CPCSI 360 Developing Accessible User Interfaces Fall 2023

Course Syllabus

Professor Sarah Morrison-Smith

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- Office: Science Center 2014
- Office hours: Monday 3 – 5pm, Tuesday 10am – 11am and 1pm – 4pm. Others only by appointment

Course Logistics

- Discord: https://tinyurl.com/cpcsi-360-23-discord
- Gradescope: https://www.gradescope.com/courses/574815
- Lectures: Science 2017

Prerequisites

CPSCI-220.

Course Description

Access technology (AT), technology that makes accessible what otherwise isn't, has the potential to increase autonomy and improve millions of people's ability to live independently. This course teaches how AT is built to work within the tough technical and human constraints in which it must operate. This course does not only teach you the deep inner workings of today's user interface technology but also serves as a guide for building the user interfaces of the future. Topics include Text-to-Speech, Speech Recognition, Screen Readers, Screen Magnification, Alternative Input, Tactile Displays, Web Transformation, and Disability Studies.

Course Materials

There are no textbooks required for this course. All course readings will be made available on the course Discord or are available through the ACM Digital Library, which can be accessed on Hamilton's campus. You will need access to an IDE suitable for client-side web development (e.g., JetBrains WebStorm etc.) throughout the course. You are also required to bring paper and a writing implement for in-class activities to all classes. If you have accommodations for disabilities that affect writing, please contact the me by email for alternate arrangements.

Grading

Your grade will be comprised of the following components:

- **Assignments**. Programming projects in HTML, CSS, and JavaScript, to be completed roughly once every other week. I will release these at regular intervals on the course Discord. They are meant to be done with the computer/debugging environment, carefully tested and meticulously commented.
- **Discussions**. Once a semester, students will take turns leading discussions on accessibility papers. This not only fosters engagement but also encourages peer learning and leadership skills. Students are expected to actively engage and contribute every week.
- **Quizzes**. Weekly quizzes will occur on Fridays in class; if a week does not have a Friday (due to holidays, etc.), there will be no quiz. Quizzes cover topics discussed during the week to reinforce learning and comprehension and are in lieu of midterm exams.
- **Group Project on Access/Assistive Technology.** Students collaborate in groups to brainstorm, design, and develop an access/assistive technology of their choice. Projects are evaluated based on innovation, feasibility, and actual accessibility improvements. Project Checkpoints include:
  - **Project Pitch:** Groups present their project ideas and get feedback**.**
  - **Design Checkpoint:** Detailed design document and project plan.
  - **Alpha:** A functional "bare bones" prototype of the technology with identified potential improvements.
  - **Beta:** An improved prototype with identified final improvements.
  - **Complete System Submission:** submission of the completed, working system.
  - **Evaluation plan:** A detailed plan for how the system could be evaluated in the future.
- **Final exam**. The final exam is a timed, 3-hour written exam given in person on December 14 from 2-5pm.

At semester's end, I'll calculate your average based on the stated weights. Grades round to the nearest whole number (92.4 to 92, 92.5 to 93). No grade bumping or extra credit is allowed. Your grade reflects mastery of course content

and meeting or exceeding assignment/exam criteria. Effort isn't a grading factor. We'll use Gradescope for assignment submission and grade posting.

Grade Category	Percentage
Discussion Presentation	5%
Discussion Participation	5%
Assignments (equally weighted)	10%
Group Project (divided across checkpoints)	30%
Quizzes (equally weighted)	30%
Final exam	20%
Total	100%

Re-Grade Requests

If you believe I have made a genuine error when grading your assignment, submit a grade review request on Gradescope, referencing the rubric, within one week of posting. After this period, no grade changes can occur. Note that the whole assignment will be **reassessed,** and your grade may decrease. Similarly, any concerns about absent grades must be raised within a week of grade publication.

Course Policies

Communication

The preferred means of communication depend on the purpose of the discussion:

- **Personal requests**: should be sent via email or discussed one-on-one during office hours.
- **Questions and discussion of assignments and quizzes**: should happen during **class**, and via the Discord workspace. Discord communications intended specifically for me should mention @sarahmorrisonsmith.
- **Course announcements and assignments**: will be regularly posted through Discord. It is your responsibility to check Discord regularly for announcements. Missing an announcement, for example, due to absence or not checking Discord, is not an acceptable excuse for incomplete or incorrect work or missing a deadline.

Late Assignments and Makeups

Late work is not accepted without prior approval. If you contact me at least one business day before the due date with appropriate requests for an extension, you will automatically be given an additional amount of time to make up late assignments equal to the time lost due to the unforeseen circumstance.

Incompletes

Incompletes will be granted for only the most extreme circumstances. To be considered for an incomplete you must 1) let me know at in advance that you are seeking an incomplete, and 2) provide documentation to support the request. This decision is also made in consultation with the Dean of Students.

Attendance

You are expected to attend every class. You may be excused only for college-sanctioned activities and you must let me know about such absences as soon as you are notified. If you are sick or will be absent for a significant period of time, please contact me to work out a way to catch up. If you miss class for a college-sanctioned activity, you may make up the participation points by contacting me via email.

Code Headers

All code, regardless of the must have a commented header at the top with your name(s), assignment name, and date. Code without this header will have points taken off. Here is an example of a header for a program written in Python:

```
"""
Name: Sarah Morrison-Smith
Assignment: Assignment 0
Date: 3/8/23
"""
```

Academic Integrity & Collaboration

All assignment code must be written by you. The only exception is for starter code provided by me. All such code should be documented with its origin and its usage and is considered separate from the main body of the work. Any such code will not be considered in grading code and design elements of the project and must be cited appropriately. You are allowed to consult with me, TAs, tutors, and online resources for high-level discussion such as "I iterated over the vertices and marked each one with their strongly connected component." Sharing or receiving code, typing code into others' editors, allowing someone to type into yours, and copying code from online resources is not allowed. Write in your own words. **Unless explicitly specified in the directions for the assignment, the use of artificial intelligence resources such as OpenAI's ChatGPT, GitHub's Copilot, or any other AI code generation tools to complete assignments is considered cheating.** Furthermore, if you see a solution online, you should immediately tell me, and I will give you another problem to work on. If you are unsure about collaboration rules, ask me.

Citation

Always cite any external help in your projects to acknowledge their contribution, except class notes or professor discussions. This includes peers, TAs, tutors, and internet sources. Any non-self- written part must be cited. Code citations should appear in comments, documents, and when discussed, listing author and location. A mere acknowledgment isn't enough; citations must identify the source and help received. Here is an example:

```
# CITE: Stephen Greenfield
# URL: http://www.math.rutgers.edu/~greenfie/gs2004/euclid.html
# HELP: Source of Euclid's method for determining GCD.
```

All images, facts, and other information that you did not wholly come up with on your own must be cited in presentations and documents. Acceptable citation styles include MLA, APA, Chicago, and IEEE.

Public Code Policy

You may not post code you write for assignments in this class publicly (**e.g.,** GitHub, your blog, etc.), even after the semester ends, although you may provide your code privately to potential employers. You may publicly post your code from your group assignment.

Consequences for Academic Dishonesty

Academic integrity is important, and I will not tolerate violations. Academic integrity is important, and I will not tolerate violations. Egregious violation of these rules (i.e., cheating on a quiz or exam, plagiarism that is beyond overlooking a citation for a line or two of code, etc.) will result in a final grade of 'F' for the class.

Seeking Help

Accommodations

If you believe you may need accommodation for a disability, contact me privately within the first two weeks of the semester to discuss your specific needs. If you have not already done so, please contact Allen Harrison, Assistant Dean of Students for International Students and Accessibility at 315-859-4021, or via email at aharriso@hamilton.edu. He is responsible for determining reasonable and appropriate accommodations for students with disabilities on a case-by-case basis.

Mental Health and Wellness

If you are feeling isolated, depressed, sad, anxious, angry, or overwhelmed, you aren't alone: we all struggle sometimes. Don't stay silent! Talk to a trusted confidant: a friend, a family member, a professor you trust. The counseling center offers completely confidential and highly professional services, and can be contacted at 315-859-4340. If this seems like a difficult step, contact me. We can talk and call or walk to the counseling center together.

Course Outline

Week	Topics	Readings	Homework
08/25	Introduction & Syllabus	No Readings	No Homework

08/28 - 09/01	Accessibility & Technology Begin Intro to HTML, CSS, & Javascript	P. W. Fong "Reading a Computer Science Research Paper." SIGCSE Bull. 41, 2 (2009), 138–140. DOI: https://doi.org/10.1145/1595453.1595493. 6 pages	Assignment 0 – Basic Web Programming
09/04 - 09/08	Finish Intro to HTML, CSS, & Javascript Assignment 1 Presentations	C. O'Brien. "How to Learn JavaScript (With Prior Coding Experience). Blog post. https://mochiresearch.com/2021/07/23/how-to-learn-javascript-with-prior-coding-experience/. 9 pages	Assignment 1 – Finding the Accessibility Around You
09/11 - 09/15	Accessibility & "The Web"	J. Mankoff, G. R. Hayes, and D. Kasnitz. 2010. Disability studies as a source of critical inquiry for the field of assistive technology. Proc. of ASSETS '10. ACM, New York, NY, USA, 3–10. DOI: https://doi.org/10.1145/1878803.1878807. 8 pages.	Group Project Part 0 – Group Formation and Project Pitches
09/18 - 09/22	Accessibility & "The Web" Continued	J. P. Bigham, I. Lin, and S. Savage. 2017. The Effects of "Not Knowing What You Don't Know" on Web Accessibility for Blind Web Users. Proc. ASSETS '17. ACM, New York, NY, USA, 101-109. DOI: https://doi.org/10.1145/3132525.3132533. 9 pages	Assignment 2 – Web Accessibility
09/25 - 09/29	Text-to-speech	J. P. Bigham, A. C. Cavender, J. T. Brudvik, J. O. Wobbrock, and R. E. Ladner. 2007. WebinSitu: a comparative analysis of blind and sighted browsing behavior. Proc. of ASSETS '07. ACM, New York, NY, USA, 51–58. https://doi.org/10.1145/1296843.1296854. 8 pages.	Assignment 3 – Making a Webpage Speak
10/02 - 10/04	Text to Speech	No Readings	Group Project Part 1 – Design Checkpoint
10/09 - 10/11	Screen Readers	No Readings	No Assignment – Fall Break
10/16 - 10/20	Screen Readers	W. K. Edwards, E. D. Mynatt, and K. Stockton. 1994. Providing access to graphical user interfaces—not graphical screens. Proc. of ASSETS '94. ACM, New York, NY, USA, 47–54. https://doi.org/10.1145/191028.191041	Assignment 5 – Magnifier for Chrome
10/23 - 10/27	Magnification	S. F. A. Szpiro, S. Hashash, Y. Zhao, and S. Azenkot. 2016. How People with Low Vision Access Computing Devices: Understanding Challenges and Opportunities. Proc. of ASSETS '16. ACM, New York, NY, USA, 171-180. DOI: https://doi.org/10.1145/2982142.2982168. 10 pages	Group Project Part 2 – Alpha Checkpoint
10/30 - 11/03	Computer Vision	H. Kacorri, K. M. Kitani, J. P. Bigham, and C. Asakawa. 2017. People with Visual Impairment Training Personal Object Recognizers: Feasibility and Challenges. Proc. of CHI '17. ACM, New York, NY, USA, 5839-5849. DOI: https://doi.org/10.1145/3025453.3025899. 12 pages	Assignment 7 – Single Button Input
11/06 - 11/10	Input	S. K. Kane, C. Jayant, J. O. Wobbrock, and R. E. Ladner. 2009. Freedom to roam: a study of mobile device adoption and accessibility for people with visual and motor disabilities. Proc. of ASSETS '09. ACM, New York, NY,	Group Project Part 3 – Beta Checkpoint

		USA, 115–122. https://doi.org/10.1145/1639642.1639663. 8 pages.	
11/13 - 11/17	Tactile Displays	D. Reusser, E. Knoop, R. Siegwart, and P. Beardsley. 2019. Feeling Fireworks: An Inclusive Tactile Firework Display. Proc. of CHI '19. ACM, New York, NY, USA, Paper 429, DOI: https://doi.org/10.1145/3290605.3300659. 11 pages.	Assignment 8 – A Speech Controlled Website
11/20 - 11/24	Thanksgiving Recess – no Class	No Readings	No Homework
11/27 - 12/01	Accessible Video Games	B. A. Smith and S. K. Nayar. 2018. *The RAD: Making Racing Games Equivalently Accessible to People Who Are Blind*. Proc. of CHI '18. ACM, New York, NY, USA, Paper 516, 1–12. DOI: https://doi.org/10.1145/3173574.3174090 12 pages	Group Project Part 4 – Final System Submission
12/04 - 12/08	Language Disabilities	L. Bryant, M. Brunner, and B. Hemsley. "A review of virtual reality technologies in the field of communication disability: implications for practice and research." Disability and Rehabilitation: Assistive Technology 15.4 (2020): 365-372. DOI: https://doi.org/10.1080/17483107.2018.1549276. 9 pages.	Group Project Part 5 – Evaluation Plan
12/11 - 12/15	Final Exams	No Readings	No Homework

Final Exam Date

The final exam for this class is on Thursday, December 14th from 2:00-5:00 PM in our regular classroom of Science 2017.