CSE 118 Fall 2017
Thu 10/5

Nadir Weibel
Today

• Admin
• Piazza registration
• Gradescope Registration
• Ubicomp … continued
• Reading/Annotating research papers
• Group Discussions
• Team Formation
Register to Piazza

http://piazza.com/ucsd/fall207/cse118cse218
## CSE 118
**Fall 2017**

### Description
The advent of affordable sensors and interaction devices led to a new era. Mobile phones, tablet computers, and digital home devices are now ubiquitous. The term "ubiquitous computing" was first used in the late 1980s to describe the idea of computing devices seamlessly integrated into our daily lives. This course explores the opportunities for the user to be part of the computing landscape. On the other hand, we will focus on the development of innovative applications and interactive systems based on these devices. On the other hand, we will focus on the development of innovative applications and interactive systems based on these devices.

### Active Assignments

<table>
<thead>
<tr>
<th>Activity</th>
<th>Submission</th>
<th>Due Date</th>
<th>GRADE</th>
<th>Status</th>
<th>Points Offered</th>
<th>Points Earned</th>
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</thead>
<tbody>
<tr>
<td>Week 1 introduction summary</td>
<td>Oct 05</td>
<td>Sept 14</td>
<td>95</td>
<td>A</td>
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<td>Week 2 personal assessment</td>
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<td>Week 3 discussion self-assessment</td>
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<td>Sept 14</td>
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<td>Week 4 structured summary</td>
<td>Oct 12</td>
<td>Sept 14</td>
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<td>Sept 14</td>
<td>90</td>
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<tr>
<td>Midterm presentation (submit the 15 students of your team also have a substantive presentation)</td>
<td>Oct 15</td>
<td>Sept 14</td>
<td>90</td>
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<td>Week 6 structured summary</td>
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<tr>
<td>Week 7 structured summary</td>
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<td>Sept 14</td>
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<td>Week 8 discussion self-assessment</td>
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<td>Sept 14</td>
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<tr>
<td>Final presentation (submit to the 15 students of your team also have a substantive presentation)</td>
<td>Oct 05</td>
<td>Sept 14</td>
<td>90</td>
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<td>Final project status</td>
<td>Oct 15</td>
<td>Sept 14</td>
<td>90</td>
<td>B</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

### Entry Code: MX32NZ
Ubicomp ... continued
Interacting with Ubicomp Devices
Novel devices

1. Foot controls
2. Eye-tracking
3. Multiple-degrees-of-freedom devices
4. DataGlove
5. Haptic feedback
6. Bimanual input
7. Tangible user interfaces
8. Handheld devices
9. Digital pens
10. Table top touch screens
11. Game controllers
12. Depth-Cameras
V. Bush’s Memex

A memex is a device in which an individual stores his books, records and communications and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory.

Atlantic Monthly, "As we may think" July 1945
This is a beautiful and ingenious machine, very useful and convenient for anyone who takes pleasure in study, especially those who are indisposed and tormented by gout. For with this machine a man can see and turn through a large number of books without moving from one spot. Moreover, it has another fine convenience in that it occupies very little space in the place where it is set, as anyone of intelligence can clearly see from the drawing.
SketchPad
Ivan Sutherland -1963
Experiment at PARC – TAB
Experiment at PARC - PAD
Experiment at PARC – BOARD
The Office of the Future

An in-depth analysis of how word processing will reshape the corporate office

... a relatively small but fast-growing group of companies will have moved into the office-of-the-future environment. The leap forward will be led by the “papermakers” – those companies that are involved primarily in generating, modifying, or moving paper.

These pioneers will have hooked together word-processing equipment into office systems to transfer information electronically and to move it into and out of central electronic files. For them, it will be the start of the paperless office.

Digital Desk

Pierre Wellner, Xerox EuroParc 1992
Paperless Office?

“I’ve finally achieved a paperless office.”
Today?
Ambient and Wearable Sensors

- Accelerometer, Gyroscope, Magnetometer, Barometer, Thermometer, Relative Humidity Sensor, Light Sensor, EEG, EMG, Heart rate, etc.

Images:
- Accelerometer
- Gyroscope
- EEG Reader
- Tattooed (MC10 Sensor)
Behavior/Activity Tracking
Smart Homes and Automation
Music?

Björk - Declare Independence
CSE 118 Fall 2017
Organization, Group Discussions, Projects and Teams
<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>TOPIC</th>
<th>READINGS</th>
<th>ASSIGNMENTS</th>
<th>NOTES</th>
</tr>
</thead>
</table>
| 1    | Tue Oct 9| Lecture: Introduction to Course and Introduction to Ubicomp.  
[CSE 116 slides]  
2. [CSE 116 slides]  
3. [CSE 210 slides] | CSE 116  
- TBA - 2pm in CSE 210  
CSE 210  
- TBA - 2pm in CSE 210  
CSE 2164  
- TBA - 2pm in CSE 210  | As shown, paper size of change you need to be an IT/20 network tutor on campus or using wi-fi. |
| 1    | Thu Oct 9| Group Discussions, Projects, Policies, and Team Formation  
2. [CSE 116 slides]  
3. [CSE 210 slides] | - TBA - 2pm in CSE 210  
CSE 210  
- TBA - 2pm in CSE 210  
CSE 2164  
- TBA - 2pm in CSE 210  | As shown, paper size of change you need to be an IT/20 network tutor on campus or using wi-fi. |
| 2    | Tue Oct 10| Lecture: Endo-sensor (Y. Vakman)  
2. [CSE 116 slides]  
3. [CSE 210 slides] | CSE 116  
- TBA - 2pm (Week 1)  
CSE 210  
- TBA - 2pm (Week 1)  
CSE 2164  
- TBA - 2pm (Week 1)  | Deadline 2pm |
| 2    | Thu Oct 10| Group Discussion: A) Ubiquitous Computing and B) EndoSensoric  
4 papers from week 1 and 2 | - TBA - 2pm  
CSE 118+218  
- TBA - 2pm  
CSE 210  
- TBA - 2pm | Paper Discussion in the assigned discussion rooms [see here]  
Deadline 11.59pm. |
| 3    | Tue Oct 17| Content Awareness | 1. [CSE 116 slides]  
2. [CSE 210 slides] | CSE 116  
- TBA - 2pm (Week 2)  
CSE 210  
- TBA - 2pm (Week 2)  | Deadline 2pm  
CSE 118+218  
- TBA - 2pm  
CSE 210  
- TBA - 2pm | Paper Discussion in the assigned discussion rooms [see here]  
Deadline 11.59pm. |
| 3    | Thu Oct 18| Group Discussions: Content Awareness | - TBA - 2pm  
CSE 118+218  
- TBA - 2pm  
CSE 210  
- TBA - 2pm | Paper Discussion in the assigned discussion rooms [see here]  
Deadline 11.59pm. |
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Course</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tue Oct 24</td>
<td>Mid Term Preparation [Prof. Wezel at UT Houston]</td>
<td>CSE 118</td>
<td>Menu (1st week)</td>
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<td></td>
<td>CSE 219</td>
<td>Paper essay (Week 4)</td>
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<td>No readings</td>
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<td>Thu Oct 26</td>
<td>Mid Term Presentations</td>
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<td>Midterm presentations [4 teams per room]</td>
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<td>Tue Oct 31</td>
<td>Reading Body Movements</td>
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<td>1. TBD</td>
<td>CSE 118</td>
<td>Paper discussion</td>
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<td>2. TBD</td>
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<td>CSE 219</td>
<td>Paper discussion</td>
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<td>Thu Nov 02</td>
<td>Group Discussions: Tracking Body Movements</td>
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<td>Paper discussion in the assigned discussion rooms (see here)</td>
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<td>CSE 118</td>
<td>Paper discussion</td>
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<td>Tue Nov 07</td>
<td>Software Engineering in Ubcomp</td>
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<td>1. TBD</td>
<td>CSE 118</td>
<td>Paper discussion</td>
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<td>2. TBD</td>
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<td>CSE 219</td>
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<td>Thu Nov 09</td>
<td>Group Discussion: Software Engineering</td>
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<td>CSE 118</td>
<td>Paper discussion</td>
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<td>CSE 219</td>
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<td>Tue Nov 14</td>
<td>Design of Ubcomp Systems</td>
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<td>1. TBD</td>
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<td>Paper discussion</td>
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<td>Thu Nov 18</td>
<td>Group Discussion: Design of Ubcomp Systems</td>
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<td>CSE 118</td>
<td>Paper discussion</td>
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<td>Date</td>
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<td>8 Nov 21</td>
<td>Applications of Machine Learning to Ubicomp</td>
<td>CSE 118 - Mini-Quiz (Week 7)</td>
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<td>CSE 218 - Submit 1-page essay (Week 7)</td>
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<td><strong>Deadline 2pm</strong></td>
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<td>6 Nov 23</td>
<td>No class: Thanksgiving</td>
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<td>9 Nov 28</td>
<td>Career for Ubicomp</td>
<td>CSE 118 - Mini-Quiz (Week 8)</td>
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<td>CSE 218 - Submit 1-page essay (Week 8)</td>
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<td><strong>Deadline 2pm</strong></td>
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<td>9 Nov 30</td>
<td>Group Discussion: Sizes for Ubicomp</td>
<td>CSE 118 - Mini-Quiz (Week 9)</td>
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<td>CSE 218 - Submit 1-page essay (Week 9)</td>
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<td><strong>Deadline 2pm</strong></td>
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<td>10 Dec 5</td>
<td>Group Discussion on Privacy and Human (Dr. G. M. Nelson)</td>
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<td>CSE 118 - Mini-Quiz (Week 9)</td>
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<td>CSE 218 - Submit 1-page essay (Week 9)</td>
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<td><strong>Deadline 2pm</strong></td>
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<td>10 Dec 7</td>
<td>Final Presentations</td>
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<td><strong>Final presentations [4 teams 1 hour]</strong></td>
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| Finals     |                                                            | Final Demos                                                                  | 2-5pm in CSE 1200 (Setup 1-2pm, Teardown 4-5pm)
How to Read an Engineering Research Paper

William G. Griswold
with additions by Nadir Weibel
(based on some ideas from Ali Khayam)
CSE, UC San Diego

Reading research papers effectively is challenging. These papers are written in a very condensed style because of page limitations and the intended audience, which is assumed to already know the area well. Moreover, the reasons for writing the paper may be different than the reasons the paper has been assigned, meaning you have to work harder to find the content that you are interested in. Finally, your time is very limited, so you may not have time to read every word of the paper or read it several times to extract all the nuances. For all these reasons, reading a research paper can require a special approach.

To develop an effective reading style for research papers, it can help to know two things: what you should get out of the paper, and where that information is located in the paper. First, I'll describe how a typical research paper is put together.

Despite a paper's condensed form, it is likely repetitive. The introduction will state not only the motivations behind the work, but also outline the solution. Often this may be all the expert requires from the paper. The body of the paper states the authors’ solution to the problem in detail, and should also describe a detailed evaluation of the solution in terms of arguments or an experiment. Finally, the paper will conclude with a recap, including a discussion of the primary contributions. A paper will also discuss related work to some degree. Because of the repetition in these papers at different levels of detail and from different perspectives, it may be desirable, to read the paper “out of order” or to skip certain sections.
How to read an Engineering Paper
Typical Structure

- Abstract
- Introduction
- Related Work
- Background
- System Model
- Contribution
- Performance Evaluation
- Conclusions
- References
Typical Structure

• **Abstract**
  - Describing the main idea/proposed solution of the paper in a few words

• **Introduction**
  - Expands the abstract, also discusses: Limitations of existing work, how the proposed solution has been evaluated

• **Related Work**
  - What has already taken place in this area? And how is this paper different?

• **Background**
  - Optional: Used if concepts from a different domain are used
Typical Structure

• System Model
  • The basic system-level model and assumptions
• Contribution
  • One or two sections describing the contributions of the work
• Performance Evaluation
  • Performance comparison with existing work
• Conclusions
  • Salient findings
• References
Paper Reading
Getting the big picture

• Read the Abstract and Introduction carefully
• Skim through the rest of the paper
• Pay special attention to results (tables, figures, etc.) and discussions on results
Paper Reading
Getting the big picture

• What problem is the paper trying to solve?
  • Highlight three to four lines
• What are the limitations of prior work?
  • Highlight maximum two to three lines
• How is the problem solved by this paper?
• What is the paper’s contribution?
  • Highlight three to five lines
• How is the proposed solution evaluated?
  • What kind of data/experiments were conducted?
  • No need to highlight anything; you can highlight two to three words here
Paper Reading

Getting the Details (System)

• Read the System / Model carefully
  • The whole paper is going to be based on this model

• Understand the gist of the contribution/proposal
  • Does it make sense?
  • Do you think it will work?
  • How will the proposal be evaluated?

• Don’t try to read all the math/technical details in one go
  • Read the assumptions and system model
  • Try to work out a solution to the problem
Paper Reading

Getting the Details (Evaluation)

- Is the evaluation fair and comprehensive?
  - Try to find the next paper you want to read from this section
- Understand the results
  - Do not miss a single figure and table
  - Find the corresponding discussions in the paper and read them thoroughly
Annotate

• Highlight important comments as you go. Using a highlighter, as opposed to underlining, can really help key sentences "pop out" at you when you return to review the paper later.

• Mark the important paragraphs of the paper according to motivation/problem, idea/solution, their evaluation, and contributions.

• On the front of the paper, write down the take-away message.

• On the front of the paper, or near the end, write down your key questions. Other questions may be written in the margins as you read.

• Try to answer the questions for yourself, as best you can. Use Google or other sources as appropriate.
Understanding

• Try to retain:
  • The problem
  • The basic idea of the proposed solution
  • Your personal notes on the paper’s mathematics
  • Shortcomings of the proposed approach
Ask yourself

• What is the message you take away from this paper?

• Are you convinced that the paper attempted an important problem?
  • If your answer is NO, Justify it!

• Are you convinced that the paper proposed a viable solution?
Readings


• V. Bush, "As We May Think", Atlantic Monthly, July 1945
Group Discussions
CSE 118+218
Thursday’s Discussion Logistics

• 5 groups, 5 classrooms, each one with a different instructor
• 18-20 students per room (grad+ugrad, CSE 118+218)
CSE 118+218

Thursday’s Discussion Logistics

First discussion:
- Next week (W2)

Group Assignment:
- Wednesday of next week
CSE 118+218
Thursday’s Discussion: Inner/Outer Circles

• Called “Socratic Discussion”

• During 30 minutes, the inner circle will discuss the assigned readings.

• We will switch positions, the people on the outer circle will become the inner circle, and they will discuss the same reading selection.

• New discussion will drive newer, refreshed viewpoints and evidence.

• Each student is graded on individual performance and how he/she contributes to the whole class discussion.
CSE 118+218
Thursday’s Discussion: Objectives

Through consistent Inner-Outer Circle discussions, you are forced to direct your own learning. You decide which parts of the passage to discuss and what path the discussion will follow. In particular you will learn how to:

- Teach one another about what you find in your reading
- Take risks rather than rely on teacher validation
- Read and evaluate literature orally and on a complex level
- Involve yourself completely in the reading and listening process
- Practice finding and preparing meaningful passages from your text
- Learn how to take notes effectively from listening
CSE 118+218
Thursday’s Discussion: Inner/Outer Circles

- Inner circle (9-10 students) 30min discussion
  - Define topics of discussion: 4-5 topics defined by the group (not the instructor) to be put on the board and be discussed during the 30min discussion
  - Start from the paper topics and dive into personal experience, other readings, news, observations
  - Build on each other argument rather than starting a new one all the time
  - Use the topics on the board to transition into a new discussion, but always try to create a bridge
CSE 118+218
Thursday’s Discussion Logistics

• Outer circle (9-10 students) observation
  • Take notes on the arguments that have been discussed (so you won’t repeat them when it is your turn)
  • Take notes on the dynamics of the discussion: turn-taking, leaders, best arguments, best ideas, etc,
• Everyone on the outer circle will be assigned one specific point to look for
• One student in the outer circles will trace the dynamics of the discussion
CSE 118+218
Thursday’s Discussion Logistics
CSE 118+218
Thursday’s Discussion Logistics

• Debriefing
  • We will spend 10 minutes before switching groups (inner/outer) to discuss what happened and learn from it
## Participation Rubric for Group Discussion of Engineering Research Papers - Self Evaluation

<table>
<thead>
<tr>
<th>Masterful Participation</th>
<th>Competent Participation</th>
<th>Developing Participation</th>
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</thead>
<tbody>
<tr>
<td>communicates clearly using language of discipline</td>
<td>speaks clearly or uses language of discipline, but not both</td>
<td>simplistic, incoherent, or inaudible communication</td>
</tr>
<tr>
<td>communicates succinctly</td>
<td>speaks at length or laconically</td>
<td>runs on or speaks in fragments</td>
</tr>
<tr>
<td>stays on topic</td>
<td>digresses</td>
<td>raises irrelevant subjects</td>
</tr>
<tr>
<td>constructively builds on contributions of others</td>
<td>raively restates what others says or contradicts others without evidence</td>
<td>ignores what others say</td>
</tr>
<tr>
<td>brings others into conversation according to perceived level of participation or subject expertise</td>
<td>participates while leaving room in conversation for others</td>
<td>interrupts others, dominates conversation, or doesn't participate</td>
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<tr>
<td>consistent eye contact/gestures</td>
<td>some eye contact and gestures</td>
<td>looks down a lot, little gesture</td>
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<tr>
<td>contributions energize others</td>
<td>contributions are worked into conversation</td>
<td>contributions cannot be engaged</td>
</tr>
<tr>
<td>uses humor in on-topic way</td>
<td>uses humor</td>
<td>does not use humor</td>
</tr>
<tr>
<td>starts new avenues of inquiry after previous topic has run its course</td>
<td>abruptly changes subject</td>
<td>always lets others take the lead</td>
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<tr>
<td>asks valuable, sincere questions</td>
<td>asks questions</td>
<td>asks insincere questions, or doesn't ask questions</td>
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<tr>
<td>introduces creative or provocative ideas</td>
<td>introduces ideas</td>
<td>does not introduce ideas</td>
</tr>
<tr>
<td>makes salient points, good answers</td>
<td>makes points or answers</td>
<td>does not make points or offer answers</td>
</tr>
<tr>
<td>draws own conclusions by applying a rationale supported by evidence or logical reference</td>
<td>draws conclusions supported by only iconic reference to paper</td>
<td>offers opinions or accepts conclusions of paper as facts</td>
</tr>
<tr>
<td>draws on content in other papers, specific personal experience, or details of current events</td>
<td>makes vague or iconic reference to other papers, personal experiences, or current events</td>
<td>does not draw on outside sources, engages the paper only on its own terms</td>
</tr>
<tr>
<td>inclusively summarizes paper or points of others in own words</td>
<td>summarizes clumsily</td>
<td>repeats what others say or incorrectly summarizes</td>
</tr>
</tbody>
</table>

Notable questions, points, ideas, team work (see back for more)

Week:  
Topic:  
Date:  
Student:  

<table>
<thead>
<tr>
<th>Best Questions</th>
<th>Best Points</th>
<th>Best Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best things that happened</td>
<td>Things most needing improvement</td>
<td>Best Deductive Thinking (use of logic or rationale supported by evidence)</td>
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</tbody>
</table>
Research Projects
Research Projects
Teams and Ideas

- Define a team project (3 undergrads, 3 grads) to explore ubiquitous computing
  - Usefulness, scalability, cost, how, effects…
  - Not necessarily big, but insightful or useful
- Come up with own idea or build on existing work
- Goal: having a working prototype by the end of the quarter
  - something that you can demo!
- The best project will participate to the CHI or Ubicomp Conferences
Forming Teams

• Start NOW to talk with your peers about common interests and cool ideas

• Groups can be heterogeneous, not everybody needs to do hardcore programming, but groups need also designers, managers, etc. Some of you are from outside CSE

• Use Piazza, remember that groups will have to be across CSE 118 and CSE 218

• If you have a good idea, send me a short description and perhaps a sketch I will present it next week during class

• Look on the web for what other people already did (as inspiration only: you should do something new)
Meet and Greet