



Introduction to Computer Science

Qingsong GuoFall 2017School of Computer Science & Technology



Instructor

Name

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How to greet me

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Education Background

Ph.D Sep 2011 - Aug 2016

University of Southern Denmark Department of Mathematics and Computer

Science, Faculty of Science



M.S Sep 2008 - Jul 2011

Renmin University of China,

Computer Science, Information School



For Foreign Students

How is your Chinese?

For Chinese Students

How is your English?

For All of You

Learn from each other. 互相学习

Today's Agenda

Part 1. Course Information

- Description Provide America Contraction Contraction Provide America Contraction Provide America Provide Ame
- Grading Scheme

Part 2. History of computing

Evolution of computing devices

Part 3. Recognize of Hardware

▷ The hardware constitution of a computer system

Part 4. Overview of Computer Science

- Computer System, Hardware, Software
- Data Representation, Storage, Manipulation
- Algorithm, Data Structure, Programming, etc.

CS101 Introduction to computer science

Lecture 1

Overview of CS101

Course Info

Course number: CS101 Classroom: Tue 11201T / Thu 14404Z Instructor: Qingsong Guo (Abel) Homepage: <u>abelgo.cn</u> Email:

qingsongg@gmail.com

Course site

http://abelgo.cn/cs101.html

Course management

Piazza (North University of China, cs101)

Course Website

Homepage

- http://abelgo.cn/cs101.html Holds:
- Syllabus: course description, textbooks, ...
- Schedule: homework, assignment descriptions, description of course readings, links to class lecture notes

Course Management System

- Piazza
- Everything about CS101

Demo of course website and Piazza

Question & Answer

Textbooks



Computer Science: An Overview. 12th Edition.

Think Python: How to Think Like a Computer Scientist. 2nd Edition.



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Turing's Cathedral: The Origins of the Digital Universe. 1st Edition.

A History of Silicon Valley: The Greatest Creation of Wealth in the History of the Planet. 2nd Edition.



Contents of Textbook

- Chapter 1: Data Storage
- Chapter 2: Data Manipulation
- Chapter 3: Operating Systems
- Chapter 4: Networks and the Internet
- Chapter 5: Algorithms
- Chapter 6: Programming Languages
- Chapter 7: Software Engineering
- Chapter 8: Data Abstractions
- Chapter 9: Database Systems
- Chapter 10: Computer Graphics
- Chapter 11: Artificial Intelligence
- Chapter 12: Theory of Computation



Grading Scheme

Grading (tentative)

- 15% Course Participation & Discussion
- 15% Mandatory Quizzes & Reading Assignments
- 10% Programming Project
- ▷ 60% Final Exam

Extra credit

- ▷ +5% Extra Credit for Your Performance
- ▷ No more than 100% in total

Useful Suggestions

Office Hours

- Thursday 7:00PM 10:00PM (to be determined)
- Questions on your studies
- It's not obligation but will be a good opportunity

Preparation for Classes

- Prepare for a lecture will be very helpful
- Ask questions frequently
- Join in-class discussions

Learning Objectives

- 1. To provide an overview of some of the big ideas and concepts of computer science
- 2. To give an understanding of what motivated the development of these ideas
- 3. Provide a sense of exciting current developments, and where the future lies
- 4. Teach you to Think As Computer Scientist

What this class is not:

- Not a programming course
- Computer science is far more than just programming languages
- Not a computer literacy course (I assume you know how to use a computer)

Think As Computer Scientists

1. System Perspective

- Computer System: Hardware + Software
- Networking, the Internet, the World Wide Web

2. Think in Data

Representation, Storage, Manipulation

3. Algorithmic Thinking

- Algorithms: representation, implementation, etc.
- Data Structures

4. Programming

- Programming Languages
- Software Engine

Why Study Computer Science?

- 1. The computer is a profoundly important technology
- Broadly impactful
- Occasionally disruptive

2. Computer science is the discipline that seeks to build a scientific foundation for a variety of topics.

3. Computer science provides the underpinnings for today's computer applications as well as the foundations for tomorrow's applications.

4. Computers center our daily life, shopping, traveling, even studying, etc. Understanding computers is important.

What is Computer Science?

Broadly, computer science is the study of

- what can be accomplished using computers, and
- ▶ how to construct software to do these things.

Many views on the field

- Mathematical vs empirical
- Mathematical: views computers as a device with precise, formal meaning to all operations. Hence, mathematics should be capable of describing everything a computer can do.
- Empirical: views computers as complex systems where there are often multiple ways to accomplish a task, and tradeoffs among them. Understanding is only possible via a process of building programs and exploring their properties.

What is Computer Science? (cont'd)

Domain-specific

Information-centered

 Computer science is the study of information, including its representation, storage, transmission, and processing (e.g., data structures, databases)

Program-centered

Computer science is the study of programming, including appropriate choice of language for a problem, language design, compiler construction, program verification and correctness.

Algorithm-centered

Computer science is the study of algorithms. Study of algorithm design, characteristics of algorithms, what is computable, tradeoffs of different algorithms.

What is Computer Science? (Edge cases)

Human-computer interaction

- The study of the user interfaces of software, and how users interact with software.
- Expands the focus of inquiry to be a system comprised of the computer plus humans interacting with it

Software engineering

- ▷ The study of the construction of large-scale software systems.
- Requirements engineering determining what a software system should do is a social process, and is very challenging to get right.
- Large software code bases are so complex that formal approaches are insufficient to model software behavior. Mathematical view of computer science is insufficient.

Digital arts

A field that explores what computers can accomplish, but with the aim of creating an **artistic** experience.

THANKS! Any questions?