COMP SCI 1MD3
Introduction to Programming

Winter 2018

Dr. Douglas Stebila

McMaster University

Topic 0
Course Overview

CS 1MD3 • Introduction to Programming
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What this course is about

- **Fundamentals of Programming**
- **Concepts of Computation**
- **Computational Problem Solving**

- More on “breadth” than on “depth” in a particular topic
- More “rigorous” than “explorative”
- More on “timeless” topics than on “technology”

Teaching Staff

Instructor:

- Dr. Douglas Stebila <stebilad@mcmaster.ca>
- Office: ITB-162
- Consultation: Thursdays 2:30-3:30 or by appointment

Teaching Staff

TAs:

- Victor Chen <chenv5@mcmaster.ca>
- Natalie Chin <chinnh@mcmaster.ca>
- Karl Knopf <knopfk@mcmaster.ca>
- Joey Legere <legerejk@mcmaster.ca>

Website

- **Avenue**: All teaching & assignment resources posted to Avenue
- **JupyterHub**: Will be used for online submission of assignments. Details to follow.
- **Facebook discussion group**: Teaching team will answer questions posted there. Use of Facebook is not required and all official material will be posted to Avenue. Students are expected to behave appropriately on the Facebook group.

https://www.facebook.com/groups/742631169273586/

Learning Activities

- **Lectures:** Tuesdays, Wednesdays, Fridays 3:30-4:20pm, ITB AB 102
- **Tutorials:**
  - T04: Mondays 10:30-11:20am, BSB 244 (Joey)
  - T01: Mondays 1:30-2:20pm, BSB 249 (Natalie)
  - T02: Mondays 4:30-5:20pm, BSB 249 (Victor)
  - T03: Tuesdays 2:30-3:20, BSB 249 (Karl)
- **Drop-in centre:** Daily, 9am-4:30pm, ITB 242 (John Nakamura)
  - (closed selected times including M, Th 12:30-1:30, Tu 1:30-2:30),
- **Office hours** (Stebila)**:** Thursdays 2:30-3:30pm, ITB 162

Prerequisites

- Some mathematics background
  - MATH 1K03, MATH 1LS3, Grade 12 Advanced Functions & Introductory Calculus U, Grade 12 Calculus & Vectors
- No programming knowledge assumed
- Antirequisite: ENG 1D04

By the end of the course, you will have

- learned the essential parts of the Python programming language (sufficiently to learn more on Python on your own)
- learned how to organize, write, document, test medium-sized programs
- be aware of limits of computation
- be able to bring an informal problem statement into a computational formulation
- learned a number of algorithmic techniques for solving complex problems

What you need to bring with you

- Rigorous thinking
- No specific mathematical background beyond high school, but openness to mathematical concepts
- Commitment to practice programming on your own
- Notebook computer useful (but not necessary)
- iClicker to every class (used for polling but not assessment)

Getting assistance

- **Talking to the TAs during the tutorials**
- **Drop-in centre**
- **Facebook discussion group**
- **Email and consultation hours**

Outline of Topics

- Introduction to Computer Science, Computer Systems, Python programming language, Computational thinking
- Values and types (innate data types, data encoding, expressions, variables, assignment, strings, lists, object & classes)
- Imperative programming (modules, flow of control, control structures -- loops, exceptions and exception processing, procedures and parameter passing)
- Input and output, files, and operations with files
- Data visualization
- Databases and machine learning

Assessment

- **Meaningful & memorable**
  - **5%**, due weekly on Mondays at 5pm
- **Labs**
  - **40%**, due weekly on Wednesdays at 5pm
- **Test #1**
  - **15%**, in class on Tue Feb 13, locations TBA
- **Test #1**
  - **15%**, in class on Wed Mar 14, locations TBA
- **Final exam**
  - **25%**

Meaningful & memorable (M&M)

- Each week, submit a paragraph on Avenue Discussions about what you learned in class – something "meaningful" and "memorable" from class
  - Allows you to reflect on your learning
  - Gives feedback to the teaching team
  - "Every sensible submission counts"
    - If you didn't learn anything useful, explain why
- 0.5% each, 5% total
  - 12 weeks, 10 due => can skip a couple without penalty
- Open Fridays after class, due Mondays at 5pm
  - First one due Mon Jan 15

Labs

- Programming exercises to complete
- Most important part of the course!
- Timeline:
  - Posted on Tuesdays/Wednesdays
  - Help in tutorials on Mondays/Tuesdays
  - Due on Wednesdays at 5pm
    - First one due Wed Jan 17
- 4% each, 40% total
  - 11 labs => we drop lowest mark
- Some bonus questions for a challenge!

Tests

- Completed on a computer
- In class on Tues Feb 13 and Wed Mar 14
  - Locations announced on Avenue closer to date
  - Bring your laptop, or labs available for students without laptop
- 15% each, 30% total

Final exam

- Completed on a computer
- During final exam period
  - Locations announced on Avenue closer to date
  - Bring your laptop, or labs available for students with laptop
- 25%

Extensions and late policy

- See course outline on Avenue for details.

- M&M:
  - No MSAF/extensions
  - No late submission
  - Best 10 out of 12 count
- Labs:
  - MSAF => 3 calendar day extension
  - No late submissions
  - Best 10 out of 11 count

Submit MSAF online at http://www.mcmaster.ca/msaf/

Extensions and late policy

- See course outline on Avenue for details.

- Tests:
  - 1 MSAF/faculty-approved relief
    => weight added to other test+exam
  - 2 MSAF/faculty-approved reliefs
    => separate test coordinated with instructor
- Final exam:
  - Standard university policy on missed exams

Submit MSAF online at http://www.mcmaster.ca/msaf/

Students with disabilities

- Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. **Academic accommodations must be arranged for each term of study.**
- Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities

Tentative Timeline

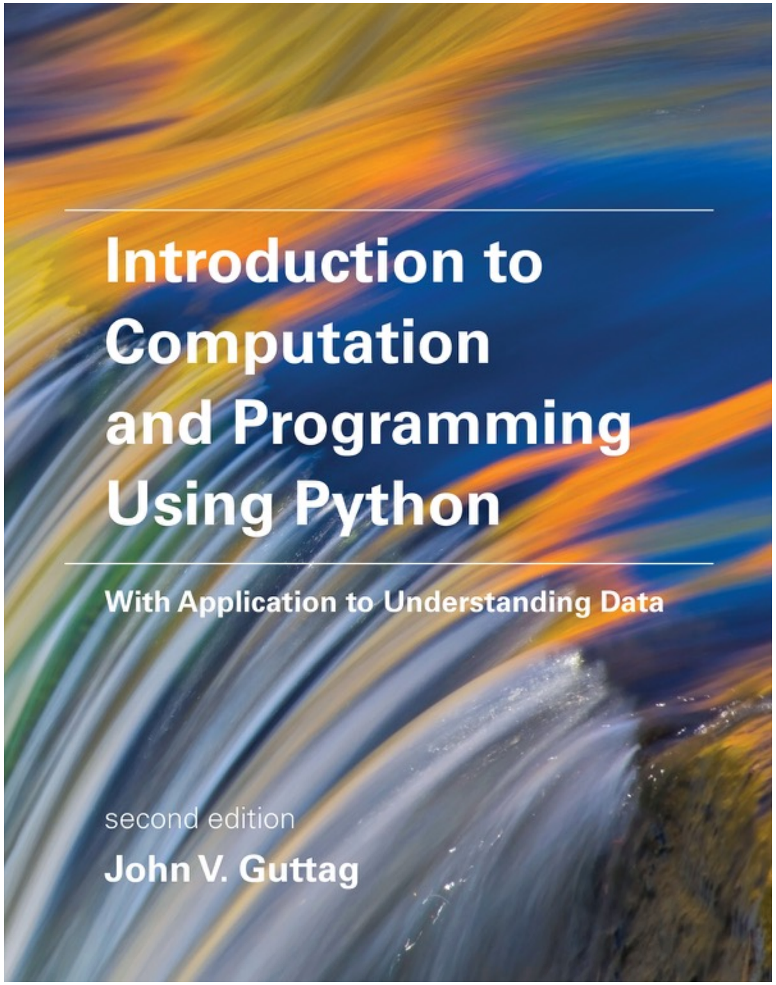
Week	Main topic	Lectures	M&M due	Tutorials	Lab due	Test
1	Course overview	Jan 5	None	Jan 8/9	None	
2	Programming & expressions	Jan 9-12	Jan 15	Jan 15/16	Jan 17	
3	Statements	Jan 16-19	Jan 22	Jan 22/23	Jan 24	
4	Functions	Jan 23-26	Jan 29	Jan 29/30	Jan 31	
5	Numerical computations	Jan 30-Feb 2	Feb 5	Feb 5/6	Feb 7	
6	Structured data types	Feb 6-9	Feb 12	Feb 12/13	Feb 14	Feb 13
7	Testing & exceptions	Feb 14-16	Feb 26	Feb 26/27	Feb 28	
	Reading week (Feb 19-23)	None	None	None	None	
8	Classes	Feb 27-Mar 1	Mar 5	Mar 5/6	Mar 7	
9	Interaction and files	Mar 6-9	Mar 12	Mar 12/13	Mar 14	Mar 14
10	Data visualization	Mar 13, 16	Mar 19	Mar 19/20	Mar 21	
11	Databases	Mar 20-23	Mar 26	Mar 26/27	Mar 28	
12	Machine learning	Mar 27-30	Apr 2	Apr 2/3	Apr 4	
13	Advanced topics	Apr 3-6	Apr 9	None	None	
Finals						Exam period

Recommended reference

Introduction to Computation and Programming Using Python, With Application to Understanding Data, second edition. John V. Guttag, MIT Press, 2016. ISBN 978-0-262-52962-4

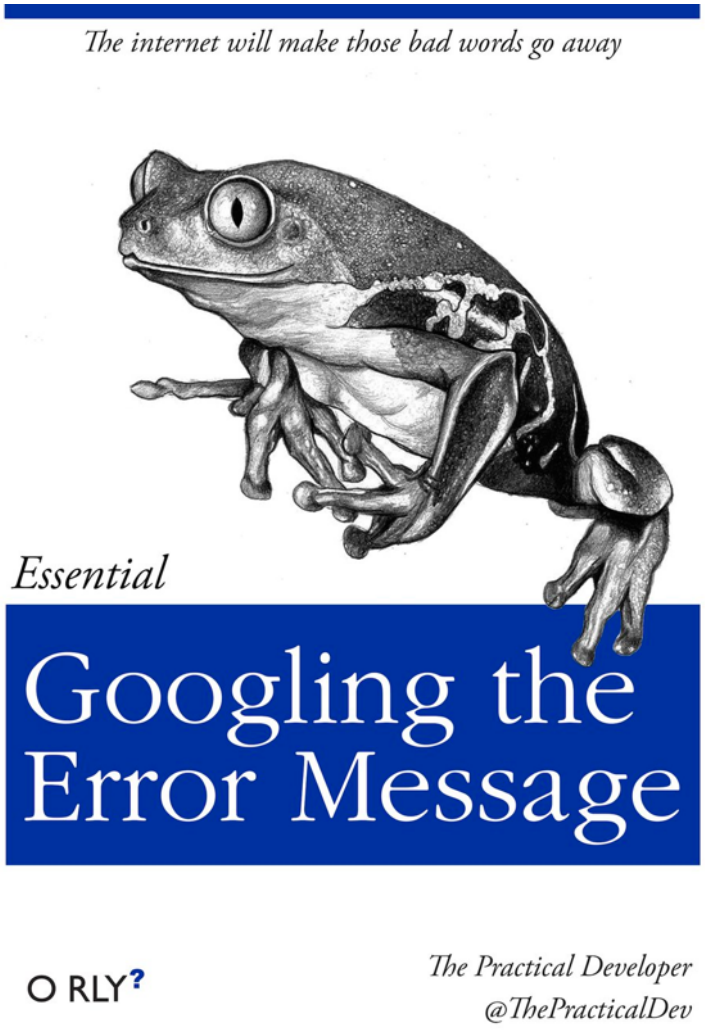
Purchasing options:

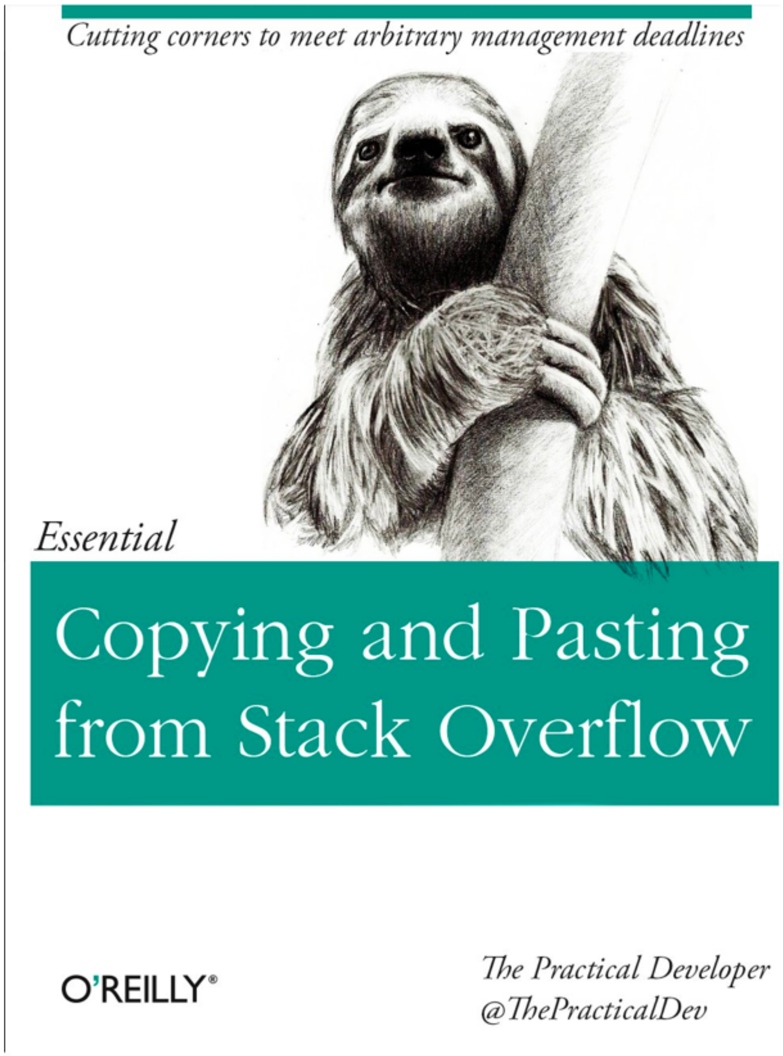
- Paperback: Campus store, coming next week
- Paperback: Amazon, $57.90
- Paperback: Chapters, $58.50
- E-book (Kindle): Amazon, $47.90
- E-Book (Kobo): Chapters, $47.90


Introduction to Computation and Programming Using Python
With Application to Understanding Data
second edition
John V. Guttag

Important: Look for resources that use Python 3, not Python 2

Or…


The internet will make those bad words go away
Essential
Googling the Error Message
O RLY?
The Practical Developer
@ThePracticalDev

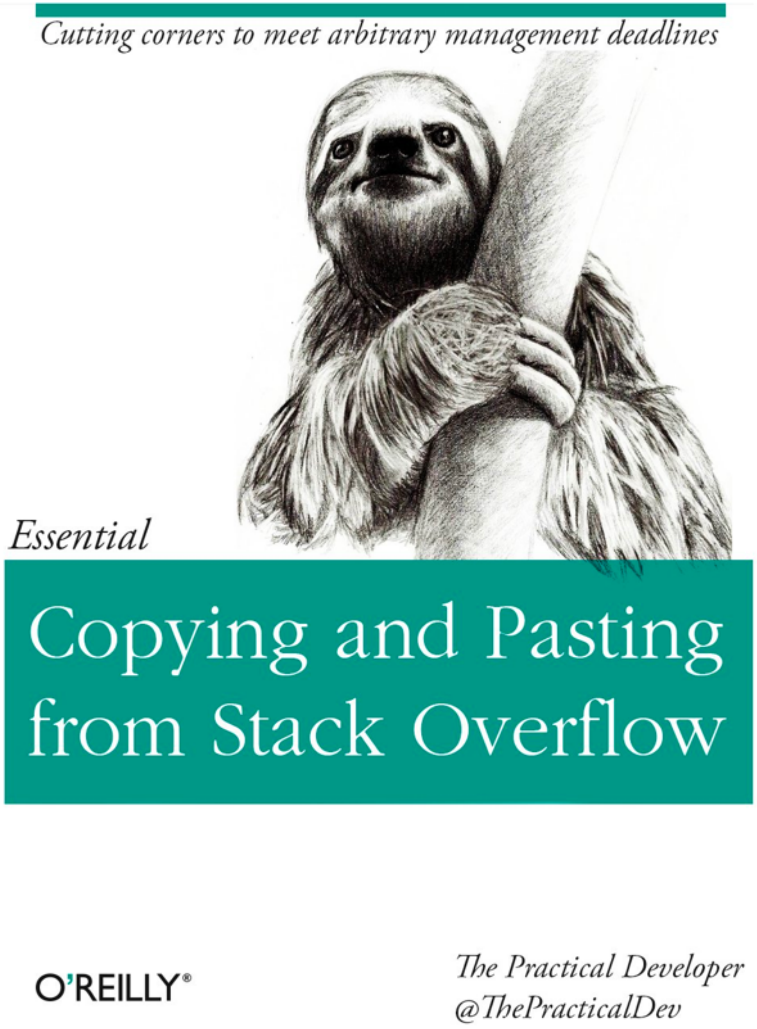

Cutting corners to meet arbitrary management deadlines
Essential
Copying and Pasting from Stack Overflow
O'REILLY®
The Practical Developer
@ThePracticalDev

http://imgur.com/gallery/vqUQ5

Academic Dishonesty

- “You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.”

- You are encouraged to discuss your problems with others, but work you submit must be your own.
- We will use source-code similarity-detection tools.


Cutting corners to meet arbitrary management deadlines
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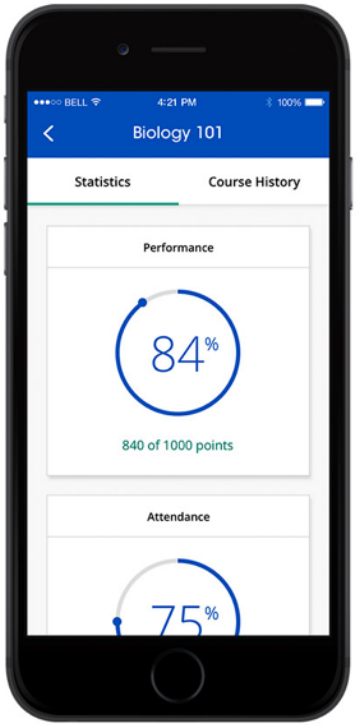
O'REILLY®
The Practical Developer
@ThePracticalDev

How to succeed in CS 1MD3

- **Lab exercises** are the best preparation for midterm tests and final exam
- You cannot learn the material the night before
- Do all exercises, even if you are familiar with programming
- Check your understanding with fellow students and TAs
- Come to class!

iClicker questions



BELL 4:21 PM 100%

Biology 101

Statistics Course History

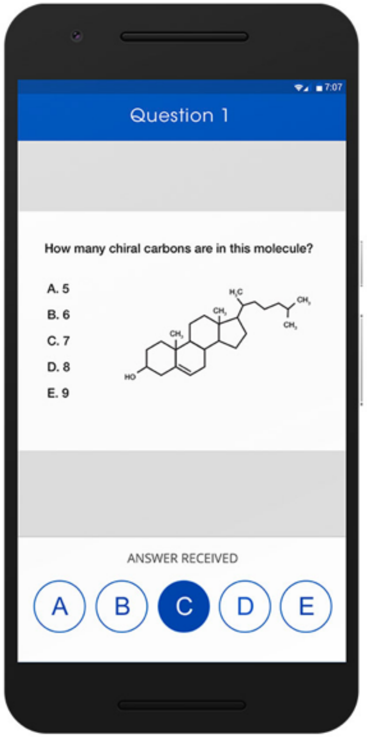
Performance

84%

840 of 1000 points

Attendance

75%



7:07

Question 1

How many chiral carbons are in this molecule?

A. 5
B. 6
C. 7
D. 8
E. 9

ANSWER RECEIVED

A B C D E

Search for 1MD3 or Stebila

Frequency A A

https://www1.iclicker.com/students

Question 1: Have you programmed before?

A. Never

B. Played with small programs

C. Wrote programs of 100 lines or more

D. Had programming jobs

Question 2: How did you learn to program or about computer science?

A. Didn’t learn

B. Only on my own

C. Took 1 course

D. Took 2 courses

E. Took 3 or more courses

Question 3: How many years of programming experience do you have?

A. No experience

B. 1 year

C. 2 years

D. 3 years

E. 4 or more years

Question 4: Which programming language are you most familiar with, if any?

A. Visual Basic

B. Java

C. Python

D. Another imperative language: C, Pascal, C#, …

E. Another functional language: Haskell, ocaml, elm, …

Question 5: What are you studying?

A. Computer Science

B. Faculty of Engineering (non-CS)

C. DeGroote School of Business

D. Faculty of Health Sciences

E. Faculty of Humanities

More on next sldie

Question 6: What are you studying?

A. Faculty of Science

B. Faculty of Social Sciences

C. Other

Question 7: Can you bring a notebook computer to the tutorials and tests?

A. Yes

B. No

What to do now

1. Join the Facebook group
2. Read the course outline on Avenue
3. Consider purchasing the textbook
4. Consider getting an iClicker
5. Download and install Python and Jupyter
   - Instructions for Windows and macOS on Avenue
     - Content -> Course overview -> Jan 8/9 Lab

- Tutorials for Mon Jan 8 / Tues Jan 9
  - Assistance installing Python and Jupyter
- No M&M due next Monday January 8
- No lab due next Wednesday January 10
- Next class: Tuesday January 9