Computing Everywhere

Tuesdays/Wednesdays, 7-9 pm
January 3rd - February 1st, 2016
Frances Searle Building 3-220
Jamie Gorson, jamiegorson2021@u.northwestern.edu (student point of contact)

Course Overview

This course is a series of workshops, designed to improve computational literacy and computational thinking. The course will include a basic introduction to what computation is, and how programs and algorithms work, but will also focus on the social, political, and psychological implications of living in an environment that is often mediated by computation.

Course Goals

The overall goal for the course is to introduce students to computational thinking. This includes moving beyond seeing algorithms and programs as black boxes, and to a conceptual understanding of how computation works, where computation is used, and what some of the benefits and dangers of computation are. We have multiple specific objectives, including:

- Understanding what an algorithm is, and how it differs from a program
- Understanding basic programming principles, such as AND/OR logical operators and loops, and create basic programs in Python
- Understanding how to evaluate, design, and build accessible interfaces
- Understanding how information travels across the Internet
- Thinking critically about the claims that are made about the implications of technology, through understanding the affordances of technologies
- Thinking critically about the interaction between humans and computation - as both designers and consumers of computation

Course Structure and Student Evaluation

This course is not graded, and satisfactory credit will be earned through the mandatory attendance of all workshops.

Instructors

Colin Fitzpatrick (fitzcn@u.northwestern.edu) is a doctoral candidate in the Technology and Social Behavior program. He researches first impressions online in the context of dating and hookup apps.

Elham Beheshti (beheshti@u.northwestern.edu) is a doctoral candidate in Computer Science. Her research focuses on the design and evaluation of interactive learning tools in informal learning environments. In particular, she is interested in designing interactive tabletop exhibits for use in science centers.

Jamie Gorson (jamiegorson2021@u.northwestern.edu) is a PhD student in Technology and Social Behavior and has a B.S in Computer Engineering from Olin College of Engineering. She is interested in Educational Technology, specifically how technology can help increase Project-Based Learning in schools.

Mark Díaz (mark.diaz@u.northwestern.edu) is a PhD student in Technology and Social Behavior. He researches online communication and how marginalized populations experience and respond to discrimination.

Jes Feuston (jessicafeuston2019@u.northwestern.edu) is a second year in the Technology and Social Behavior program. Her research in human-computer interaction involves understanding the impact of social systems and technology on mental health.

Jeremy Foote (jdfoote@u.northwestern.edu) is a PhD student in Media, Technology, and Society. He researches how new online communities get started and how what happens early on influences a community in the future.

Scott Allen Cambo (scottcambo2019@u.northwestern.edu) Scott Cambo is a PhD student in the Technology and Social Behavior program at Northwestern University studying how learning algorithms and the user interfaces that connect users to them can be designed to facilitate better understanding, trust, performance, and usefulness of such systems

Mike DeVito (devitom@u.northwestern.edu) is a doctoral student in the Media, Technology, and Society PhD program. His research focuses on user understanding of algorithmically-driven systems such as the algorithmic curation systems that power many social media platforms.

Workshop Descriptions

1. Sorting out Sorting (1/3 & 1/4) - Colin Fitzpatrick

This first workshop introduces computational thinking through the lens of algorithms. We begin by discussing algorithms we encounter in our everyday lives, the ways in which we interact with algorithms, and the expectations we have of algorithms. We then build our own algorithms, first

without and then with code (Python). We end by discussing broader implications of algorithms and how they are designed. [http://fitzcn.net/sorting/]

2. EarSketch (1/10 & 1/11) - Elham Beheshti and Jamie Gorson

In this workshop, we will use Python to create music on a platform called EarSketch. EarSketch (https://earsketch.gatech.edu) allows you to compose music by coding in Python programming language. We will first introduce the EarSketch program and its workspace and built-in tools as well as Python terminology and tools. Then, we will compose music! We will also explore different ways to expand and improve our codes, using a range of computational concepts including looping, functions, and data types.

3. Accessibility in Computing (1/17 & 1/18) - Jes Feuston and Mark Díaz

Accessibility is a crucial component of interface design, however it is often left out of design and engineering conversations and introductory courses that teach usability. Individuals with disabilities are active users of everyday applications such as Google Maps or Yelp, however many designers and engineers may not consider them to be significant users. This workshop will highlight ways to design and build with accessibility in mind, as well as demonstrate how design choices can introduce ease or inconvenience for different populations. In addition to considering audiences with different abilities in the design of assistive technologies, we will consider issues of accessibility when designing for “everyday” users.

4. Information Flow on the Internet (1/24 & 1/25) - Jeremy Foote

In this workshop, we will use some of the computational intuitions that you have been developing to understand how the Internet works. Each of you will be users and nodes in a network, and we will show how messages are passed between computers. We will start with a basic representation, and then add in TCP, authentication, encryption, and proxy servers. At each step, we'll talk about how they work at a conceptual level and why each layer has been added. In the end, you will realize that uploading a cat GIF is much more complicated (and cooler!) than you thought.

5. Algorithms are Everywhere (1/31 & 2/1) - Scott Cambo and Mike DeVito

Algorithmic decision making systems are pervasive in business and culture, and have a general reputation as bias-free, even-handed decision makers. However, all algorithms have embedded biases, and these biases have real-world consequences. It is not impossible to identify and

mitigate algorithmic bias. This workshop is an introduction to algorithmic bias, where it comes from, how to identify it, and how solutions to these problems will take cooperation and understanding between those charged with engineering the systems and those with the knowledge of culture, society, law, and ethics. Communication Studies students should be able to leave this workshop with enough general understanding of the concepts and jargon used with algorithms as well as their cultural and social impact to feel confident that they can successfully collaborate with software engineers to mitigate biases or even go on to learn how to engineer these systems themselves.

Workshop Assessments

Short workshop assessments in the form of anonymous canvas surveys will be completed at the end of each workshop by each student. Additional feedback to Jamie or Jeremy is also welcome.

Recordings and Privacy

It is essential to the success of this class that participants feel comfortable sharing questions, fears, reservations and various experiences during discussions. Therefore, you may not create any audio or video recordings during class time nor share verbatim comments with those not in class whether through text messages, email, social media updates, casual lunch time conversation or any other format.

Getting Help or Answers to Questions

Course Details

Most of the information you need for this course will be on Canvas (syllabus, lecture slides, etc.).

If there's something course-specific you can't find on Canvas after looking carefully, email a fellow student (first) and one of the instructors (second) if your peers are also struggling to find it.

If you're having trouble with Canvas itself, you should contact NUIT Support: http://www.it.northwestern.edu/supportcenter/index.html

Attendance

As a workshop-based course, attendance every week is necessary to receive credit for the course. Each workshop will build off of the previous workshops and missing a workshop may make it difficult to participate fully in the future.

Electronic and Other Distractions

To facilitate an environment in which we are all focused on discussion of relevant issues and learning, it is imperative that we all take steps to limit potential distraction. Except when clearly being used for purposes immediately related to class (and in a manner that is not distracting to others), laptops, tablets, cell phones, personal digital assistants, music players, cameras and other devices should all be turned off during class. You may not talk on the phone, text, IM, email, read, solve crosswords, take pictures, etc. during class. All of these activities are likely to distract you, your peers, and the instructors; which is not fair to others in the class. Those engaging in these activities may be called on by the instructor to describe what they are doing and/or asked to leave the class. Direct repercussions could include loss of class attendance and class participation points.

Students with Disabilities

Students with disabilities who believe that they may need accommodations in this class are encouraged to contact the Office of Services for Students with Disabilities (SSD) as soon as possible (i.e., during the first week of classes, barring extenuating circumstances that prohibit this) to ensure that such accommodations are implemented in a timely fashion. In general and to ensure fairness to all students, the instructors will not make accommodations for disabilities without documentation from the SSD office. For more information, visit the SSD website at http://www.northwestern.edu/accessiblenu/.

Academic Integrity at Northwestern

Students are expected to comply with University regulations regarding academic integrity. If you are in doubt about what constitutes academic dishonesty, speak to the instructors before the assignment is due and/or examine the University web site. Academic dishonesty includes, but is not limited to cheating on an exam (e.g., copying others' answers, providing information to others, using a crib sheet) or plagiarism of a paper (e.g., taking material from readings without citation, copying another student's paper). Failure to maintain academic integrity on an assignment will result in a loss of credit for that assignment—at a minimum. Other penalties may also apply, including academic suspension. The guidelines for determining academic dishonesty and procedures followed in a suspected incident of academic dishonesty are detailed on the website.

For more information, visit:
http://www.communication.northwestern.edu/programs/undergraduate/policies_procedures/academic_integrity/

Sexual Harassment Policy

It is the policy of Northwestern University that no member of the Northwestern community—students, faculty, administrators, or staff—may sexually harass any other member of the community. Sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute harassment when:

- submission to such conduct is made or threatened to be made, either explicitly or implicitly, a term or condition of an individual's employment or education; or
- submission to or rejection of such conduct is used or threatened to be used as the basis for academic or employment decisions affecting that individual; or
- such conduct has the purpose or effect of substantially interfering with an individual's academic or professional performance or creating what a reasonable person would sense as an intimidating, hostile, or offensive employment, educational, or living environment.

For more information, visit:
http://www.northwestern.edu/sexual-harassment/university-policies/sexual-harassment-policy/index.html