# Special Topics

**Collaboration and designing interfaces**

- Groupware and CSCW
- Categories of interaction

- **Designing for small screen displays**

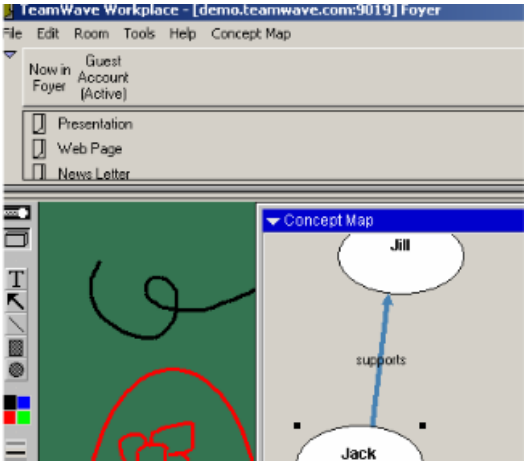


# Part I: Designing Software And Technology To Support Group Processes

- **Groupware**
- **CSCW**
- **Categories of Interaction**

# Groupware

- **Software that supports group processes**




**The TeamWave Workplace © Sonexis Inc.**

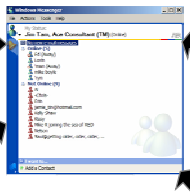

**Instant messenger © Microsoft**



# Computer-Supported Cooperative Work (CSCW)

- **The theoretical principles for designing and evaluating groupware**
- **Examine how groups work and how technology can be used to facilitate this work**

Sociology



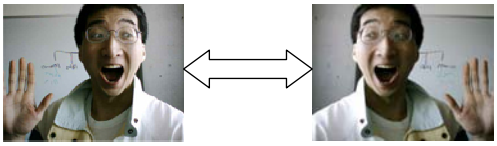
Anthropology

Social Psychology

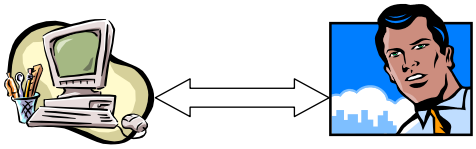
Many other sources

## Focus Of Groupware And CSCW

**Facilitating human-human interaction**



**…in contrast to HCI which is about facilitating human-computer interaction**





## Categories Of Interactions: Real World

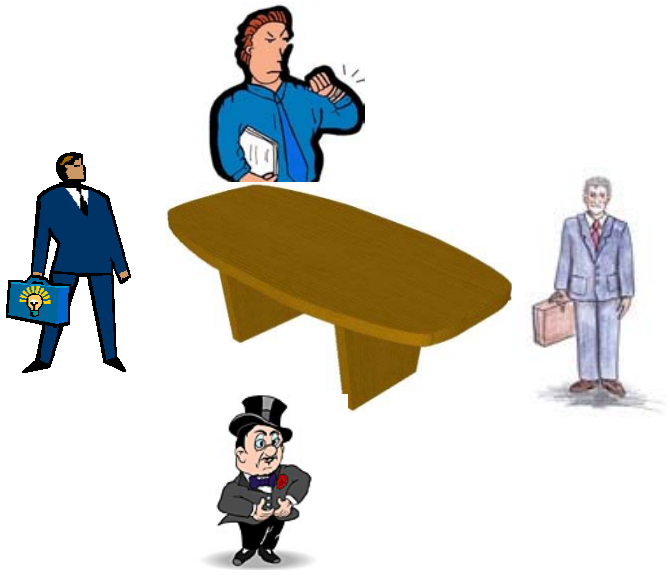
| | **Same time** | **Different times** |
|---|---|---|
| **Same place** | Traditional classroom setting | Refrigerator magnets, sticky notes |
| **Different place** | Telephone | Traditional mail system |

## Categories Of Interactions: Computer World[1]

| | Same time | Different times |
|---|---|---|
| **Same place** | Wall displays,<br>Video games (non-networked) | Group calendars |
| **Different place** | Instant messaging<br>Online communities<br>Video/Audio conferencing | Email, Newsgroups, Blogs |

James Tam

## Same Place, Same Time



James Tam

## Same Place, Same Time (2)

**Shared display with a single presenter**

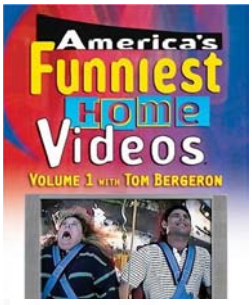
- e.g., presentation tools: PowerPoint

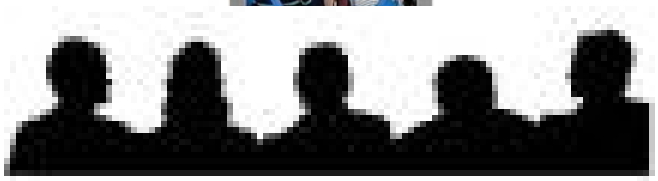


## Same Time, Same Place (3)

**Audience response units**

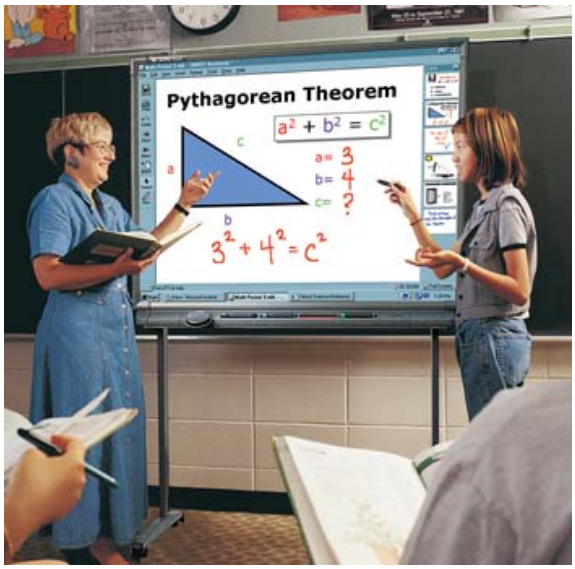
- e.g., Votes in government forums, talk and game shows



America's Funniest Home Videos: www.abc.com

# Same Place, Same Time (4)

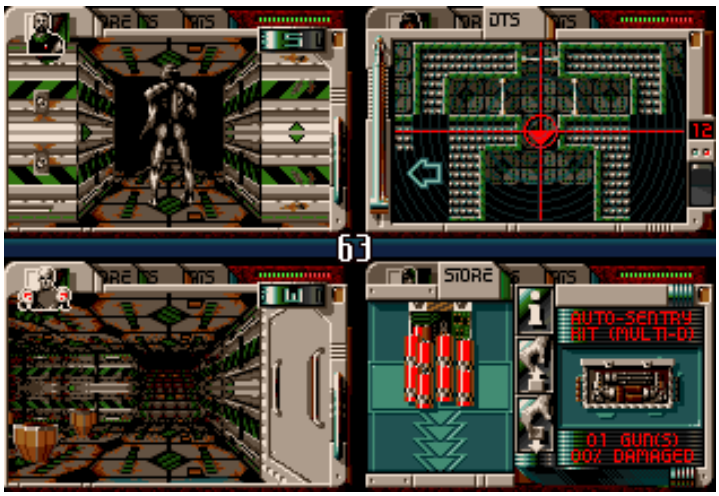



www.smarttech.com

James Tam

# Same Place, Same Time (5)

**Single display groupware: separate up the space**




Hired Guns © 1993 Psygnosis (Sony)

James Tam

# Same Place, Same Time (7)

**Single display groupware**

Multiple collaborators

Multiple input devices

One display device

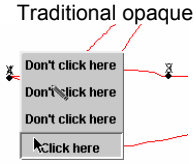


# Same Place, Same Time (8)

**Single display groupware: Having all collaborators working in the same space may result in issues that don't appear with a single user system.**

- e.g., menu selection

Traditional opaque menu




Translucent menu

## Same Place, Same Time (9)

- **Electronic meeting rooms**
- **Technology can be used in business meetings for:**
  - Brain storming
  - Voting on and ranking issues.

www.groupsystems.com



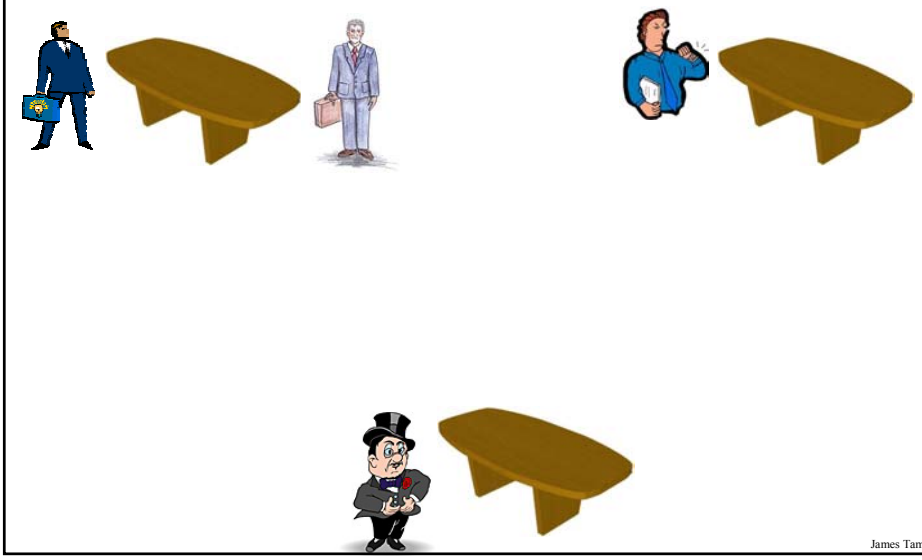
## Same Place, Same Time (10)

**Some of the benefits of employing electronic meeting systems (Nunamaker et al. 1991):**

- Parallel communication can occur
- Anonymity of contributions
- The contributions of participants produce a permanent record of what occurred.
- The process structure provided by the approach helps focus the group on key issues and discourages digressions and unproductive behaviors.

Nunamaker, J.F., Dennis, A. R., Valacich, J.S., Douglas R. and George, J.F. *Electronic Meeting Systems to Support Group Work*. Communications of the ACM, 34(7) (July 1991), pp. 40 – 61.

# Different Place, Same Time



James Tam

# Different Place, Same Time (2)

Ultima Online © Origin/EA

James Tam

## Different Place, Same Time (3)

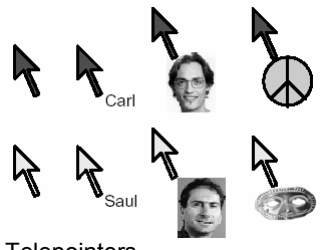
**Some the challenges involve awareness of the environment and other people**

- Who is around?
- What are they doing?
- Where are they?

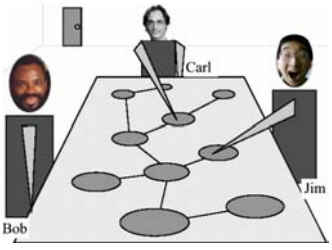


## Different Place, Same Time (4)

**Who is around?**




Telepointers

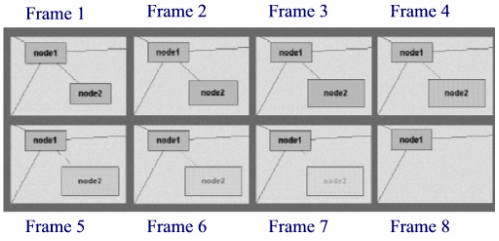



Avatars

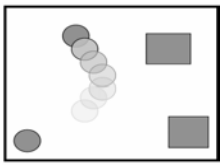
Images from Gutwin (1997) *Workspace Awareness in Real-Time Distributed Groupware.* Ph.D. Thesis, Department of Computer Science, University of Calgary, Calgary, Alberta, Canada. December.

# Different Place, Same Time (5)

- **What are they doing?**
  - In the virtual computer work, small quick actions may be easily missed.
  - Typical groupware support:
    - Provide information about intermediate states rather than just the end result.
    - Exaggerate the representation of physical events.




"Supernova" effect for a deletion



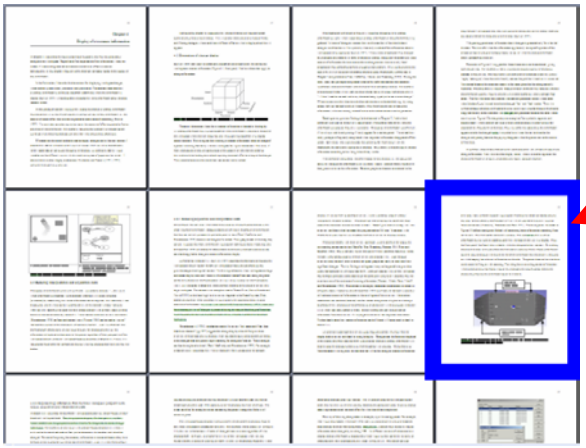
Leaving a trail for a movement

Images from Gutwin (1997) *Workspace Awareness in Real-Time Distributed Groupware*. Ph.D. Thesis, Department of Computer Science, University of Calgary, Calgary, Alberta, Canada. December.

James Tam

# Different Place, Same Time (6)

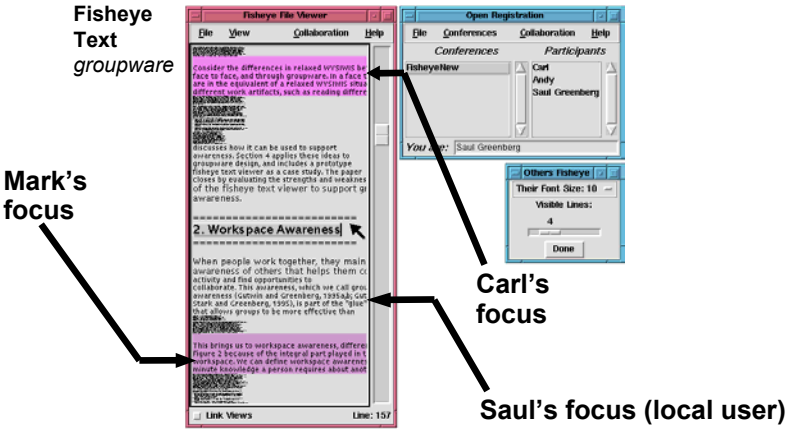
- **Where is everyone?**
  - This issue was easily handled with the traditional WYSIWIS systems – everyone has to be in the same location.




James Tam

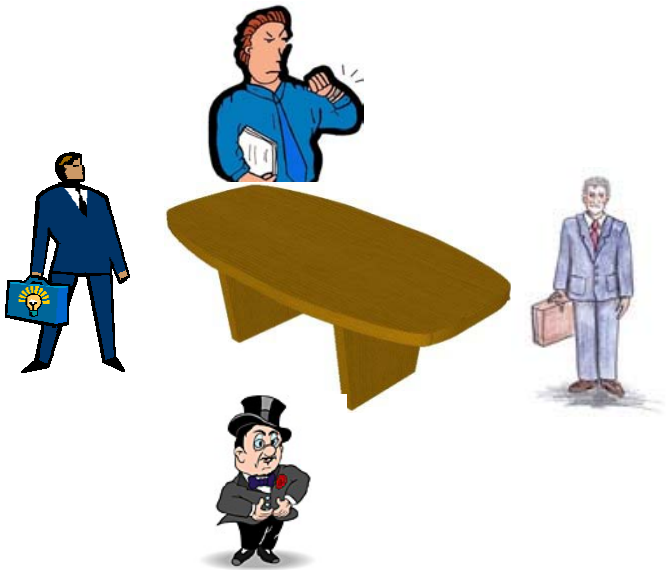
# Different Place, Same Time (7)

- **Where is everyone?**
  - This is more of a challenge when participant's view of the workspace can differ (e.g., they can be in different locations).




James Tam

# Same Place, Different Time



James Tam

## Same Place, Different Time (2)

**Some issues:**

- The accumulation of information over time may result in the need for some sort of structure i.e., simply accumulating information about everything is typically not a solution.

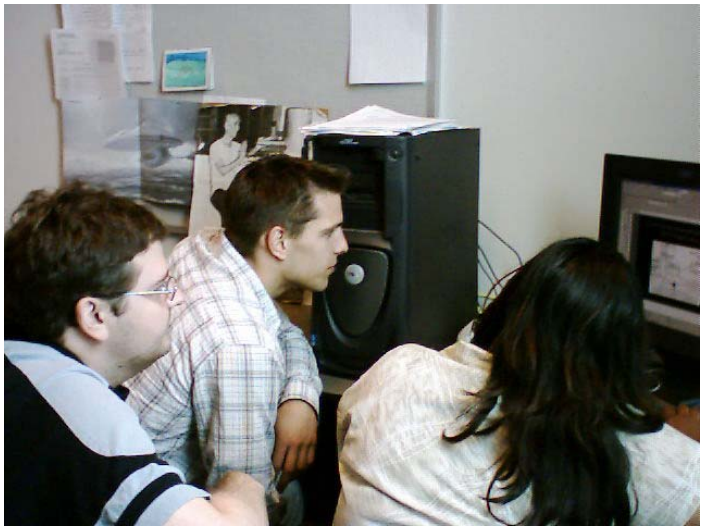


## Same Place, Different Time (3)

**A group of people are working together on a project**

## Same Place, Different Time (4)

**While one person is away, the others continue working**



James Tam

## Same Place, Different Time (5)

**The absent person comes back**

James Tam

# Same Place, Different Time (6)

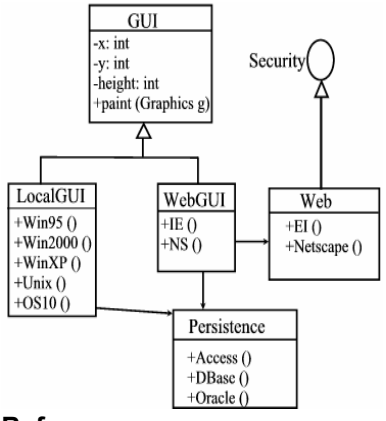
**Now he's left trying to figure out what's different**

Wav file from the Simpson © Fox

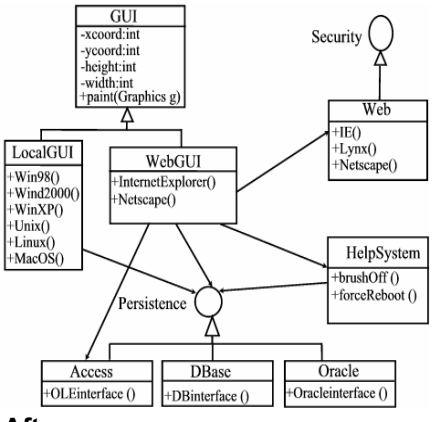


# Same Place, Different Time (7)

**Keeping Up With Changes Is Hard!**



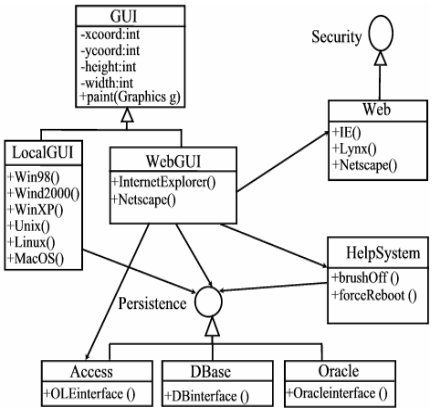

**Before**




**After**

# Same Place, Different Time (8)

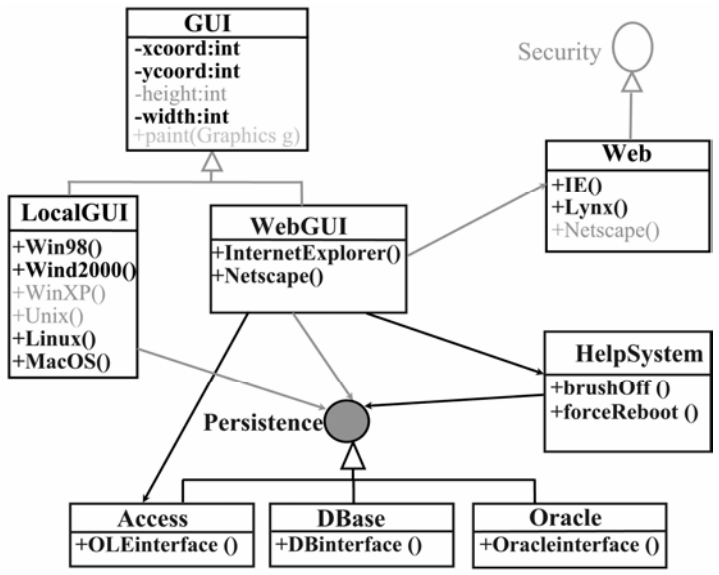
**Keeping Up With Changes Is Hard!**



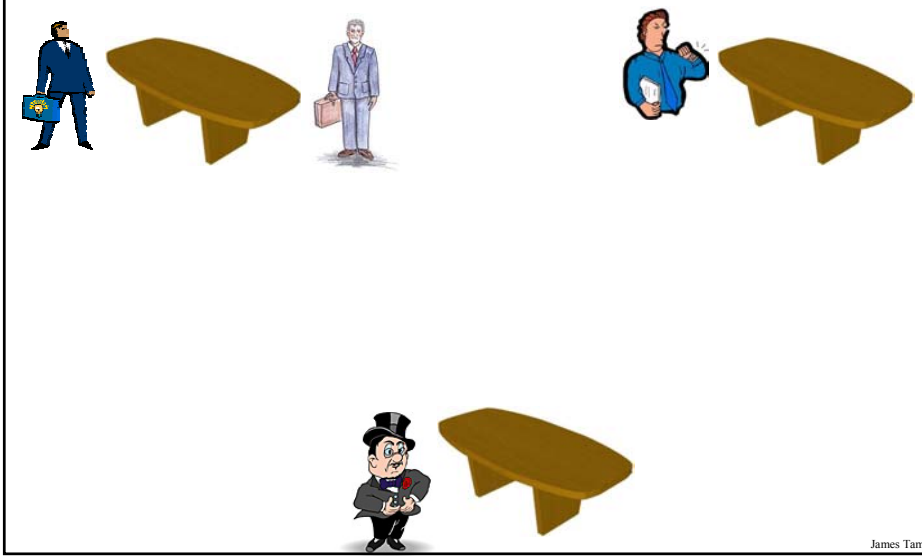

**After**



# Same Place, Different Time (9)



## Different Place, Different Time





## Different Place, Different Time (2)

- **The challenges of tracking changes may be even more daunting (i.e., face-to-face communication may not be an option in this case).**
- **Options vary from sparse forms of communication (e.g., email) to online communities.**

## Different Time, Different Place (3)

- **Newsgroups**
- **Listservers**
- **Discussion boards**
- **Web-logs (blogs)**
- **Wikis**
- **Online communities**



## Why Evaluating Groupware Systems Is Difficult

**Existing techniques used to evaluate single user systems are difficult to apply to groupware**

- Lab observation and studies
- Field studies
- Inspection techniques (e.g., usability heuristics)

**No agreed upon measures for success**

- e.g., Email: success or failure?

# Part II: Designing For Small Screen Displays

- **Issues associated with designing menus for small screens**
- **Case study: evaluating a small screen device**



# Small Screen Displays

**Some issues:**

- Extremely limited display area/resolution
- Frequent interruptions and distractions may occur during use
- Device may be used almost anywhere (makes evaluation more challenging)


Nokia 3205i: www.nokia.com

## Menus For Small Screen Displays

- **Representation of information: some visualizations and methods of interaction may not be possible.**
- **Less elaborate representations may have to be employed:**
  - Iconic representations
  - Text



## Iconic Representations

- **Small icons**
  - It's difficult to design an clearly recognizable icon within a very limited space.
  - Typically requires a text description.
  - Rarely used.
- **Large icons**
  - With increased display space allotted they have been used successfully in certain applications.
  - Once the mapping is learned then they can be easily recognized.

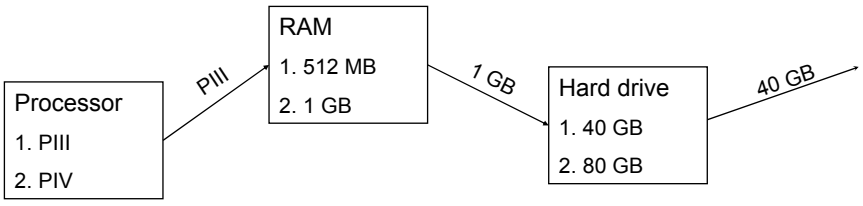
# Text

- **Requires concise wording**
  - Sometimes every character counts



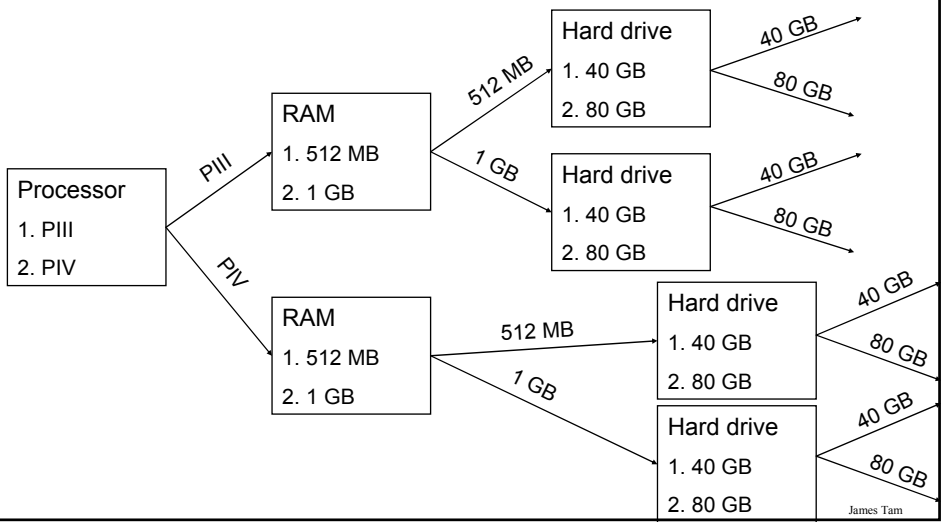
# The Smaller The Screen The More Temporal Is The Design

- **Example one: a low resolution display only allows for a limited number of options to be displayed.**



# The Smaller The Screen The More Temporal Is The Design

- **Example one: a low resolution display only allows for a limited number of options to be displayed.**




James Tam

# The Smaller The Screen The More Temporal Is The Design (2)

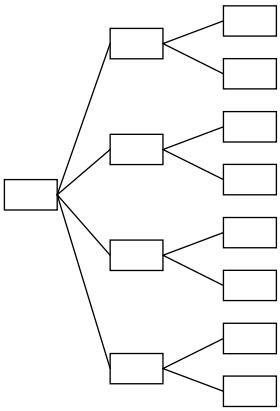
- **Example two: a higher resolution display with a larger number options available reduces the need to remember previous menu selections.**

Options

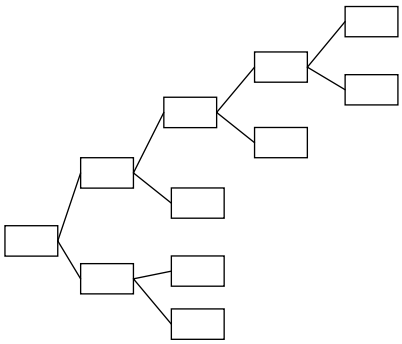
1. PIII, 512 MB, 40 GB
2. PIII, 512 MB, 80 GB
3. PIII, 1 GB, 40 GB
4. PIII, 1 GB, 80 GB
5. PIV, 512 MB, 40 GB
6. PIV, 512 MB, 80 GB
7. PIV, 1 GB, 40 GB
8. PIV, 1 GB, 80 GB

James Tam

## To Avoid Overly Temporal Designs, Consider Broader Rather Than Deeper Hierarchies



Vs.





## Ordering Of Lists

**If users tend to use a small number of features a majority of the time then consider ordering list by frequency or use over an alphabetical ordering.**

## Provide Navigational Shortcuts

1. **To the main menu**
2. **To the previous menu**



## Less Can Be More

**Limit features to the most essential**

**'Bury' less commonly used features in less accessible areas:**

- "Advanced functions"
- Select "more" features


Original design


Revised design

Images from "Designing the User Interface" (4th Edition) by Ben Shneiderman and Catherine Plaisant

# Soft Vs. Hard Keys

## Hard keys

- Are tied to fixed functions, commonly used and important functions e.g., disconnect, calendar, address book.


Image from "Designing the User Interface" (4th Edition) by Ben Shneiderman and Catherine Plaisant



# Soft Vs. Hard Keys (2)

## Soft keys

- Are located near the screen.
- Their exact function changes depending upon the context


Images from "Designing the User Interface" (4th Edition) by Ben Shneiderman and Catherine Plaisant

## Balance Consistency Vs. Navigation

**While consistency of menus is important, this should be balanced by the need to distinguish between menu types.**



## Case Study: Evaluating A Small Mobile Device

A usability study was conducted by 'The GIST' (Glasgow Interactive Systems) to evaluate the gestural (touch) and audio based interface for the Windows Media Player running on an Hewlett-Packard iPAQ Pocket PC.

## Study Methodology

**To simulate everyday use participants wore the iPAD with either:**

1. Media Player
2. The experimental 'TouchPlayer'

**They were to complete a series of pre-created tasks asked they walked e.g., "Find the song Wonderwall".**



## Measures Of Performance

1. **Time to complete a single task**
2. **Time to complete the entire series of tasks**
3. **The number of errors**
4. **Mental workload[1]**
5. **Percentage of normal walking speed**

1 Mental Workload was measure using the TLX (Task Load Index) questionnaire.

## You Now Know

- **What is groupware and CSCW and how they are related.**
- **What are the different categories of interaction and some of the issues associated with each category.**
- **Some of the issues associated with developing for a small screen display such as menus on a mobile device.**
- **Evaluating groupware and small screen displays may be more difficult than evaluating standard software so standard evaluation techniques may need to be modified.**