



# Computer Science is a Science

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# Outline

1. **Introduction**
2. What is science?
3. What does computer science study?
4. Why do some people think it is not a science?
5. Summary
6. Acknowledgement, Q&A





## 2. What is science?

- Definition

- Explore the basic principles of the world
- CS qualifies!

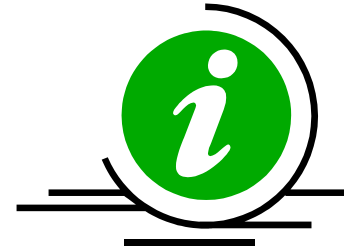
- CS : Information processing

- ``Informatics''



## 2. What is science?

- Information computation
  - Theoretical foundation
  - Implementation
  - Application
- Example : Programming
  - Church-Turing model
  - programming language
  - programming projects



### 3. What does computer science study?

- Theoretical CS

- Fundamental question
  - *“What can be (efficiently) automated?”* [1]
- Need tools : Turing machine
- Computability : computable
- Computational complexity : efficiency

- Experimental CS

- Hypothesis, models, test
- Follows science research paradigm

[1] Denning, P. et al. Computer as a discipline. Commun. ACM 32,1 (Jan. 1929),9-23



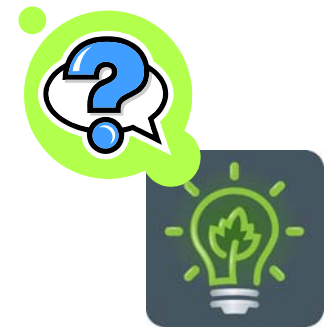
## 4. Why do some people think it is not a science?

- Viewpoint 1

- Artificial
- Made up of transistors
- Electronics engineering

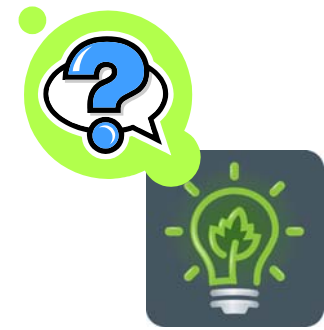
- My Answer

- Existing computers
- Other kinds of models
- Just a TOOL
  - Computer  $\neq$  Computer Science



## 4. Why do some people think it is not a science?

- Viewpoint 2
  - Engineering
  - Not science
- My Answer
  - History : dates back to 19th century
  - Combination
    - Computing
    - Engineering
    - Mathematics
    - Art
  - Boundary becomes blurred
  - Shares fundamental principles



# Summary

- CS qualifies the definition of science
- CS research conforms science research paradigm
- CS is a combination of many subjects





## 6. Acknowledgement, Q & A

- Thanks for listening

