HCI-4/631 Software Architectures for User Interfaces, Fall 2006

Place and Time: XXXXXX, Monday and Wednesday 9:00-10:30
Instructor: Vassilis Kostakos (vassilis@cmu.edu)
Office: 2.91
Office Hours: Monday 10:30-11:30, Wednesday 10:30-11:30

Course Description

This course is designed to:

- introduce students to the basic organizing principles found in interactive software
- provide experience with user interface implementation
- explore advanced interaction techniques

We will cover four broad topics:

- Desktop-based graphical user interfaces
- The World Wide Web
- History & visions of interactive computing
- Mobile & pervasive interfaces and interaction

Prerequisites

Prerequisites: Good programming experience in Java, C, or C++. Projects can be done in Java or any language of your choice.

Textbook

There is no textbook for the main material of the course. However, you may find it useful to get a book on the Java programming language and on JavaScript. Numerous such books are available. Depending on your background and experience learning programming languages, you might want to consider either a tutorial or reference style book.

Programming Resources

For this class you will need to have access to an up to date Java system on some platform. One way to do this is to download the latest version of the system (JDK 1.5, aka "Java 2 Standard Edition v1.5") directly from Sun. It is free and can be found at: http://java.sun.com/j2se/1.5.0/.

Java Tutorial	*Learning Java*, 2nd Edition, O'Reilly & Associates, by Pat Niemeyer and Jonathan Knudsen (http://www.oreilly.com/catalog/learnjava2/)
List of Java books	http://www.javaworld.com/javaworld/jw-05-2001/jw-0518-introbooks.html (It's a little old, but the basic Java language has not changed much)
Java tutorial online	http://java.sun.com/docs/books/tutorial/reallybigindex.html#getStarted (lots of tutorials on new aspects of Java, like Collections and Security)
Java Swing tutorial	http://java.sun.com/docs/books/tutorial/uiswing/ (assumes you know Java already)
JavaDoc APIs	http://java.sun.com/j2se/1.5.0/docs/api/index.html
Eclipse IDE	If you don't have a Java development environment, you can use the free Eclipse IDE available starting here: http://www.eclipse.org/

Finally, miscellaneous useful links:

APIs for XML, Java, JavaScript, etc	http://gotapi.com/
Apache Jakarta	http://jakarta.apache.org/ (lots of high-quality source code for Java)

JavaScript / Web-based widget libraries	http://www.mochikit.com/ http://dojotoolkit.org/ http://openrico.org/ http://script.aculo.us/ http://prototype.conio.net/ http://developer.yahoo.com/yui/ http://code.google.com/webtoolkit/ (Java to AJAX transformer) (Yes, there are **lots** of JavaScript libraries out there)
Strategies for Commenting Code	http://particletree.com/features/successful-strategies-for-commenting-code
Protolizer	http://www.protolize.org/index.php (A collection of useful resources for web dev)

Grading and Exams

There is no exam for this course. Individual components will be weighted as follows (this is tentative and subject to change):

Project 1	5%	(solo)
Project 2	10%	(solo)
Project 3	15%	(2-3 person teams)
Project 4	20%	(2-3 person teams)
Project 5	30%	(2-3 people teams)
Participation	10%	
Homework	10%	

Projects

There will be 5 projects in this course. These projects will begin with a small "warmup" project to insure you know the basics of the Java language and environment, as well as the Swing user interface toolkit. The other projects will deal with browser plugins, information visualization, and facebook applications. The final project will be the most challenging, and will be a fairly large-scale group project of your choice.

Some assignments are individual assignments. It is ok to talk with others in or out of the class about assignments about big picture concepts, specific API details, or even help with debugging, as long as they are done reasonably and not excessively (i.e. they do not end up doing your assignment for you). It is also ok to examine (or in some cases, extend) open source software to gain a deeper understanding of how user interfaces work and to get insight into doing your assignment.

It is NOT ok to copy and paste under any circumstances. Here, I'd like to adhere to the Reasonable Person Principle. If you think that what you are doing is a reasonable thing, then it will likely be ok. If you are in doubt, then ask. In all cases, add a README text file documenting what help you got

Class participation / Attendance

A good portion of the learning in any upper level class comes from intelligent discussion involving the instructor and the students. If you don't attend class, you cannot participate, and your performance in the class may reflect that. This portion of your grade will consist of:

- The instructor knowing your face and name
- Participating in in-class exercises
- Answering questions when randomly called

I expect that each student will make an effort to attend all lectures and contribute constructively to the discussion. Let me know in advance if you cannot attend any class. I also reserve the right to use judgment of class participation to adjust the final overall average for any student.

Homework

Homework assignments for this class will include reading summaries. Your two lowest homework grades will be dropped from your homework average. See the schedule (below) for when reading summaries are due.

Students are expected to do reading assignments **prior** to class so that they can participate fully in class discussions. Students must submit a printed summary (200 words) and a one-sentence "highlight" **for each** chapter or article in the reading assignment. The highlight may be something you found particularly interesting or noteworthy, a question you would like to discuss in class, a point you disagree with, etc. Summaries are due at the **beginning of class**. Summaries and highlights will not be accepted late. If you do not attend class, you will not be permitted to submit your summaries and highlights.

Final Project

Students will work on semester projects in groups of 2-3. These will be substantial projects demonstrating mastery of some user interface topic in-depth. Potential projects include things like:

- Creating an interesting mobile service and accompanying UI (e.g., pervasive service)
- Creating an interesting GUI interaction technique (standard desktop or web-based)
- Making it easier to create high-quality GUIs (e.g., automated usability evaluation, debugging techniques, regression tests, easier to do cool animation, etc)

The final submission for Project 5 should include a 6-10 page report (follow this template: http://www.chi2008.org/chi2008pubsformat.doc), the source code for your project and ALL necessary instructions to install & run your project. Additionally, you will give a 10-15 minute presentation of your project.

Here is the rough timeline:

- Wed Apr 2: Project 5 (Final project) assigned
- Wed Apr 16: project groups are formed, and each group stands up and presents their idea
- Wed 4 June: Presentation, submit your project on a CD, and a printed 6-10 page paper describing your work.

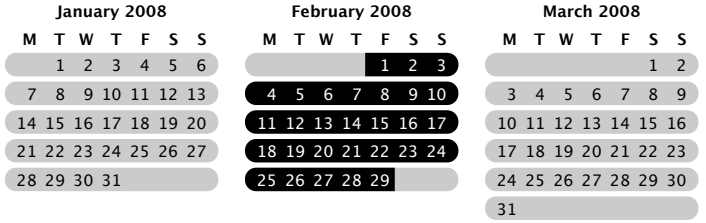
On-Line Material

Lecture slides and other material will be available at http://www.hci-uma.org/courses/saui. Lecture slides on a given topic will typically not be made available prior to the completion of lecture on that topic.

Tentative Schedule

Date	Topic	Assignments	
M 4/2	Course Introduction	• Project 1 assigned	Desktop User
W 6/2	Organization of UI Software		
M 11/2	GUI Output Models		
W 13/2	GUI Output Models (cont.)	• Project 1 due, Project 2 assigned	
M 18/2	GUI Input Models		
W 20/2	GUI Input Models (cont.)		
M 25/2	Information visualisation	• Project 2 due, Project 3 assigned	
W 27/2	GUI Interaction Techniques		
M 3/3	Properties of People		
W 5/3	Properties of People (cont.)		
M 10/3	Web Alphabet Soup	• Reading: What is the Document Object Model? http://www.w3.org/TR/WD-DOM/introduction.html • Reading: Wikipedia entry on Cascading Style Sheets	Web
W 12/3	Web Architectural Philosophy	• Reading: Principled design of the modern Web architecture, by Fielding et al http://doi.acm.org/10.1145/337180.337228	
M 17/3	Mobile Web	• Project 3 due, Project 4 assigned • Reading: Schilit et al, m-Links: An Infrastructure for Very Small Internet Devices http://www.fxpal.com/publications/FXPAL-PR-01-028.pdf	
W 19/3	Social web	• Reading: A familiar face(book): profile elements as signals in an online social network http://doi.acm.org/10.1145/1240624.1240695	
M 24/3	No class		
W 26/3	No class		
M 31/3	History of UIs (Memex, NLS, Sketchpad)	• Reading: Tools for Thought (Chapter 9), by Rheingold. http://www.rheingold.com/texts/tft/9.html	Visions
W 2/4	History of UIs (Xerox Star, Apple Lisa)	• Project 4 due, Project 5 assigned • Reading: The Xerox Star: A Retrospective, by Johnson et al. http://www.guidebookgallery.org/articles/thexeroxstararetrospective	
M 7/4	No class		
W 9/4	No class		
M 14/4	Future Visions (Ubicomp, Apple Knowledge Navigator)		
W 16/4	Project ideas		
M 21/4	Tangible UIs	• Reading: Tangible Bits: Towards Seamless Interfaces between People, Bits and Atoms, by Ishii and Ullmer. http://doi.acm.org/10.1145/258549.258715	Mobile and Pervasive UIs
W 23/4	Multimodal interaction / Pen	• Reading: Ten Myths of Multimodal Interaction, by Oviatt http://doi.acm.org/10.1145/319382.319398	
M 28/4	No class		
W 30/4	No class		
M 5/5	Multimodal interaction / 2-Handed interaction	• Reading: ToolStone: Effective Use of the Physical Manipulation Vocabularies of Input Devices, by Rekimoto et al http://www.csl.sony.co.jp/person/rekimoto/papers/uist00.pdf	
W 7/5	Project 5 status	• Project 5 oral presentations	
M 12/5	Mobile user interfaces / Smart Spaces	• Reading: Pick-and-Drop: A Direct Manipulation Technique for Multiple Computer Environments http://www.csl.sony.co.jp/person/rekimoto/papers/uist97.pdf	
W 14/5	Sensor-based interaction	• Reading: Sensing Techniques for Mobile Interaction, by Hinckley et al http://research.microsoft.com/users/kenh/papers/PPC-Sensing_color.pdf	
M 19/5	Location-based services	• Reading: Reach out and touch: using NFC and 2D barcodes for service discovery and interaction with mobile devices http://www.cs.bath.ac.uk/pervasive/publications/ReachOutandTouch.pdf	
W 21/5	Project 5 status	• Project 5 oral presentations	
F 6/6	Project 5 due		

February 2008



SAUI
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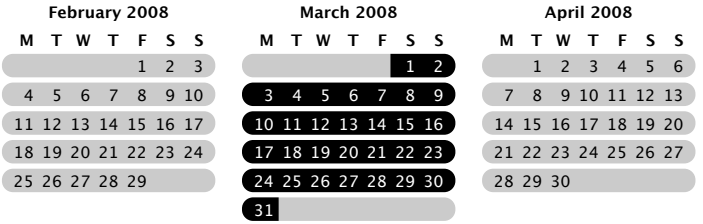
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
28	29	30	31	1	2	3
4 Project 1 assigned (Java) 09:00 Introduction	5 Carnaval	6 09:00 Organisation of UI Software	7	8	9	10
11 09:00 GUI Output Models	12	13 Project 2 assigned (browser) Project 1 due 09:00 GUI Output Models (cont.)	14	15	16	17
18 09:00 GUI Input models	19	20 09:00 GUI Input models (cont.)	21	22	23	24
25 Project 3 assi... (Visualisation) Project 2 due 09:00 Information visualisation	26	27 09:00 GUI interaction techniques	28	29	1	2

March 2008



SAUI
UMA

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
25 Project 2 due Project 3 assi... (Visualisation) 09:00 Information visualisation	26	27 09:00 GUI interaction techniques	28	29	1	2
3 09:00 Properties of people	4	5 09:00 Properties of people (cont.)	6	7	8	9
10 09:00 Web alphabet soup	11	12 09:00 Web architectural philosophy	13	14	15	16
17 09:00 Mobile web	18	19 Project 4 assigned (Facebook) Project 3 due 09:00 Social web	20	21 Easter break	22 Easter break	23 Easter break
24 Easter break	25 Easter break	26 Easter break	27 Easter break	28 Easter break	29 Easter break	30
31 09:00 History of UIs	1	2 Project 4 due Project 5 assigned 09:00 History of UIs (cont.)	3	4	5	6

April 2008

SAUI
UMA

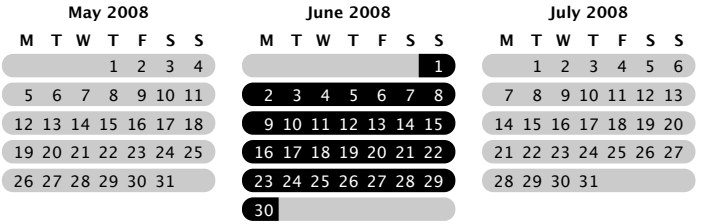
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
31 09:00 History of UIs	1	2 Project 4 due Project 5 assigned 09:00 History of UIs (cont.)	3	4	5	6
7 09:00 No class	8	9 09:00 No class	10	11	12	13
14 09:00 Future visions	15	16 09:00 Project ideas	17	18	19	20
21 09:00 Tangible UIs	22	23 09:00 Multimodal interaction (Pens)	24	25 Liberty day	26 Activities	27
28 Activities	29	30	1 Labour Day	2	3	4

May 2008

SAUI
UMA

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
28 Activities	29	30	1 Labour Day	2	3	4
5 09:00 Multimodal interaction (2-handed)	6	7 09:00 Project status	8	9	10	11
12 09:00 Mobile UIs / Smart Spaces	13	14 09:00 Sensor-based interaction	15	16	17	18
19 09:00 Location-based services	20	21 09:00 Project status	22 Corpo de Zeus	23	24	25
26 09:00 No class	27	28 09:00 No class	29	30	31	1

June 2008



SAUI
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Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
26 09:00 No class	27	28 09:00 No class	29	30	31	1
2 09:00 No class	3	4 Project 5 due	5	6	7	8
9 Exams	10 Day of Portugal	11	12	13	14	15
16 Exams	17	18	19	20	21	22
23	24	25	26	27	28	29
30	1	2	3	4	5	6