visualProgramming

instructor

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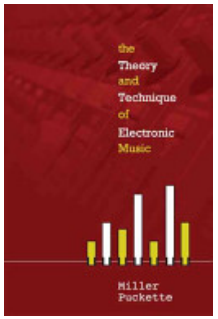
texts & software

required text

Chung, B.W.C. *Multimedia Programming with Pure Data*. Packt Publishing. 2013.

Puckette, M. *The Theory and Technique of Electronic Music*. World Scientific Publishing Company. 2007. Online: http://msp.ucsd.edu/techniques.htm.



You will be expected to read a number of texts provided directly online and/or via the ACM Digital Library (http://dl.acm.org). Note that to access the ACM DL, you must be on campus, proxied through the NMSU network (via http://lib.nmsu.edu), or have a paid subscription. **You are responsible for access.**

ACM DL DIGITAL LIBRARY

required software

You are responsible for having access to the following software for this course.

Pure Data-Extended 0.43.4. Online: http://puredata.info. Note: Must have access to a webcam, a microphone, and ability to use GEM for graphics.

Alice 3. Online: http://alice.org.

Pd

Alice3

course description

In this course, we will learn how to do visual programming, that is, specifying a program using blocks representing code arranged in 2D space. Both block-based and graph-based programming will be covered using Alice for block-based and Pure Data for graph-based. We will have a smattering of topics that are relevant to understanding visual programming, its uses, and how to make interesting systems with it. These include analog and digital signal processing, reactive environments, computer vision, physically based modeling, and animation.

objectives

Students completing this course will be able to:

- Develop software in visual environments, both block-based and graph-based.
- Understand flows of control in visual programming environments.
- Make use of signals, digital and analog, for driving software.
- Communicate software design and evaluation with presentations, demos, and reports.

prerequisites

This course involves reading, designing, and coding. You are **expected to be a competent coder**. Requires a C- or better in CS 272 and CS 278 for 481; graduate students should expect work consistent with this level of experience.

team-based learning

This course borrows materials from team-based learning, but does not implement it completely. You can expect that:

- You will be responsible for readings outside of class.
- There may be a quiz on every reading at the start of class; if so, you will take it individually, then take it with your team.
- The lectures will be short. Students will present some work.
- There will be a team project, with deliverables throughout the semester, that will take you from concept to complete system.

policies

team formation

Teams will be formed after students have identified their areas of interest through the Micro Proposals assignment. **Teams must consist entirely of either graduate students or undergraduates**; this segregation is necessary because the graduate curriculum is slightly accelerated from the undergraduate one. Teams are limited to 3 students, although teams of 2 or 4 will be considered when necessary.

reading / quizzes / exams

You are responsible for reading all materials prior to class. Throughout the semester, students will take readiness assurance quizzes based on the reading. Missed quizzes **cannot** be made up. The course will include a comprehensive mid-term exam that will cover all topics up to that point. There will be no final exam.

attendance / class participation

Attendance is expected at every class. Students should be present both physically and mentally, asking questions, discussing, and not otherwise engaged (in a device). A student with more than one unexcused absences will lose points from the Presentation Questions / Class Participation component of his/her grade.

assignments

Normally, assignments are due before class on the day of presentations, and by midnight for written work (as specified in Canvas). **Late work will be accepted, but with a 10% penalty per day late (or 20% per class day, if the work is to be presented).** No extensions will be granted for failure to install required software.

Graduate student assignments normally require more work than the undergraduate equivalent.

You will work with a team most of the semester, and team activities make up most of your grade. **Students are only eligible for the team portion of the grade if they earn at least 70% of their individual grade.**

total	100		
readiness assurance tests*	3		
team readiness assurance tests	3		
exam*	15		
participation*	2		
software access*	2		
exercises*	10		
Alice world*	15	←	100%
specification	4.5%		30%
code	4.5%		30%
demo	6%		40%
final project	50	←	100%
micro proposal*	2.5		5%
concept sketch	5		10%
concept sketch presentation	2.5		5%
mid-project progress check	2.5		5%
project progress check	5		10%
final code	7.5		15%
final demo	7.5		15%
final presentation	7.5		15%
final report	7.5		15%
peer review	2.5		5%

grade	%
A	93.5–100%
A-	89.5–93.4%
B+	86.5–89.4%
B	83.5–86.4%
B-	79.5–83.4%
C+	76.5–79.4%
C	73.5–76.4%
C-	69.5–73.4%
D	59.5–69.4%
F	<59.4%

TENTATIVE schedule

date		topic	reading	activity	due
1/19	Th	Introduction to Visual Programming		self introductions	
1/24	Tu	Uses of Visual Programming		bring up any software issues	
1/26	Th	Introduction to Alice			verify access to **all** software
1/31	Tu	Programming in Alice			
2/2	Th	Tangible Interaction	Ishii & Ulmer; Jordà et al.		Alice world specification
2/7	Tu	Interactive Environments	Cooperstock et al.; Krueger; Greenberg et al.		
2/9	Th	Getting Started with Pd	Chung: 1		
2/14	Tu	Computer Graphics with GEM	Chung: 2		
2/16	Th	[prof. @ NSF]	← Alice world demos →		Alice world
2/21	Tu	Image Processing	Chung: 3		
2/23	Th		← micro-proposal presentations and team formation →		micro-proposals
2/28	Tu	[prof. @ GDC]	← (finish) Alice world demos →		
3/2	Th	Interactivity [prof. @ GDC]	Chung: 4		
3/7	Tu	←	concept sketch presentations →		concept sketch
3/9	Th	Motion Detection	Chung: 5		exercise 1
3/14	Tu	Analog and Digital Signals	Puckette: 1–1.7, 2		
3/16	Th	Control Signals	Puckette: 3–3.8, 8–8.1, 9–9.5		
3/21	Tu				
3/23	Th		Spring Break		
3/28	Tu		← project demos →		mid-project progress check
3/30	Th	Particle Systems and Choreography	Reeves; Sims		
4/4	Tu	<work on project>			exercise 2
4/6	Th	Animation with Particle Systems	Chung: 6		
4/11	Tu		← exam →		
4/13	Th	←	status update presentations →		project progress check
4/18	Tu	Audio Programming + Outside World	Chung: 7, 8		
4/20	Th	Motion Capture	Moeslund & Granum		exercise 3
4/25	Tu	Sensors + Extending Pd	Bellotti et al., Chung: 9, Appx.		
4/27	Th	←	final presentations and demos →		FP presentation, FP final demo
5/2	Tu	←	final presentations and demos →		
5/4	Th		← final code review →		FP code
5/9	Tu	<work on final report> [prof. @ CHI]		Final Exam Slot	
5/11	Th				final report, peer review

references

Bellotti, V., Back, M., Edwards, W. K., Grinter, R. E., Henderson, A., Lopes, C. Making sense of sensing systems: five questions for designers and researchers. In *Proc. SIGCHI Conf. Human Factors in Computing Systems* (2002), 415–422.

Cooperstock, J. R., Fels, S. S., Buxton, W., Smith, K. C. Reactive environments. *Commun. ACM 40*, 9 (Sept. 1997), 65–73.

Ishii, H., Ullmer, B. Tangible bits: Towards seamless interfaces between people, bits and atoms. In *Proc. ACM SIGCHI Conf. Human Factors in Computing Systems* (1997), 234–241.

Jordà, S., Geiger, G., Alonso, M., Kaltenbrunner, M. The reacTable: Exploring the synergy between live music performance and tabletop tangible interfaces. In *Proc. International Conference on Tangible and Embedded Interaction* (2007), 139–146.

Krueger, M. W. Responsive environments. In *Proc. June 13-16, 1977, National Computer Conf.* (1977), 423–433.

Moeslund, T.B., Granum, E. A survey of computer vision-based human motion capture. *Computer Vision and Image Understanding 81*, (2001), 231–268.

Greenberg, S., Marquardt, N., Ballendat, T., Diaz-Marino, R., Wang, M. Proxemic interactions: The new Ubicomp? *interactions 18*, 1 (Jan. 2011), 42–50.

Reeves, W. T. Particle systems - a technique for modeling a class of fuzzy objects. *ACM Transactions on Graphics 2*, 2 (1983), 91–108.

Sims, K. Particle animation and rendering using data parallel computation. In *SIGGRAPH '90: Proc. Conf. Computer Graphics and Interactive Techniques* (1990), 405–413.

university policies

academic honesty

Plagiarism is using another person's work without acknowledgment, making it appear to be one's own. Intentional and unintentional instances of plagiarism are considered instances of academic misconduct and are subject to disciplinary action such as failure on the assignment, failure of the course or dismissal from the university. The NMSU Library has more information and help on how to avoid plagiarism at http://lib.nmsu.edu/plagiarism/.

As programmers, reuse is an essential part of our work. You are welcome to use existing libraries and reuse your own code, but must make certain to appropriate document and provide licenses. You must adhere to any licensing terms and are responsible for any fees for software you choose to license.

disability notice

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act Amendments Act (ADAAA) covers issues relating to disability and accommodations. If a student has questions or needs an accommodation in the classroom (all medical information is treated confidentially), contact:

Student Accessibility Services (SAS), Corbett Center, Rm. 208
sas@nmsu.edu; (575) 646-6840; website: http://sas.nmsu.edu.

discrimination policy

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Furthermore, Title IX prohibits sex discrimination to include sexual misconduct: sexual violence (sexual assault, rape), sexual harassment and retaliation.

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equity@nmsu.edu; (575) 646-3635; website: http://www.nmsu.edu/~eeo.