Today

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

http://piazza.com/ucsd/fall2018/cse118cse218
Ubicomp ... continued
Interacting with Devices
SketchPad
Ivan Sutherland - 1963
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.
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

Paperless Office?

“I’ve finally achieved a paperless office.”
Ubiquitous Computing

- A less-traveled path I call the invisible; its highest ideal is to make a computer so imbedded, so fitting, so natural, that we use it without even thinking about it.

- Provide hundreds of wireless computing devices per person per office, of all scales ... It is invisible, everywhere computing that does
Ubiquitous Computing

- Invisible Everywhere Computing
  - invisible:
    - tiny, embedded, attachable…
  - everywhere:
    - wireless, dynamically configurable, remote access, adapting…
- aka Pervasive Computing
Ubicomp is Situated Computing

- Makes use of simple shared context
  - space
  - time
  - proximity
  - affordances
Ubicomp at Xerox PARC

Xerox Parc, 1991

https://www.youtube.com/watch?v=blw9_cob_zw
Experiment at PARC – TAB
Experiment at PARC - PAD
Experiment at PARC – BOARD
Digital Desk

Pierre Wellner, Xerox EuroParc 1992
Tangible Computing: The Marble Answering Machine

- Incoming voice messages are physically instantiated as marbles.
- The user can grasp the message (marble) and drop it into an indentation in the machine to play the message.
- The user can also place the marble onto an augmented telephone, thus dialing the caller automatically.
Tangible Computing: The Marble Answering Machine

SIMON & IMOGEN'S HOUSE

© Durrell Bichop 1992
Ambient and Wearable Sensors

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

Accelometer

Gyroscope

EEG Reader

Tattooed (MC10 Sensor)
Behavior/Activity Tracking
Smart Homes and Automation
CSE 118 Fall 2018
Organization, Group Discussions, Projects and Teams
# Schedule 1/4

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>TOPIC</th>
<th>READINGS</th>
<th>ASSIGNMENTS</th>
<th>NOTES</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Tue Oct 02</td>
<td>Introduction to the Course and Introduction to Ubicomp.</td>
<td>1. &quot;How to Read an Engineering Paper&quot;</td>
<td>CSE 118&lt;br&gt;• 11a-12:20p in CSE 2154 &lt;br&gt;CSE 218&lt;br&gt;• 12:30p-1:30p in CSE 2154</td>
<td>To download papers free of charge you need to be on UCSD's network (either on campus or using a VPN)</td>
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<td></td>
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<td>[slides 118] • [slides 218]</td>
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<td>CSE 118&lt;br&gt;• 11a-12:20p in CSE 2154 &lt;br&gt;CSE 218&lt;br&gt;• 2p-3:20p in CSE 2154</td>
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<tr>
<td>1</td>
<td>Thu Oct 04</td>
<td>Ubicomp Papers</td>
<td>1. M. Weiser, &quot;The Computer for the 21st Century&quot;. Scientific American, pp. 66-75, September 1991</td>
<td>CSE 118&lt;br&gt;• 11a-12:20p in CSE 2154 &lt;br&gt;CSE 218&lt;br&gt;• 2p-3:20p in CSE 2154</td>
<td>To download papers free of charge you need to be on UCSD's network (either on campus or using a VPN)</td>
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<td></td>
<td></td>
<td>Group Discussions, Projects, Policies, and Team Formation</td>
<td>2. V. Bush, &quot;As We May Think&quot;. Atlantic Monthly, July 1945</td>
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<td>2</td>
<td>Tue Oct 09</td>
<td>Depth Cameras and Computer Vision</td>
<td>1. TBD</td>
<td>CSE 118&lt;br&gt;• In-class Mini-Quiz (Week 1) &lt;br&gt;CSE 218&lt;br&gt;• Submit a 1-page essay (Week 1)</td>
<td>CSE 218&lt;br&gt;• Deadline 2pm. Notice: need to declare your teams on Piazza by Tuesday, October 09 at 11:59 pm!</td>
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<td>2. TBD</td>
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<td>2</td>
<td>Thu Oct 11</td>
<td>Group Discussions: (a) &quot;Ubiquitous Computing&quot; and (b) &quot;Depth Cameras and Computer Vision&quot;</td>
<td>4 papers from week 1 and 2</td>
<td>CSE 118&lt;br&gt;• Submit Annotations for paper #1 (Week 2) &lt;br&gt;CSE 218&lt;br&gt;• Submit Reading Summary</td>
<td>CSE 118&lt;br&gt;• Deadline 2pm. Paper Discussion in the assigned discussion rooms (see here)</td>
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<td>CSE 118 and CSE 218&lt;br&gt;• Submit discussion self-evaluation &lt;br&gt;Deadline 11:59pm.</td>
<td>CSE 118&lt;br&gt;• Submit Prototyping Report #1 &lt;br&gt;Deadline: Sunday Oct 14, 11:59pm.</td>
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<td>3</td>
<td>Tue Oct 16</td>
<td>Augmented, Virtual and Mixed Reality</td>
<td>1. TBD</td>
<td>CSE 118&lt;br&gt;• In-class Mini-Quiz (Week 2) &lt;br&gt;CSE 218&lt;br&gt;• Submit a 1-page essay (Week 2)</td>
<td>CSE 218&lt;br&gt;• Deadline 2pm.</td>
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<td>Date</td>
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<td>Group Discussions</td>
<td>Paper Discussion in the assigned discussion rooms [see here]</td>
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<td>3</td>
<td>Thu Oct 19</td>
<td>Group Discussions: “Augmented, Virtual and Mixed Reality”</td>
<td>CSE 118: Submit Annotations for paper 1 (week 3) Submit Reading Summary</td>
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<td>CSE 118 and CSE 218: Submit discussion self-evaluation</td>
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<td>CSE 118 and CSE 218: Submit Prototyping Report #2</td>
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<td><strong>Deadline: Sunday Oct 21, 11:50pm.</strong></td>
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<td>4</td>
<td>Tue Oct 23</td>
<td>Physiological Sensors Papers</td>
<td>Physiological Sensors Papers 1. TBD 2. TBD</td>
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<td>CSE 118: In-class mini-quiz (Week 3) No Readings</td>
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<td>CSE 218: Submit a 1-page essay (Week 3)</td>
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<td>CSE 118: Submit Annotations for paper 1 (week 3) Submit Reading Summary</td>
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<td><strong>Deadline: Sunday Oct 28, 11:50pm.</strong></td>
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<td>5</td>
<td>Tue Oct 30</td>
<td>Programming in Unity Papers</td>
<td>Programming in Unity Papers 1. TBD 2. TBD</td>
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<td>CSE 118: In-class mini-quiz (Week 4) No Readings</td>
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<td>CSE 218: Submit a 1-page essay (Week 4)</td>
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<td>CSE 118: Submit Annotations for paper #1 (week 5) Submit Reading Summary</td>
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<td><strong>Deadline 11:50pm</strong></td>
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<td>5</td>
<td>Thu Nov 1</td>
<td>Group Discussions: “Programming in Unity”</td>
<td>CSE 118 and CSE 218: Submit Prototyping Report #4</td>
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<td>6 Nov 06</td>
<td>Teams and Projects Reports #1</td>
<td>CSE 218: Submit a 1-page essay (Week 5)</td>
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<td><strong>Deadline: 2pm</strong></td>
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<td>7 Nov 08</td>
<td>Group Discussion: “Design of Ubicomp Systems”</td>
<td>CSE 118: Submit Reading Summary</td>
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<td>No annotation submission</td>
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<td>7 Nov 13</td>
<td>Teams and Projects Reports #2</td>
<td>CSE 18: In-class Mini-Quiz (Week 6)</td>
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<td><strong>Deadline: 2pm</strong></td>
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<td>CSE 218: Submit a 1-page essay (Week 6)</td>
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<td><strong>Deadline: 2pm</strong></td>
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<tr>
<td>8 Nov 15</td>
<td>Group Discussion: “Software Engineering in Ubicomp”</td>
<td>CSE 118: Submit Reading Summary</td>
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<td><strong>Deadline: 2pm</strong></td>
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<td>8 Nov 20</td>
<td>Teams and Projects Reports #3</td>
<td>CSE 118: In-class Mini-Quiz (Week 7)</td>
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<td>CSE 218: Submit a 1-page essay (Week 7)</td>
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<td><strong>Deadline: 2pm</strong></td>
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<td>Ethics and Privacy Papers</td>
<td>CSE 118+218 Teams: Submit Development Report #3</td>
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<td><strong>Deadline: Sunday Nov 25, 11.59pm.</strong></td>
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<td>8 Nov 22</td>
<td>No class: Thanksgiving</td>
<td>No Assignments</td>
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## Schedule 4/4

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>9 Tue Nov 27</td>
<td>Teams and Projects Reports #4</td>
<td>No Readings</td>
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<tr>
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<td>CSE 118</td>
<td>- Submit Reading Summary</td>
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<td>- In-class Mini-Quiz (Week 8)</td>
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<td>CSE 218</td>
<td>- Submit a 1-page essay (Week 8)</td>
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<td><em><strong>Deadline 2pm</strong></em></td>
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<td>CSE 118+218 Teams</td>
<td>- Submit Development Report #4</td>
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<td><em><strong>Deadline: Sunday Dec 02, 11:59pm.</strong></em></td>
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<tr>
<td>9 Thu Nov 29</td>
<td>Group Discussion: “Ethics and Privacy”</td>
<td>No Assignments</td>
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<td>Paper Discussion in the assigned discussion rooms (see here)</td>
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<tr>
<td>10 Tue Dec 4</td>
<td>Teams and Projects Reports #5</td>
<td>No Assignments</td>
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<tr>
<td>10 Thu Dec 6</td>
<td>Teams/Coaches Collaborative</td>
<td>No Assignments</td>
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<td>Teams Discussions in the room of their coach (see the main page here)</td>
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<tr>
<td>Finals</td>
<td>Final Demos</td>
<td>No Assignments</td>
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<td>2-5pm in CSE 1202. (Setup 1-2pm, Tear down 5-6pm)</td>
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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

Discussion Groups

CSE 118+218 Discussion Groups

On Thursday afternoon (12:30-1:50pm) students will be divided into 5 discussion groups (see below). Note: Students arriving more than 10 minutes late will NOT receive participation credit. We will use the Socratic Discussion method to learn how to critique research literature in Ubicomp. In every group, students will be randomly assigned to the inner or outer circles, but we will ensure that every student will have the same amount of inner and outer circle participation and will be placed in both circles every week. Assignments will not be disclosed until the start of the discussion.

All students (inner, outer) will propose topics to cover in the discussion, and the instructor in the room will manage the discussion. Every student in the inner group will be expected to participate actively in the discussion. Students in the outer circle will have to take note of the overall discussion using the discussion rubric. The outcome of the discussion sections will be summarized at the beginning of the following Tuesday’s lecture.

We also ask to self-evaluate your discussion based on the discussion rubric. Please submit the online form by the end of the day (Thursday 11:30pm) here: TBD

Discussion Group A - CSE 2154 (Radir Weibel):
Use this Google doc for pre-discussion notes and ideas.

Discussion Group B - CSE 2109 (Danilo Gasques):
Use this Google doc for pre-discussion notes and ideas.

Discussion Group C - CSE 2217 (Scott Lim):
Use this Google doc for pre-discussion notes and ideas.

Discussion Group D - CSE 3217 (Yuangyuansheng):
Use this Google doc for pre-discussion notes and ideas.

Discussion Group E - CSE 4217 (Janet Johnson):
Use this Google doc for pre-discussion notes and ideas.

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.
- 0 points if no show or do not participate, 1 point if participates (+1 bonus point for awesomeness)
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 happen 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>
</tr>
</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>naively restates what others say 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>
</tr>
<tr>
<td>consistent eye contact/gestures</td>
<td>some eye contact and gestures</td>
<td>looks down a lot, little gesture</td>
</tr>
<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>
</tr>
<tr>
<td>asks valuable, sincere questions</td>
<td>asks questions</td>
<td>asks insincere questions, or doesn’t ask questions</td>
</tr>
<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 inference</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>incisively 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>

- Engaged people problem
- Engaged technical problem
- Engaged proposed solution
- Engaged evaluation
- Engaged future directions
- Engaged conclusion / take-aways
- Engaged meta topics

**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>
</tr>
</tbody>
</table>
Research Projects
Research Projects
Teams and Ideas

• Define a team project (2 undergrads, 2 grads) to explore ubiquitous computing

• 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, Ubicomp or DIS Conferences
Forming Teams

- Start NOW to talk with your peers about common interests and cool ideas
- Deadline to create teams is Tuesday of next week (10/9)
  - Submit your teams to the instructors on piazza detailing Team Name, Team Members (names and PIDs), and affiliation (CSE 118 or CSE 218)
- 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