CPCSI 360 Developing Accessible User Interfaces Fall 2022

Course Syllabus

Professor Sarah Morrison-Smith

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- Office: Science Center 2014
- Office hours: Monday 11am-1pm, Tuesday 2-4pm, Wednesday 12-2pm; others only by appointment

Course Logistics

- Course website: https://www.sarahmorrisonsmith.com/cpcsi-360-22, contact me for password
- Discord: https://tinyurl.com/cpcsi-360-22-discord
- Gradescope: https://www.gradescope.com/courses/408137

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.

Discord

All communication for this course happens through the course Discord server. It is your responsibility to check Discord for updates and communication from me. You are encouraged to ask and answer each other's questions, following the guidelines under Honesty & Collaboration. Mention @Dr. Sarah in any communication requiring my responses. Any personal communication, or communication for which privacy is desired, should be done via email or in one-on-one meetings with me.

Course Materials

Textbooks, Software, and Materials Required

There are no textbooks required for this course. All course readings will be made available on the course website 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

At the end of the semester, I will compute an average using the weights below.

Grade Category	Percentage
Assignments (equally weighted)	50%
Midterm exams (equally weighted)	20%
Final exam	10%
Reading Questions	10%
Discussion Participation	10%
Total	100%

All final course grades will be rounded to the nearest whole number. For example, a score of 92.4 rounds to 92, but 92.5 rounds to 93. There will be no grade bumping. There is no extra credit in this course. Your grade in this class is the reflection of mastery of course content, and consistent demonstration of your ability to meet or exceed the

grading criteria and rubrics of individual assignments and exams. Effort will not be factored into your grade. This course will use the Gradescope for all assignment submissions and posting grades.

Course Policies

Late Assignments and Makeups

All assignments will be assessed a late penalty of -10% for each day late. After 3 days, you will receive a 0. If you contact the me at least one business day before the due date (unless faced with an emergency) with appropriate requests for extension and/or makeup assignments, you may 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 filling out the missed-class Google form.

Re-Grade Requests

If you believe I have made a genuine error when grading your assignment, please submit a grade review request through Gradescope with an explanation describing why the grade received is incorrect, with references to the posted rubric. Grade reviews must be requested within one week of a grade being posted. After this time, no grade will be revisited. In the event of a grade review, the entire assignment will be reviewed. It is possible to receive a lower grade on a reviewed assignment. Similarly, inquiries about missing grades must be made within one week of grades being posted.

Honesty & Collaboration

On your assignments, you must acknowledge your collaborators if you get significant[1] help from anyone, you should cite them, and be specific about the scope of that help. (See below for how to properly cite your sources.)

Take care not to plagiarize. You should not show your answers or code to others (except TAs and the professor), and should not look at each others' answers and/or code. You are allowed to discuss at a high level what you are doing, like "I iterated over the vertices and marked each one with their strongly connected component." Keep the discussion with others at this level. Treat code as you would an essay; once you show another student an essay, you lose control over what happens with your work. Likewise, you would not simply take text from that person's essay and include it in yours. Similarly, you should never simply take code from someone else and include it in yours. If you find yourself doing so, and then disguising the fact by changing variable names and so on, then you are violating the honor code by plagiarizing.

In addition to prohibiting the sharing any amount of code and/or written solutions directly with someone, the honor code prohibits receiving such materials from someone, typing code into someone else's editor, and having someone type into yours. In all of these cases, either you are not properly wrestling with the content of the course, or you are doing someone else's work for them. The students on either end of this transaction are equally culpable. Citing others is honorable and will have no effect on your assessment. Plagiarism, however, is not excused by citations. This class assumes that you will use only the following approved outside resources in addition to readings required in class or resources linked to assignments:

[1] By significant, we mean the kind of help that is deeper than a simple syntax correction. If someone reminds you (for example) that you are missing a semicolon, or that you forgot to declare a data type, then you do not have to cite. But if someone assists you with your overall code design, or helps you navigate a logical error, then that is significant help. By analogy, imagine asking someone if you should use affect or effect in a sentence, and they explain. You wouldn't cite them for that bit of help. But if that person proofread your paper? Of course you would.

- W3Schools HTML, CSS, and JavaScript tutorials (https://www.w3schools.com/)
- W3C WCAG 2.0-2.2 (https://www.w3.org/WAI/standards-guidelines/wcag/)
- WAVE Web Accessibility Evaluation Tool (https://wave.webaim.org/)
- JQuery API (https://api.jquery.com/)
- Google's Chrome Developer (https://developer.chrome.com/)
- WebAIM accessibility resources (https://webaim.org/resources/)

If you seek help from an online source, then you need to treat that source just like you would a human being. All of the plagiarism problems described above pertain to online sources. If you find yourself copying any amount of a solution (either written or in code) from on online source, then you are plagiarizing, even if you cite the source. Furthermore, if you see a solution online, you should immediately tell your professor who will give you another problem to work on.

For non-programming assignments or assignments that contain non-programming components such as lab notebooks, write in your own words. Using the words or phrasing of a source written by someone else without full attribution is plagiarism and will be reported to student conduct. This includes using online paraphrasing tools that claim to generate plagiarism-free text from primary sources. If you are unsure if a form or degree of collaboration is allowed by this Collaboration section, ask for clarification before engaging in the collaboration.

Citation

Code should be cited in comments, in documents, and in person when you talk about code. Citation style is up to you, but should always include the code's author and availability location. Example citation styles include:

```
// CITE: < author(s) names >
// DESC: < description of collaboration >
```

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.

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

Tentative Assignment Due Dates

Date	Assignment	Method
9/04	Assignment 0	Gradescope submission & in-class presentations
9/18	Assignment 1	Gradescope submission
10/02	Assignment 2	Gradescope submission
10/16	Assignment 3	Gradescope submission
11/06	Assignment 4	Gradescope submission
11/20	Assignment 5	Gradescope submission
12/04	Assignment 6	Gradescope submission

Tentative Exam Dates

Date	Exam

9/22	Midterm 1 (7-9pm)
10/20	Midterm 2 (7-9pm)
11/10	Midterm 3 (7-9pm)
12/14	Final Exam (2-5pm)

Tentative Schedule

Date	**Topics**	**Readings** (available on course website or the ACM DL to be read prior to class)
8/25	Introduction & Syllabus	No Readings! First day of class!
8/30	Accessibility & Technology	Amanda Stent. "How to Read a Computer Science Research Paper." 3 pages Philip 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 S. Keshav "How to Read a Paper." 3 pages
9/1	Intro to HTML, CSS, & Javascript	Catherine 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 Liz Cork. "Ravelry and Accessibility". Blog post. ~2000 words.
9/6	Assignment 1 Presentations	Jacob O. Wobbrock, Shaun K. Kane, Krzysztof Z. Gajos, Susumu Harada, and Jon Froehlich. 2011. Ability-Based Design: Concept, Principles and Examples. ACM Trans. Access. Comput. 3, 3, Article 9 (April 2011). DOI: https://doi.org/10.1145/1952383.1952384. 27 pages.
9/8	No class – work on Assignment 1	
9/13	Assignment 1 Presentations	Jennifer Mankoff, Gillian R. Hayes, and Devva Kasnitz. 2010. Disability studies as a source of critical inquiry for the field of assistive technology. In Proceedings of the 12th international ACM SIGACCESS conference on Computers and accessibility (ASSETS '10). Association for Computing Machinery, New York, NY, USA, 3–10. DOI: https://doi.org/10.1145/1878803.1878807. 8 pages.
9/15	Accessibility & "The Web"	Stéphanie Giraud, Pierre Thérouanne, and Dirk D. Steiner. "Web accessibility: Filtering redundant and irrelevant information improves website usability for blind users." International Journal of Human-Computer Studies 111 (2018): 23-35. DOI: https://doi.org/10.1016/j.ijhcs.2017.10.011. 13 pages
9/20	Accessibility & "The Web"	Jeffrey P. Bigham, Irene Lin, and Saiph Savage. 2017. The Effects of "Not Knowing What You Don't Know" on Web Accessibility for Blind Web Users. In Proceedings of the 19th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '17). ACM, New York, NY, USA, 101-109. DOI: https://doi.org/10.1145/3132525.3132533. 9 pages
9/22	Midterm 1	
9/27	Text-to-speech	Andreas Hub, Joachim Diepstraten, and Thomas Ertl. 2003. Design and development of an indoor navigation and object identification system for the blind. In Proceedings of the 6th international ACM SIGACCESS conference on Computers and accessibility

		(Assets '04). Association for Computing Machinery, New York, NY, USA, 147–152. https://doi.org/10.1145/1028630.1028657. 6 pages.
9/29	Text-to-speech	Jeffrey P. Bigham, Anna C. Cavender, Jeremy T. Brudvik, Jacob O. Wobbrock, and Richard E. Ladner. 2007. WebinSitu: a comparative analysis of blind and sighted browsing behavior. In Proceedings of the 9th international ACM SIGACCESS conference on Computers and accessibility (Assets '07). Association for Computing Machinery, New York, NY, USA, 51–58. https://doi.org/10.1145/1296843.1296854. 8 pages.
10/4	Screen Readers	Wood, Sarah G., et al. "Does use of text-to-speech and related read-aloud tools improve reading comprehension for students with reading disabilities? A meta-analysis." Journal of learning disabilities 51.1 (2018): 73-84. DOI: https://doi.org/10.1177/0022219416688170. 12 pages
10/6	Screen Readers	W. Keith Edwards, Elizabeth D. Mynatt, and Kathryn Stockton. 1994. Providing access to graphical user interfaces—not graphical screens. In Proceedings of the first annual ACM conference on Assistive technologies (Assets '94). Association for Computing Machinery, New York, NY, USA, 47–54. https://doi.org/10.1145/191028.191041
10/11	Magnification	Sarit Felicia Anais Szpiro, Shafeka Hashash, Yuhang Zhao, and Shiri Azenkot. 2016. How People with Low Vision Access Computing Devices: Understanding Challenges and Opportunities. In Proceedings of the 18th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '16). ACM, New York, NY, USA, 171-180. DOI: https://doi.org/10.1145/2982142.2982168. 10 pages
10/13	Fall Recess, No Class	
10/18	Magnification	Thomas Rathfux, Jasmin Thöner, Hermann Kaindl, and Roman Popp. 2018. Combining Design-time Generation of Web-pages with Responsive Design for Improving Low-vision Accessibility. In Proceedings of the ACM SIGCHI Symposium on Engineering Interactive Computing Systems (EICS '18). Association for Computing Machinery, New York, NY, USA, Article 10, 1–7. DOI: https://doi.org/10.1145/3220134.3220141. 7 pages
10/20	Midterm 2	
10/25	Computer Vision	Fusco, Giovanni, and James M. Coughlan. "Indoor localization using computer vision and visual-inertial odometry." International conference on computers helping people with special needs. Springer, Cham, 2018. DOI: https://doi.org/10.1007/978-3-319-94274-2_13. 8 pages
10/27	Computer Vision	Hernisa Kacorri, Kris M. Kitani, Jeffrey P. Bigham, and Chieko Asakawa. 2017. People with Visual Impairment Training Personal Object Recognizers: Feasibility and Challenges. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17). ACM, New York, NY, USA, 5839-5849. DOI: https://doi.org/10.1145/3025453.3025899. 12 pages
11/1	Input	Shaun K. Kane, Jeffrey P. Bigham, and Jacob O. Wobbrock. 2008. Slide rule: making mobile touch screens accessible to blind people using multi-touch interaction techniques. In Proceedings of the 10th international ACM SIGACCESS conference on Computers and accessibility (Assets '08). Association for Computing Machinery, New York, NY, USA, 73–80. https://doi.org/10.1145/1414471.1414487. 8 pages.

11/3	Input	Shaun K. Kane, Chandrika Jayant, Jacob O. Wobbrock, and Richard E. Ladner. 2009. Freedom to roam: a study of mobile device adoption and accessibility for people with visual and motor disabilities. In Proceedings of the 11th international ACM SIGACCESS conference on Computers and accessibility (Assets '09). Association for Computing Machinery, New York, NY, USA, 115–122. https://doi.org/10.1145/1639642.1639663. 8 pages.
11/8	Tactile Displays	Dorothea Reusser, Espen Knoop, Roland Siegwart, and Paul Beardsley. 2019. Feeling Fireworks: An Inclusive Tactile Firework Display. In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19). ACM, New York, NY, USA, Paper 429, DOI: https://doi.org/10.1145/3290605.3300659. 11 pages.
11/10	Midterm 3	
11/15	Accessibile Video Games	Brian A. Smith and Shree K. Nayar. 2018. *The RAD: Making Racing Games Equivalently Accessible to People Who Are Blind*. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). Association for Computing Machinery, New York, NY, USA, Paper 516, 1–12. DOI: https://doi.org/10.1145/3173574.3174090 12 pages
11/17	Accessibile Video Games	Barbara Leporini and Eleonora Palmucci. 2017. An inclusive educational game usable via screen reader on a touch-screen. SIGACCESS Access. Comput., 119 (October 2017), 3–9. DOI: https://doi.org/10.1145/3167902.3167903. 7 pages
11/22	Thanksgiving recess, No Class	
11/24	Thanksgiving recess, No Class	
11/29	Language Disabilities	Luz Rello. 2015. Dyslexia and web accessibility: synergies and challenges. In Proceedings of the 12th Web for All Conference (W4A '15). ACM, New York, NY, USA, Article 9, 4 pages. DOI: https://doi.org/10.1145/2745555.2746655. 4 pages.
12/1	Language Disabilities	Bryant, Lucy, Melissa Brunner, and Bronwyn 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.
12/6	Technology & Mental Health	Rui Wang, Min S. H. Aung, Saeed Abdullah, Rachel Brian, Andrew T. Campbell, Tanzeem Choudhury, Marta Hauser, John Kane, Michael Merrill, Emily A. Scherer, Vincent W. S. Tseng, and Dror Ben-Zeev. 2016. CrossCheck: toward passive sensing and detection of mental health changes in people with schizophrenia. In Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp '16). ACM, New York, NY, USA, 886-897. DOI: https://doi.org/10.1145/2971648.2971740. 12 pages
12/8	Ethics	Joseph A. Stramondo "The Distinction Between Curative and Assistive Technology." Science and Engineering Ethics (2019): 1-21. DOI: https://doi.org/10.1007/s11948-018-0058-9. 21 pages
12/14	Final Exam	

Syllabus Confirmation

When you read this far in the syllabus, please visit the following webpage: https://tinyurl.com/cpcsi-360-22-syllabus