About CS 101, Fall 2019

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(click here for video)
Course design

**survey course**

*n.*

An academic course consisting of an overview of a broad topic or field of knowledge.

(American Heritage Dictionary)

What this means:

- You will learn about many topics
- Focus on breadth, not on depth
- See the big picture of what is CS
Example sub-fields
Overall theme

How to think like a computer scientist
Example Learning Objective

Use abstraction and decomposition when reasoning about complex systems and problems.
“F1” is an abstract tool
“Half adder” is an abstract tool
“CPU instructions” are abstract tools
Essence of CS 101

The point is NOT:

▶ Become an expert at Light-Bot programming
▶ Be able to understand/design complex circuits
▶ Program a computer in machine language

The point is:

▶ Learn how to think like a computer scientist
▶ Sample what you will learn in future courses
▶ Develop new computing skills (e.g., Python)
Computer Science: An Overview
Brookshear and Brylow, 12th edition

http://www.pearsonhighered.com/brookshear
Course outline

**Part 1: Hardware and Systems**

1. Introduction
2. Data Storage
3. Program Execution
4. Operating Systems
5. Computer Networking
6. Information Security
7. Mid Project: Explore

**Part 2: Software and Data**

8. Algorithms and Python
9. Programming Languages
10. Software Engineering
11. Data Structures
12. Database Systems
13. Artificial Intelligence
14. Final Project: Create
Finch robots!
Big Ideas of Computer Science

Source: http://apcsprinciples.org/

(see also Section 0.4 of the book)
Big Idea 1: Creativity

Computing is a creative activity.
Big Idea 2: Abstraction

Abstraction reduces information and detail to facilitate focus on relevant concepts.
Big Idea 3: Data and Information

Data and information facilitate the creation of knowledge.

http://www.ibm.com/big-data
Big Idea 4: Algorithms

Algorithms are used to develop and express solutions to computational problems.
Big Idea 5: Programming

Programming enables problem solving, human expression, and creation of knowledge.

```python
# Let's make the Finch robot dance!

from finch import Finch
from time import sleep

finch = Finch()

# CHANGE CODE BELOW THIS LINE

finch.led(0, 255, 0)
finch.wheels(0.75, 0.75)
sleep(1.5)

finch.led(0, 0, 255)
finch.wheels(-0.75, -0.75)
sleep(1.5)

finch.halt()
```
Big Idea 6: The Internet

The Internet pervades modern computing.

by Wilgengebroed on Flickr
Big Idea 7: Global Impact

Computing has global impact.

Source: smallbiztrends.com