CS21: INTRODUCTION TO COMPUTER SCIENCE

Prof. Mathieson
Fall 2017
Swarthmore College
Outline Sept 6:

• Introductions
• Nonograms followup
• Syllabus highlights
• Areas of computer science

• Intro to **python** and the interpreter
• Variables and assignment
• Types and conversion: **int**, **float**, **str**
• **input** function

Make sure to sign in again (for the waitlist)
Nonogram followup
Handout example

Image credit: www.nonograms.org
Systematic solving of a nonogram

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Systematic solving of a nonogram
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Syllabus highlights

Syllabus highlights and notes

- Notes will be posted *after* class on the webpage
Syllabus highlights and notes

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• Textbook – free and online 😊
Syllabus highlights and notes

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**Extensions**

- Known conflicts: must be arranged **now**
- Emergencies: must talk to your class dean
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- Office hours: 3-5pm on Fridays in 260 (often moved to lab)
## Class Deans contact info

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<td>First-Year</td>
<td>Dean Karen Henry</td>
<td>Betsy Durning</td>
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<td>610-690-5744</td>
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<td><a href="mailto:edurnin1@swarthmore.edu">edurnin1@swarthmore.edu</a></td>
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<td>Sophomore</td>
<td>Dean Jason Rivera</td>
<td>Stephanie Holznagel (assists with schedule only)</td>
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Disability Services

http://www.swarthmore.edu/academic-advising-support/welcome-to-student-disability-service

Registering with the Student Disability Service

Please contact Leslie Hempling, Director of Student Disability Services, at lhempli1@swarthmore.edu or 610-690-5014 to arrange an intake appointment. We are happy to hold initial appointments for incoming students by phone. If at all possible, please submit documentation of your disability in advance so that we can review it prior to talking with you. We recommend that you contact us as early as possible since some accommodations (e.g., electronic books, interpreters, etc.) can take several weeks to arrange. We want to be sure that your needs are met in time for classes.

Visit the Accommodations Process and the Documentation Guidelines sections in the "For Students" section of this website for all details.
Areas of Computer Science
Computer Science Research Areas

- Artificial Intelligence
- Computer Architecture
- Computational Biology
- Databases
- Computer Science Education
- Computer Graphics
- Human-Computer Interaction
- Operating Systems
- Programming Languages
- Scientific Computing
- Cyber Security
- Theory
Artificial Intelligence

Jeremy Hsu, IEEE Spectrum
Artificial Intelligence

Computer Architecture
Artificial Intelligence

Jeremy Hsu, IEEE Spectrum

Computational Biology

Figure credit: “Genome-wide association study of 14,000 cases of seven common diseases and 3,000 shared controls” by the Wellcome Trust Case Control Consortium
Databases

Figure credit: “Distributed transactions across cloud databases”
– Microsoft Azure Database
Databases

Figure credit: “Distributed transactions across cloud databases”
– Microsoft Azure Database

Computer Science Education
Databases

Distributed transactions across cloud databases

Figure credit: “Distributed transactions across cloud databases”
– Microsoft Azure Database

Computer Graphics

“Adaptive tissue modeling”
Vidal et al, 2006

“Zootopia”
Disney, 2016

Computer Science Education
Human-Computer Interaction

Universal ATM Interface by Kristin Suzanne Bessette
Human-Computer Interaction

Universal ATM Interface by Kristin Suzanne Bessette

Operating Systems

Wikimedia Commons (by Golftheeman)
Human-Computer Interaction

Operating Systems

Programming Languages
“A numerical solution to the heat equation on a pump casing model using the finite element method.” – Wikipedia
Scientific Computing

“A numerical solution to the heat equation on a pump casing model using the finite element method.” – Wikipedia

Cyber Security

Credit: Hugh Boyes (2014)
Scientific Computing

“A numerical solution to the heat equation on a pump casing model using the finite element method.” – Wikipedia

Cyber Security

Theory

“An artistic representation of a Turing machine. Turing machines are used to model general computing devices.” – Wikipedia
Python interpreter: demo
Key CS concepts today

- **Variables** as a way to store **values**

- **Assignment operator** (=) is a way to change the value of a variable (not symmetric like equals operator in math!)
  - Variable name on the left, expression on the right

- The **type** of a variable is the type of the value it refers to

- We can **convert** a variable to a different type, but it does not change the value of the original variable
Functions for today

- type()
- input()
- int()
- str()
- float()

Types for the first few weeks

- int
- float
- str