

Introduction to Computer Science

Yufei Cui

yufei_cui@hotmail.com

May 3, 2021

Overview

1 First Section

- Subsection Example

2 Second Section

What is Computer Science?

- Clearly, it is the science of computing!
- But...What does that mean?
- What is science?
- What is a computer?

Motivation

Scenario

Suppose you are given a directory of staff from a company with over 10000 employees. In that directory, you are given a summary for each person – their name, address, SIN, job title, salary, etc. You want to be able to see the hierarchy of command, query information about workers in the in company, and be able to add, delete, and modify the data **QUICKLY**. How would you do it?

Approach

- ① Put that information in a database.
- ② Organize the database somehow, for convenient access
 - but what does convenient mean?
 - what if organizing the database one way makes it "convenient" for one type of task but at the expense of another?
- ③ Manually edit the company directory when you need to

Computer Science

- **IS** the capacity to solve problems with (or due to) computers!
- Come up with **algorithms** to solve problems, make our lives easier, leverage the fact that computers are so crazy fast.
- What is an algorithm?

Algorithm

Definition

An algorithm is (finite) sequence of instructions.

Examples:

- cooking recipes
- driving instructions
- lego instruction
- rubik cube solver

Seems easy huh?

Nowadays, a typical senior software engineer (or researcher) should be able to

- Identity the problem or task or improvement
- Define what is it that you want to accomplish
- Articulate it
- Analyze it
- Design a solution
- Code it up ← we are starting here
- Test it thoroughly
- Maintain it

Computers are SITOPID!?

When you give instructions to human vs. computer

Linda

- 1 How does my peanut butter sandwich taste?

Apple LISA

- 1 Locate hand and PB sandwich
- 2 Maneuver toward PB sandwich
- 3 Pick up sandwich with hand at exactly the right force
- 4 Insert into mouth
- 5 Chew
- 6 Swallow when sufficiently small
- 7 Match flavours to personal preference
- 8 Construct feedback
- 9 Vocalize it

Blocks of Highlighted Text

Block 1

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer lectus nisl, ultricies in feugiat rutrum, porttitor sit amet augue. Aliquam ut tortor mauris. Sed volutpat ante purus, quis accumsan dolor.

Block 2

Pellentesque sed tellus purus. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Vestibulum quis magna at risus dictum tempor eu vitae velit.

Block 3

Suspendisse tincidunt sagittis gravida. Curabitur condimentum, enim sed venenatis rutrum, ipsum neque consectetur orci, sed blandit justo nisi ac lacus.

Multiple Columns

Heading

- 1 Statement
- 2 Explanation
- 3 Example

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer lectus nisl, ultricies in feugiat rutrum, porttitor sit amet augue. Aliquam ut tortor mauris. Sed volutpat ante purus, quis accumsan dolor.

Table

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table: Table caption

Theorem

Theorem (Mass–energy equivalence)

$$E = mc^2$$

Verbatim

Example (Theorem Slide Code)

```
\begin{frame}  
\frametitle{Theorem}  
\begin{theorem}[Mass--energy equivalence]  
$E = mc^2$  
\end{theorem}  
\end{frame}
```

Figure

Uncomment the code on this slide to include your own image from the same directory as the template .TeX file.

Citation

An example of the `\cite` command to cite within the presentation:

This statement requires citation [Smith, 2012].

References



John Smith (2012)

Title of the publication

Journal Name 12(3), 45 – 678.

The End