Course Wrap-Up
CSE 120 Winter 2018

Instructor: **Teaching Assistants:**

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The Grim Conclusions of the Largest-Ever Study of Fake News

"The massive new study analyzes every major contested news story in English across the span of Twitter's existence—some 126,000 stories, tweeted by 3 million users, over more than 10 years—and finds that the truth simply cannot compete with hoax and rumor.

"This finding should dispirit every user who turns to social media to find or distribute accurate information. It suggests that no matter how adroitly people *plan* to use Twitter—no matter how meticulously they curate their feed or follow reliable sources—they can still get snookered by a falsehood in the heat of the moment.

"In short, social media seems to systematically amplify falsehood at the expense of the truth, and no one—neither experts nor politicians nor tech companies—knows how to reverse that trend. It is a dangerous moment for any system of government premised on a common public reality.

- https://www.theatlantic.com/technology/archive/2018/03/largest-study-ever-fake-news-mit-twitter/555104/

Administrivia

- ❖ Assignments:
  - ▪ Project Code, README, and Video due tonight (3/9)

- ❖ Final Exam – Tuesday 3/13, 3 pm in MGH 241
  - ▪ Scheduled slot is 2:30-4:20, but exam will be 60 minutes
  - ▪ Nearly identical to midterm – big ideas & programming
  - ▪ 10% of course grade
  - ▪ TWO sheets of notes (letter, double-sided, hand-written)
  - ▪ **Review Session:** Sun 3/11, 5-7 pm in SAV 264

- ❖ Course Evaluation: https://uw.iasystem.org/survey/188768

Outline

- ❖ **What We've Learned**
- ❖ Lecture 1 Revisited
- ❖ Your Future Beyond CSE120
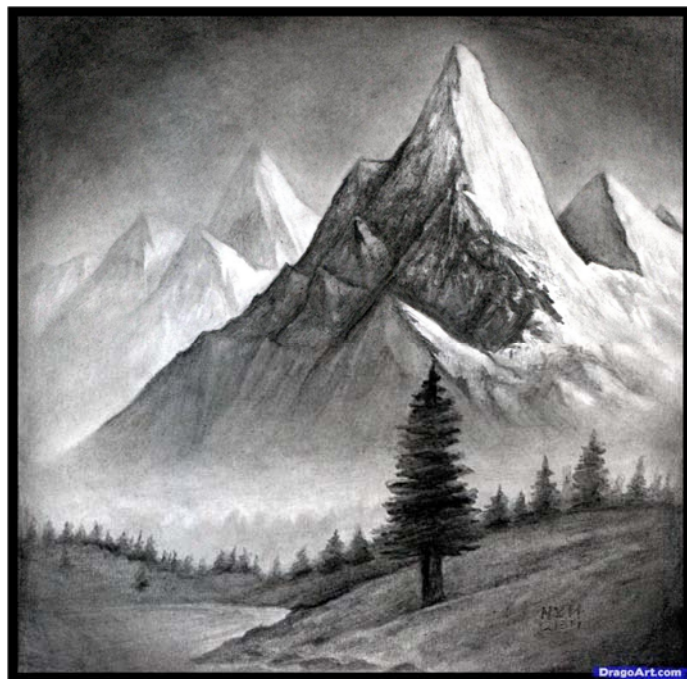
Source: DragoArt.com

Source: Project Gutenberg

Computational Thinking

❖ It's all about problem solving

  ▪ How to attack your problem in a way that a computer can help

❖ Most important idea: abstraction!

  ▪ Detail removal and generalization help us decompose complex problems

  ▪ Use bits to represent *everything* (*i.e.* digitization)

  ▪ Reuse and combine building blocks (algorithms) in ways that hopefully scale well

Building Blocks of Algorithms

Sequencing

- The application/execution of each step of an algorithm in the order given

```
fill(255);
rectMode(CORNERS);
rect(-r, -r, 0, r);
ellipse(0, -r/2, r, r);
```

Selection

- Use of conditional to select which instruction to execute next

```
if(mousePressed) {
    fill(0,0,255);
}
```

Iteration

- Repeat part of algorithm a specified number of times

```
for(int i=20; i<400; i=i+60) {
    line(i,40,i+60,80);
}
```

Functional Abstraction

- Break larger problem into smaller, reusable parts

  parameters
  arguments
  return values

Programming

- ❖ Learned our first programming language
  - ■ Processing (Java syntax)

- ❖ Iterative design cycle:
  - ■ The value of a precise specification
  - ■ Design, prototype, implement, and evaluate
  - ■ Testing and debugging

- ❖ Coding style and documentation
  - ■ Proper commenting and formatting are essential for maintenance and collaboration

Some Big Ideas

- ❖ Computers can only do a small number of things
  - Execute *exactly* what you tell it to → Computers

- ❖ Computing has physical and theoretical limits
  ↳ computability (Proofs & Computation)
  ↳ Algorithmic Complexity

- ❖ The Internet is a physical realm
  ↳ The Internet

- ❖ Data is constantly generated, stored, and analyzed
  → Privacy
  - And can be copied and distributed
  ↳ Digital Distribution

- ❖ Machines can "think" and "learn"?
  } Artificial Intelligence and Machine Learning
  - AI & the importance of probability and training sets

Social Context and Impact

- ❖ History of computing:
  - ■ Rise of the Internet and access to information → *The Internet*
  - ■ Current boom in CS and computing education → *Social Implications*

- ❖ Impacts of computing:
  - ■ Algorithms can have unintended consequences → *Algorithms*
  - ■ Privacy and security (or lack thereof) → *Privacy* → *Security*
  - ■ Social media influences the way we think and act ⎫ *Social*
  - ■ Automation and the future of labor ⎭ *Implications*

- ❖ Design matters!
  - ■ Must keep in mind users and user interface ⎫ *Human-Computer Interaction*

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Why Study Computer Science?

❖ Massive impact on our lives and society as a whole

❖ Increasingly useful for *all* fields of study and areas of employment

- Creative Writing – word editing, spell check, need to outcompete robots soon!

- Massage Therapist – massage robots soon?

- Dancing – stage lighting, motion capture to study technique

- Ren Faire Actor – analyze data on ticket sales, popular booths

Computing in Your Future

- ❖ Computing and its data are inescapable
  - You generate "digital footprints" all the time

- ❖ Computing is a regular part of *every* job
  - Use computers and computational tools
  - Generate and process data
  - Dealing with IT people
  - Understanding the computation portion of projects

- ❖ Our goal is to help you make sense of the "Digital Age" that we now all live in

About Programming

- ❖ programming ≠ computational thinking
  - *Computational thinking* is knowing how to break down and solve a problem in a way that a computer can do it
  - *Programming* is the tool you use to execute your solution
  - We use programming in this course as a way of teaching computational thinking

- ❖ Can be learned, just like any other skill
  - It's not black magic; there's no such thing as a "coding gene"
  - Yes, at first it may be challenging and mind-bending – just like learning your first non-native language
  - My hope is that you will think differently after this course

Big Ideas of Computing

❖ Exposure to a broad range of topics in computer science

  ▪ Not going to dive into the details

  ▪ These are the motivations & the applications for programming (the tool)

  ▪ Focus on what to be aware of to navigate the digital world

❖ **Goal:** become "literate" in computing

  ▪ As new innovations arise, can you read about it, understand its consequences, and form your own opinion?

  ▪ This course will ask you to *read*, *discuss*, and *write* about computing

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Giving Back to CSE120

❖ Enjoyed the class? Lots of ways to help out!

- <u>Feedback</u>: course eval, CS in Your Future, talk to me in OH or via email

- <u>Examples</u>: Permission to show your work to future classes?

- <u>Recommendations</u>: CSE120 next offered in either Wi19 or Sp19 – tell your friends!

More CS at UW

- ❖ CSE 142 + CSE 143: Computer Programming I/II *(Java)*
  - ▪ Needed for declaring CSE major *offered every quarter + summer*

- ❖ CSE 160: Data Programming *(Python)*
  - ▪ Recommended to take 142 first, can't take after 143 *offered once a year*

- ❖ CSE 154: Web Programming *(HTML, CSS, Javascript,...)*
  - ▪ Must have taken 142, 143, or 160 *offered every quarter*

- ❖ CSE/STAT/INFO 180: Intro to Data Science *(?)*
  - ▪ More forthcoming (http://escience.washington.edu/education/undergraduate/)

Social Implications Courses

- ❖ Informatics
  - ▪ INFO 101: Social Networking Technologies
  - ▪ INFO 102: Gender and Information Technology
  - ▪ INFO 200: Intellectual Foundations of Informatics

- ❖ Human Centered Design & Engineering
  - ▪ HCDE 210: Explorations in Human Centered Design

No More CS at UW or Break

- ❖ You are now somewhat programming-literate
    - ▪ Can automate tasks to make your life easier
    - ▪ More aware of possibilities of computing
    - ▪ Easier to interact with IT/CS staff at work

- ❖ Figure out what will be most useful to you
    - ▪ Some languages specific to type of work (*e.g.* R, MATLAB, Ruby on Rails, SQL)
    - ▪ Learn on your own via the Internet:

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Making the Most of College

❖ Seek out experiences that lead to new experiences (*i.e.* that pay dividends)
- Build skills, interests, relationships
- Meet new people, join interesting clubs, go on adventures

❖ Don't go it alone – find a friend group for classes

❖ Take advantage of educational opportunities
- **Research:** https://www.washington.edu/undergradresearch/students/find/
- **Student Groups:** ACM, Animation Research Labs, Husky Robotics, WOOF3D, etc.
- **Classes:** non-major courses, P.E., languages, anything of interest

❖ Take care of yourself!

Making the Most of Our Future

- ❖ Computing is resurfacing our world
  - ▪ Now almost everyone has access to everything, always
  - ▪ New technology affects privacy, jobs, safety, beliefs, etc.

- ❖ You now know the most important parts of how it all works!
  - ▪ Can bring computing to new fields/jobs/areas
  - ▪ Keep these considerations in mind as you use and/or build things

Thanks for a great quarter!

❖ Huge thanks to your awesome TAs!

Anupam   Cheng   Eugene   Sam   Sophie   Teagan

❖ Thanks to course content creators:

Larry Synder   Susan Evans   Dan Garcia   Josh Hug

❖ Best of luck in the future!

Ask Me Anything (AMA)

That's all Folks!

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