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### CSCI 49378: Lecture 1: Overview

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NYC Tech-in-Residence Corps

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# Intro to Distributed System and Cloud Computing

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# About Instructor

- 2015 - Present: Software Engineer, Google
- 2019 - Present: Tech-In-Residence Corp Member/Adjunct Lecturer
- 2013 - 2015: Software Engineer, Microsoft
- 2011 - 2013: M.S. in Computer Science, Columbia University
- 2007 - 2011: B.E. in Computer Science & Technology, Sichuan University, China

# Question

You are going to organize an important event. You need order 20 boxes of pizza for the event. How are you going to do it?

# Distributed System

A distributed system is a system whose components are located on different networked computers, which communicate and coordinate their actions by passing messages to one another.<sup>[1]</sup>

[1] M. van Steen and A.S. Tanenbaum, Distributed Systems, 3rd ed., distributed-systems.net, 2017.

# Cloud Computing

Cloud computing is the on-demand delivery of compute power, database storage, applications, and other IT resources through a cloud services platform via the internet with pay-as-you-go pricing. <sup>[1][2]</sup>

- Infrastructure-as-a-Service
- Platform-as-a-Service
- Function-as-a-Service (Serverless)
- Software-as-a-Service

[1] What is Cloud Computing, <https://aws.amazon.com/what-is-cloud-computing/>

[2] What is Cloud Computing: A Beginner's Guide. <https://azure.microsoft.com/en-us/overview/what-is-cloud-computing/>

# Learning Outcomes

After successfully completing the course, the students should achieve the following goals.

- Understand the basic concepts of distributed systems and cloud computing.
- Be aware of the established patterns of high-performance and large-scalable systems.
- Be able to leverage major cloud computing product to build a service rapidly.
- Be prepared for system design interview questions.



# Grading

Attendance: 8%

- Attendance is required for the course.
- No penalty in grading if the absence is notified in written before the class.

# Grading (continued)

Assignments: 32%

- The system design challenges are simulating system design process in real jobs and/or job interviews.
- Complete at least 2 of the 4 system design assignments. The highest 2 scores will be used.

# Grading (continued)

Group project: 60%

- Each group (2-5 students) will develop a cloud-based service in your preferred language(s). Detailed requirements will be announced later.
- Grading will be based on
  - design document
  - design presentation
  - final presentation/demo
  - source code
  - peer review

# Schedule

<https://docs.google.com/document/d/1fMgr154JNKx1M07Ro9f8YIWIV08qj6itiyY0yAX1y-4/edit#>

# Sample Design Question

- Please design a tiny URL service.