

## What is computer science?

**Answer 1.** *The study of computers.*

**Answer 2.** *The study of writing computer programs.*

**Answer 3:** *The study of the uses and applications of computers and software.*

Each captures part of the meaning.

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## Computing is everywhere

- Internet, e-mail and WWW
- Mobile phones
- DNA sequencing and human genome mapping
- Magnetic Resonance Imaging (MRI)
- GPS systems
- Social networking (e.g., Facebook)

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## How to succeed in this course

- Attend all classes.
- Keep up with laboratories and homework assignments.
- Do not wait too long to ask for help. Either see me or go to TA sessions.
- Understand what you turn in. Particularly important if you got a lot of help from me or a TA.
- Do not cheat.

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**More complete answer.** *CS is the study of **computing**, including*

- *its formal and mathematical properties,*
- *its hardware realizations,*
- *its linguistic realizations,*
- *its application.*

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Computers are new ... but

Computing is an old idea.

At the heart of computing is the idea of

an algorithm

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Algorithm

Invented by

- The Islamic mathematician (astronomer, astrologer and geographer) Muḥammad ibn Mūsā al-Khwārizmī (circa 780-850)
- Also well-known as the inventor of *algebra*.

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Computing is everywhere

- E-commerce and online shopping
- Cryptography and digital signature
- Media file compression (e.g., jpeg, mp3)
- Digital photography and videography
- Bar codes and scanners
- ATMs
- Toll collection (e.g., EZpass, FastLane)
- ...

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What is an algorithm?

A precise sequence of simple instructions that can be automated.

Examples.

1. Let  $n$  be 2.
  2. Lather your hair.
  3. Rinse.
  4. Subtract 1 from  $n$ .
  5. If  $n > 0$  go to 2.
1. Let  $m$  be 5 and  $n$  be 4.
  2. Let  $S$  be 0.
  3. Add  $m$  to  $S$ .
  4. Subtract 1 from  $n$ .
  5. If  $n > 0$  go to 3.
  6. Print  $s$ .

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# Abu 'Abd Allâh Muḥammad ibn Mûsâ al-Khwârizmî أبو عبد الله محمد ابن موسى الخوارزمي



<http://www.wikipedia.org/>

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## Python and Java

In this course, you will be learning how to program in two languages.

- Python: A very simple language that supports an *interpreter*—a software system that gives you instant feedback.
- Java: The industry standard. A bit harder to learn than Python but very powerful for developing large-scale software, involving many programmers.

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# Abu 'Abd Allâh Muḥammad ibn Mûsâ al-Khwârizmî أبو عبد الله محمد ابن موسى الخوارزمي



<http://www.routard.com/>

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## What is a computer program?

An algorithm written in a formal language understood by computers.

```
# Simple Python program
n = 4;
m = 5;
print "The product of ", m, " times ", n, " is ",
S = 0;
while (n > 0):
    S = S + m
    n = n - 1
print S
```

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