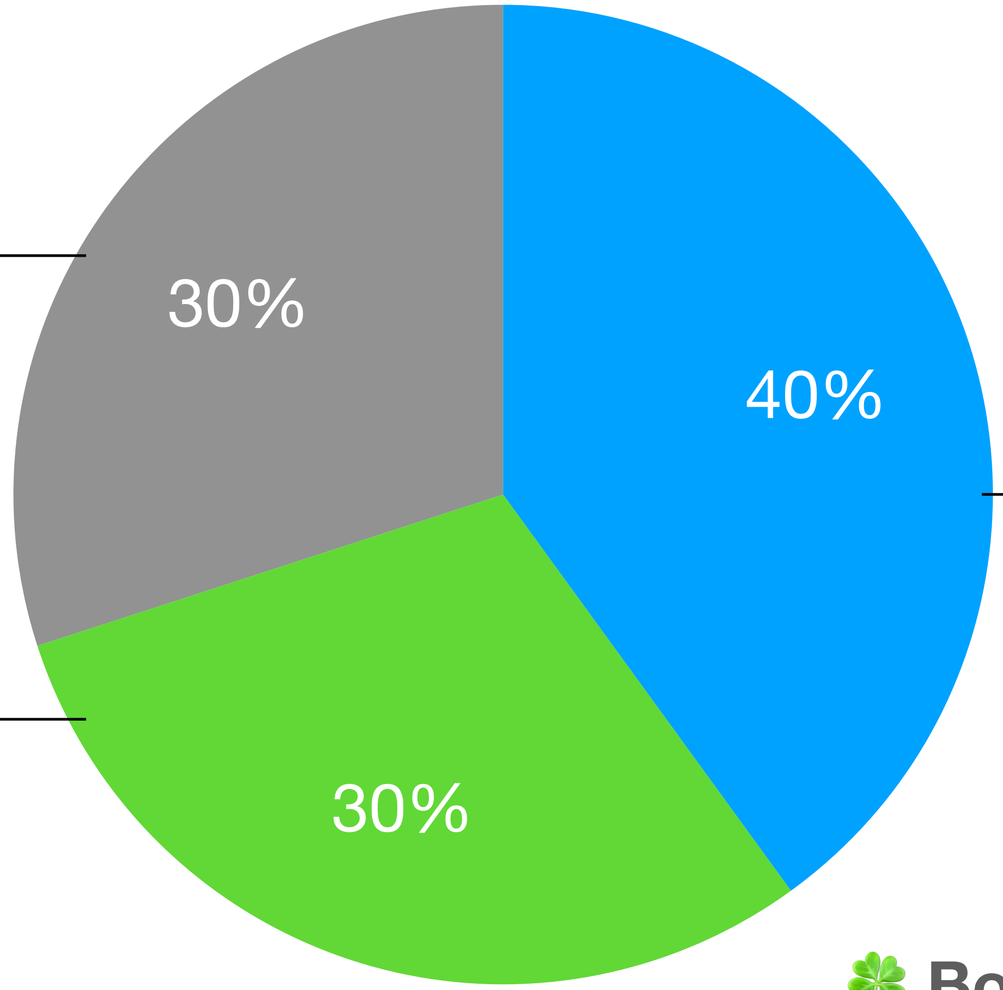
- A course to teach you how to program from scratch
- A course to teach you how to write a game
- A course to teach you how to write a website
- A course to teach you every aspect of C++

Course Logistics

Grading

Mid exam

Take-home



Programming Assignments

Tentative 2 assignments
More details will be given for each assignment

Final exam

Take-home

🍀 **Bonus:** in-class participation

Canvas

- Announcements
- Modules — lecture slides and references
- Assignments
- Zoom — join online class (just in case)
- Grades
- People
- Discussion — Q&A

Why C++?

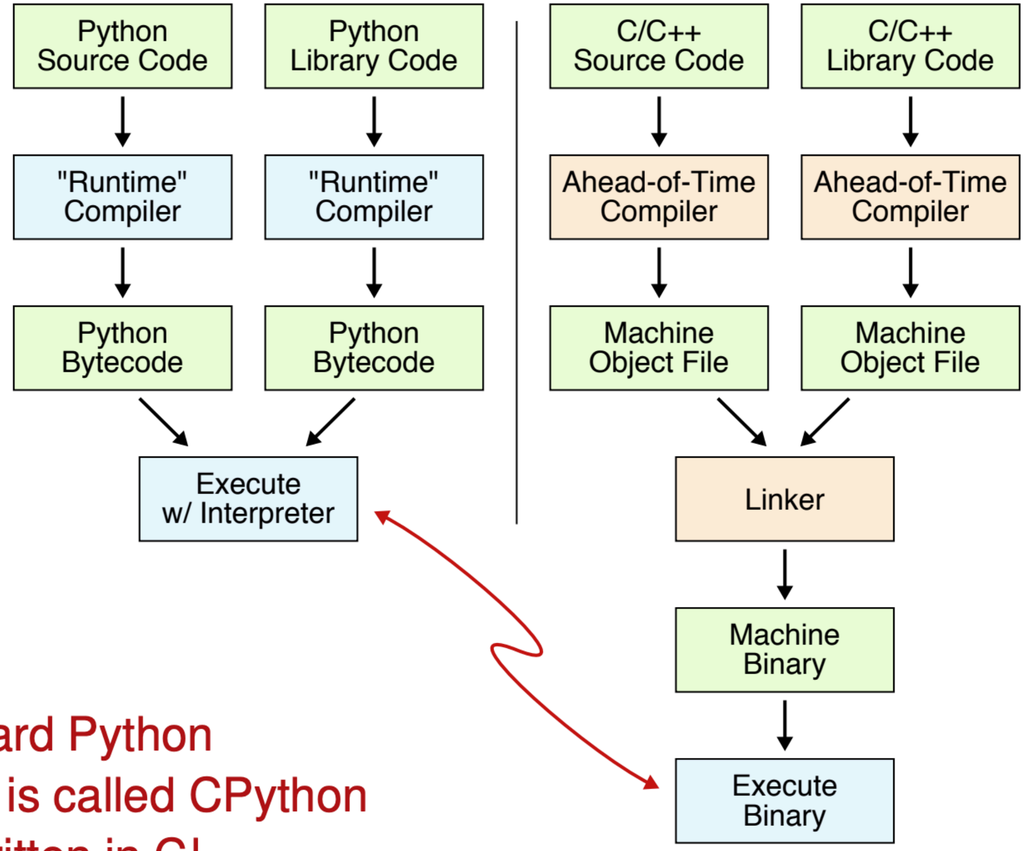
Features

- **C++ is a complied language (vs. interpreted)**
  - Before running a C++ program, you must first compile it to machine code
- **C++ is gives us access to lower-level computing resources**
  - More direct control over computer memory
  - This makes it a great tool for better understanding abstractions!
- **C++ is fast than Python and is still widely used in large companies**

Interpreted vs. Complied

```
def min(a,b):
  if a < b:
    c = a
  else
    c = b
  return c
```

```
LOAD_FAST
LOAD_FAST
COMPARE_OP
POP_JUMP_IF_F
LOAD_FAST
STORE_FAST
JUMP_FORWARD
LOAD_FAST
STORE_FAST
LOAD_FAST
RETURN_VALUE
```




```
int min( int a,
         int b )
{
  int c;
  if ( a < b )
    c = a;
  else
    c = b;
  return c;
}
```

```
pushq %rbp
movq  %rsp,%rbp
cmpl  %esi,%edi
cmovl %edi,%esi
movl  %esi,%eax
popq  %rbp
retq
```

```
1010101
100100010001001
11100111110111
111101001110111
100010011111000
1011101
11000011
```

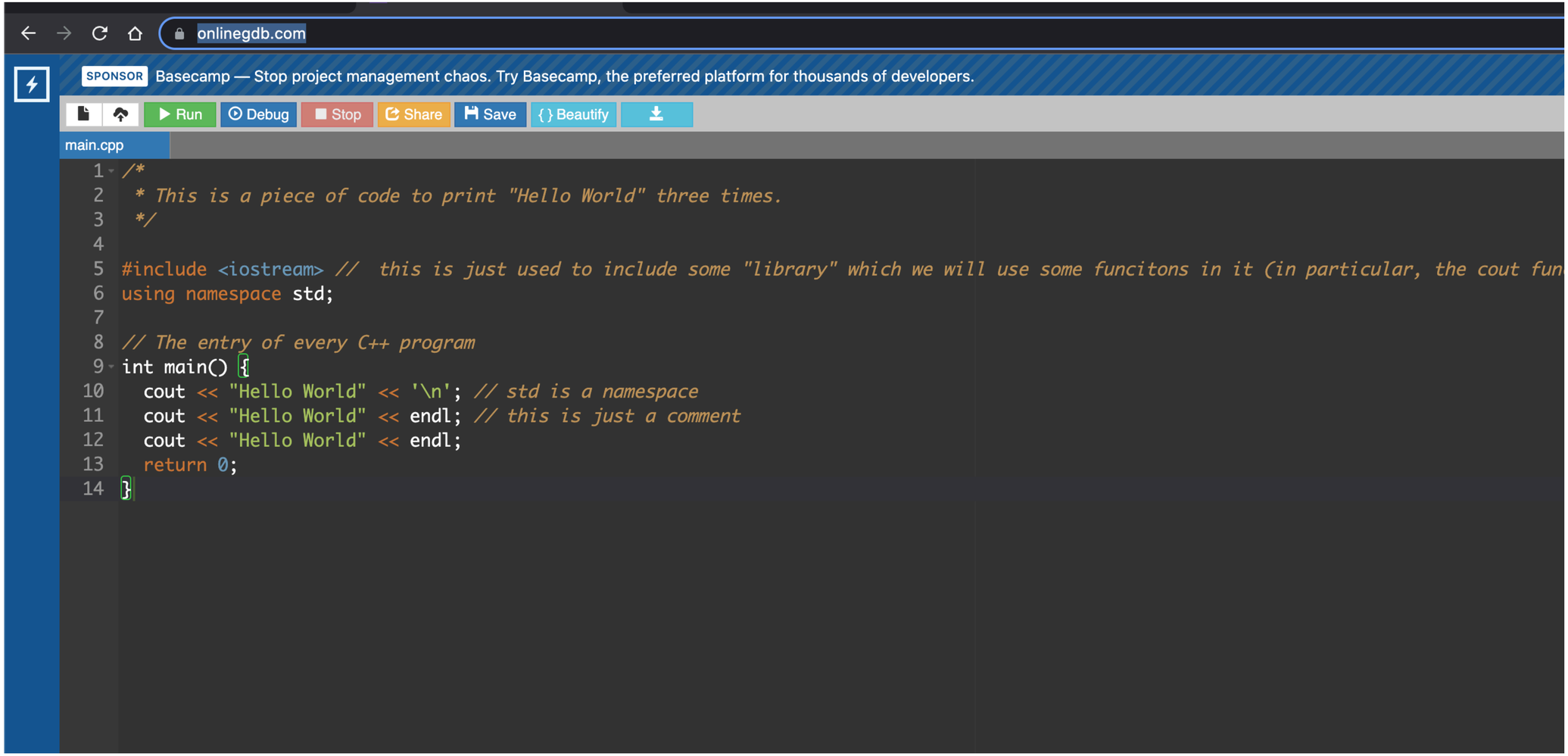
The standard Python interpreter is called CPython and it is written in C!

* source: https://www.csl.cornell.edu/courses/ece2400/handouts/ece2400-overview.pdf

Where to code?

GDB Online

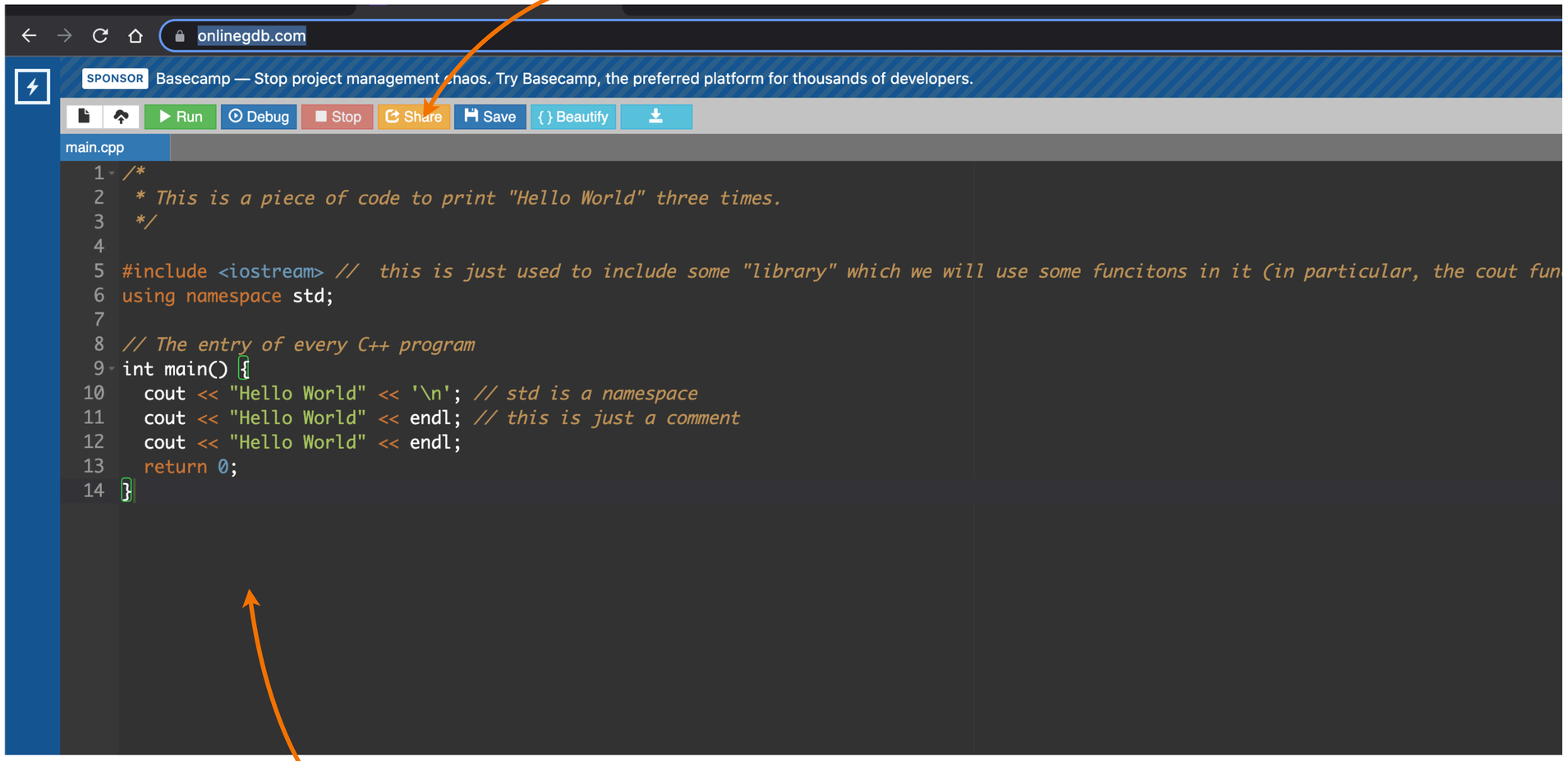
online C++ platform



How to submit code?

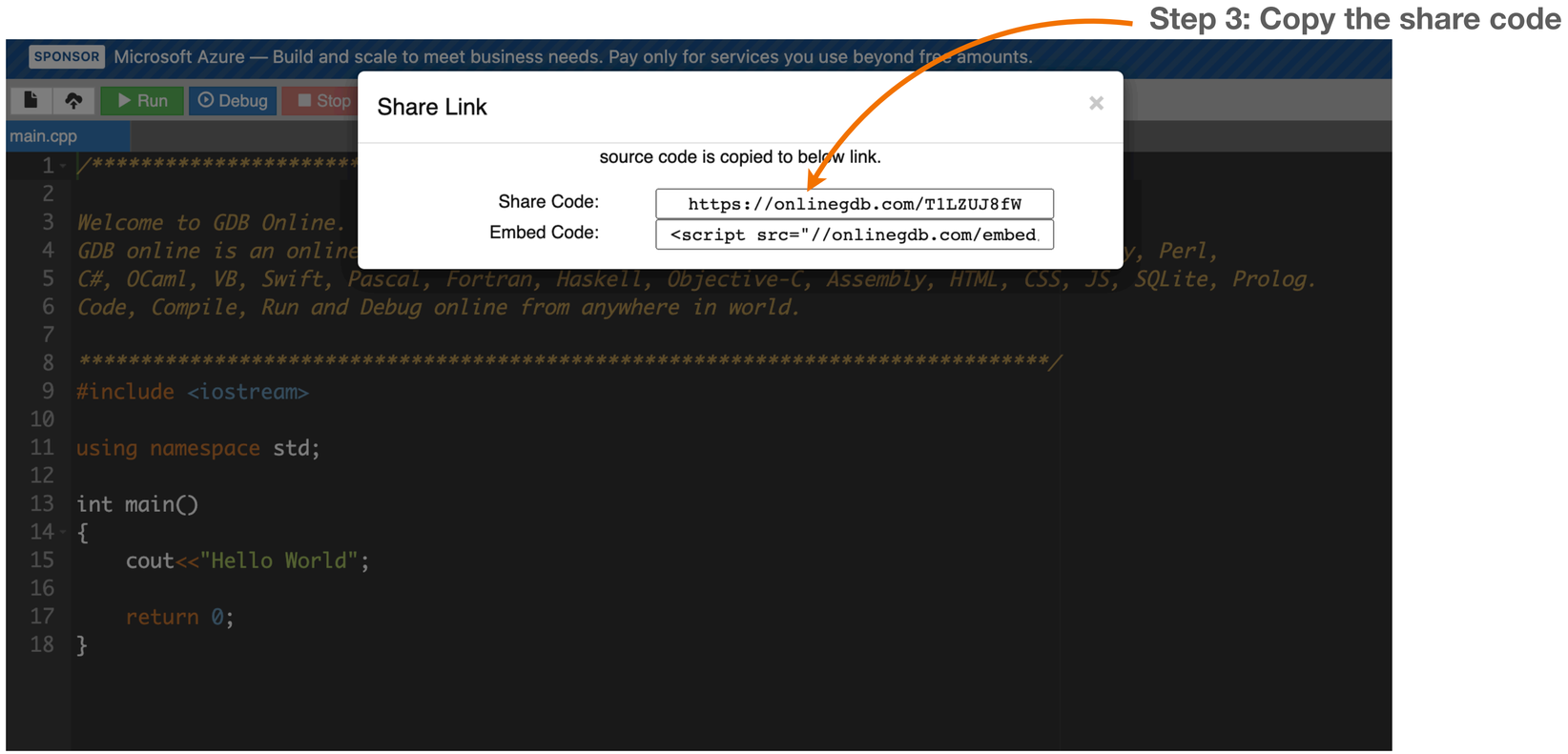
Only link is accepted…

Step 2: Click share button



Step 1: Copy your files into onlinegdb.com (you can create multiple files)

Only link is accepted…



Live Coding

Q&A

Feedback: https://forms.gle/CxFZVjnA4XuLNH4Q8

In-class problem

1. **Use any online/offline IDE you like**
2. **Write a C++ program to print out**
   a. `Name`
   b. `Which year of school`
   c. `Have you learned programming before? If yes, which language?`
3. **Share the link of your project to this Google sheet**

Follow the above mentioned steps to generate link