

visualProgramming

instructor

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CS 481 / 579-M02 (Sp. 2015) M,W 8:30am–9:45am
Prof. Zachary Dugas Touns

1 of 4

teaching assistant

Frank Natividad
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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.**



course description

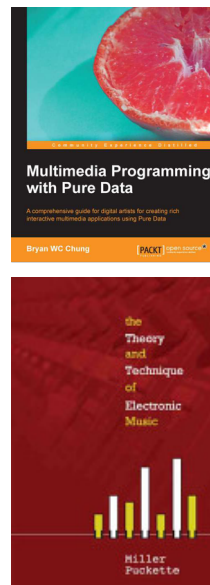
In this course, we will learn how to do visual programming, that is, specifying a program using blocks representing code arranged in 2D space. Both block-based and graph-based programming will be covered using Alice for block-based and Pure Data for graph-based. We will have a smattering of topics that 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.

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>.



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 be working with a team most of the semester, and team activities will 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	grade	%
readiness assurance tests*	3		A	93.5–100%
team readiness assurance tests	3		A-	89.5–93.4%
mid-term exam*	15		B+	86.5–89.4%
participation*	3		B	83.5–86.4%
software access*	3		B-	79.5–83.4%
exercises*	10		C+	76.5–79.4%
Alice world*	18	← 100%	C	73.5–76.4%
specification	5.4%	30%	C-	69.5–73.4%
code	5.4%	30%	D	59.5–69.4%
demo	7.2%	40%	F	<59.4%
final project	45	← 100%		
micro proposal*	2.25	5%		
concept sketch	4.5	10%		
concept sketch presentation	2.25	5%		
mid-project progress check	6.75	15%		
final code	9	20%		
final demo	9	20%		
final presentation	9	20%		
peer review	2.25	5%		

TENTATIVE schedule

date	topic	reading	activity	due	
1/21	W	Introduction to Visual Programming	self introductions		
1/26	M	Uses of Visual Programming	bring up any software issues		
1/28	W	Introduction to Alice		verify access to all software	
2/2	M	Design and Programming in Alice			
2/4	W	D&P in Alice (cont.) / VPL Code Exec.		Alice world specification	
2/9	M	Analog and Digital Signals	Puckette: 1–1.7, 2		
2/11	W	Control Signals	Puckette: 3–3.8, 8–8.1, 9–9.5		
2/16	M	<presentations>	Alice world demos	Alice world	
2/18	W	<presentations>	Alice world demos		
2/23	M	Getting Started with Pd	Chung: 1		
2/25	W	<presentations>	team formation	micro-proposals	
3/2	M	Computer Graphics with GEM	Chung: 2		
3/4	W	Image Processing	Chung: 3	exercise 1	
3/9	M	<presentations>	concept presentations	concept sketch	
3/11	W	Interactivity	Chung: 4		
3/16	M	Motion Detection	Chung: 5		
3/18	W	Motion Capture	Moeslund & Granum	exercise 2	
3/23	M	Spring Break			
3/25	W	Spring Break			
3/30	M	Motion Detection	Chung: 5		
4/1	W	<presentations>	project demos	mid-project progress check	
4/6	M	Animation with Particle Systems	Chung: 6; Reeves; Sims		
4/8	W	<test>	exam		
4/13	M	Audio Programming	Chung: 7		
4/15	W	Interfacing with the Outside World	Chung: 8	exercise 2	
4/20	M	Sensors	Bellotti et al.		
4/22	W	Extending Pd	Chung: 9, Appx.	exercise 3	
4/27	M	Tangible Interaction	Ishii & Ulmer; Jordà et al.		
4/29	W	Interactive Environments	Cooperstock et al.; Krueger; Greenberg et al.		
TBA	?	Final Exam Slot		FP presentation, FP final demo, FP code peer review	
5/8	F				

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.

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 appropriately 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. 244
sas@nmsu.edu; (575) 646-6840; website: <http://sas.nmsu.edu>.

discrimination policy

NMSU policy prohibits discrimination on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex, sexual orientation, spousal affiliation and protected veterans status.

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

Office of Institutional Equity (OIE), O'Loughlin House, 1130 University Ave.
equity@nmsu.edu; (575) 646-3635; website: <http://www.nmsu.edu/~eio>.