

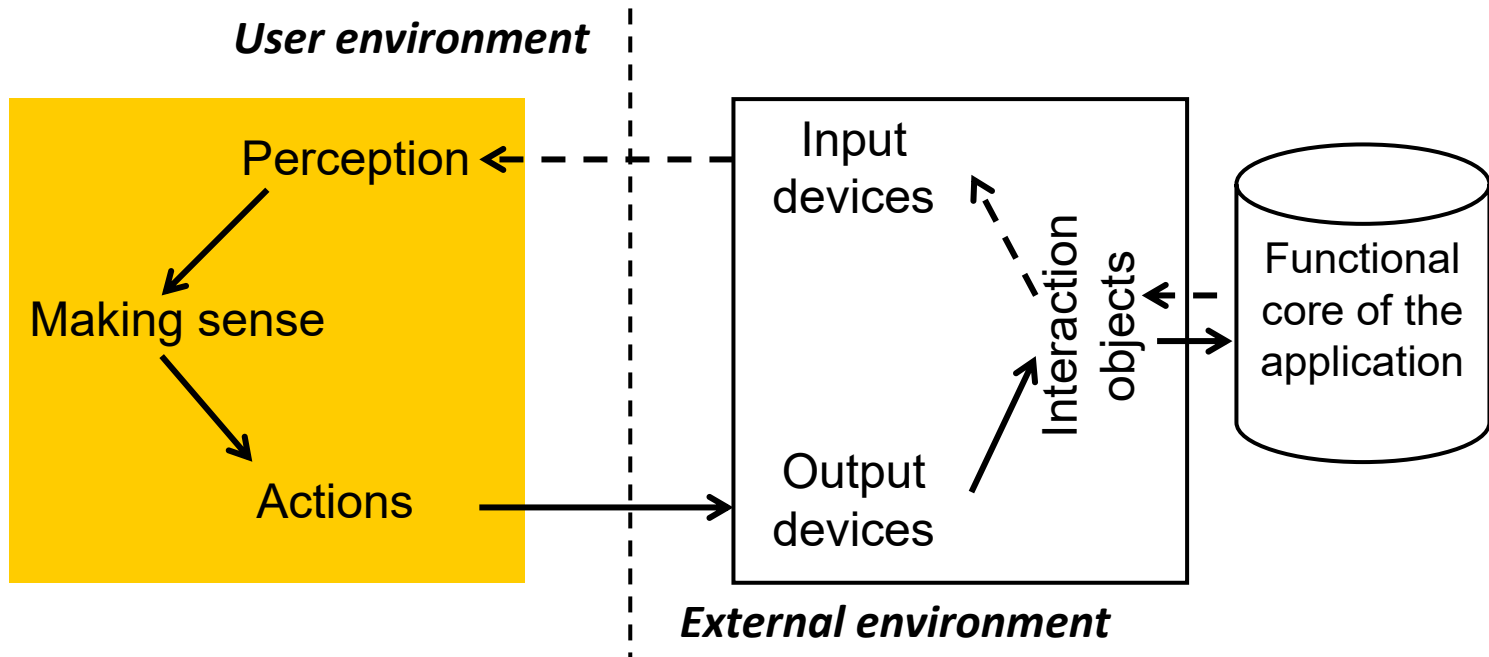


Human Computer Interaction

Demosthenes Akoumianakis

Interaction cycle

- ❖ Assuming that the external environment is a computerized application

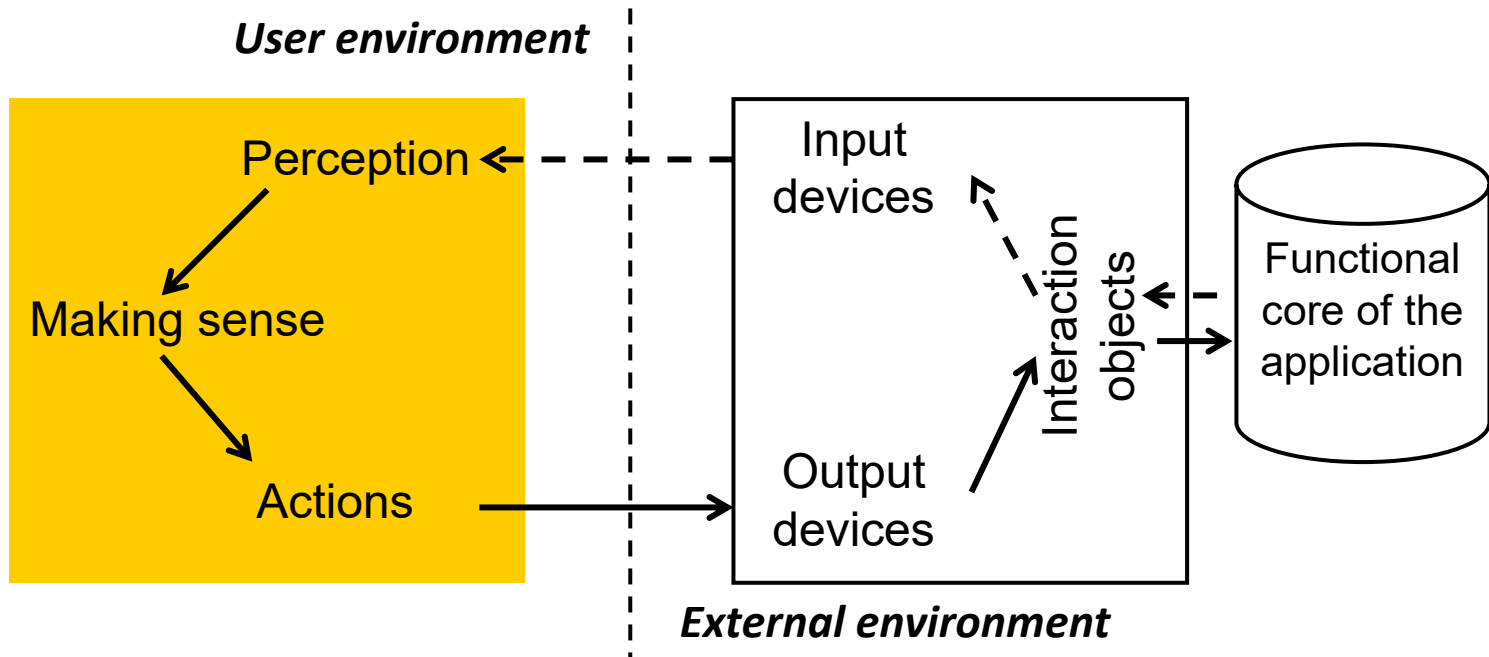


Part A – Outline

❖ Objectives

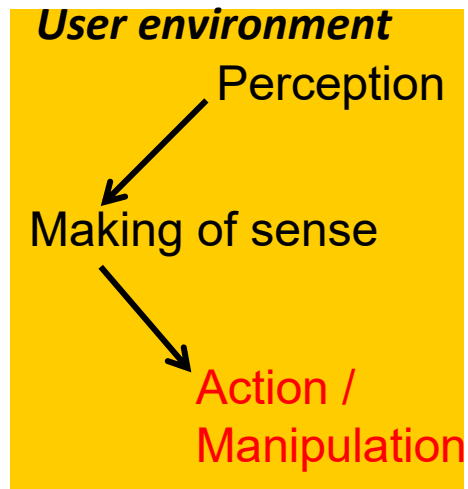
- Introducing basic concepts and challenges regarding input, event programming and user interface structure

Interaction cycle explained



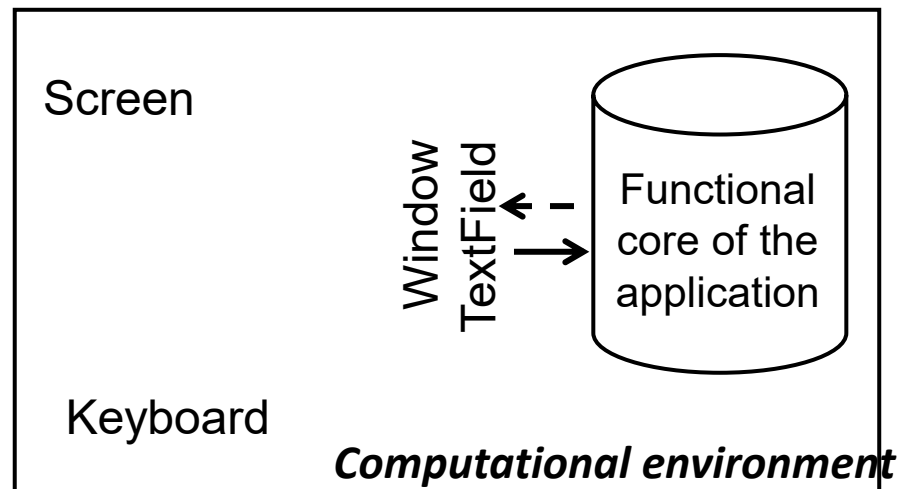
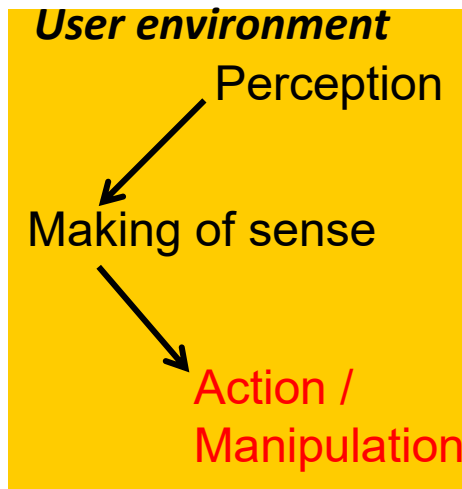
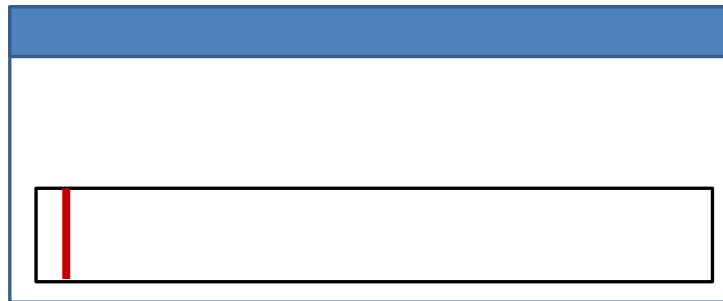
Interaction cycle explained

User environment



Interaction cycle explained

Computational environment

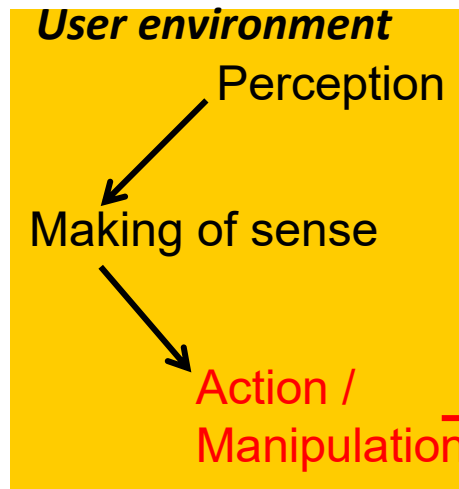
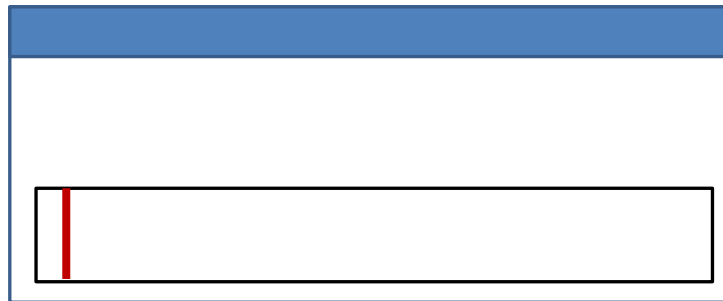


Interaction cycle explained

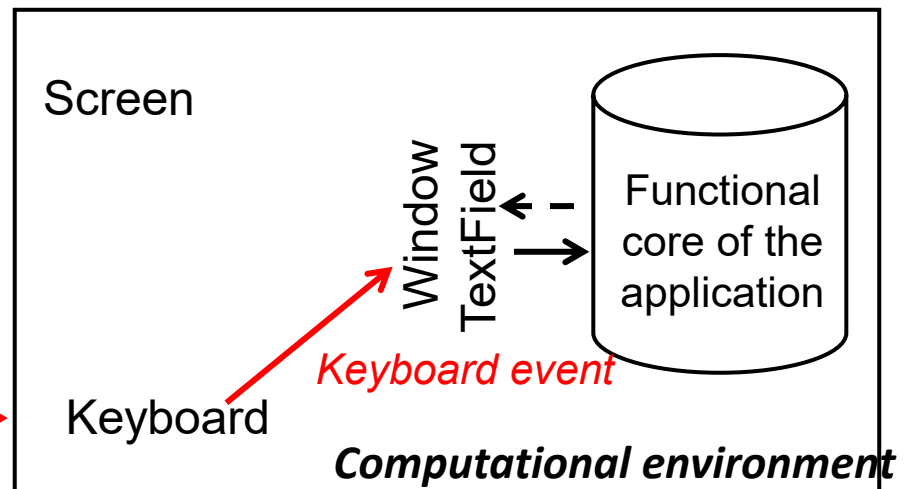
User action / manipulation

Manipulation

Keyboard event

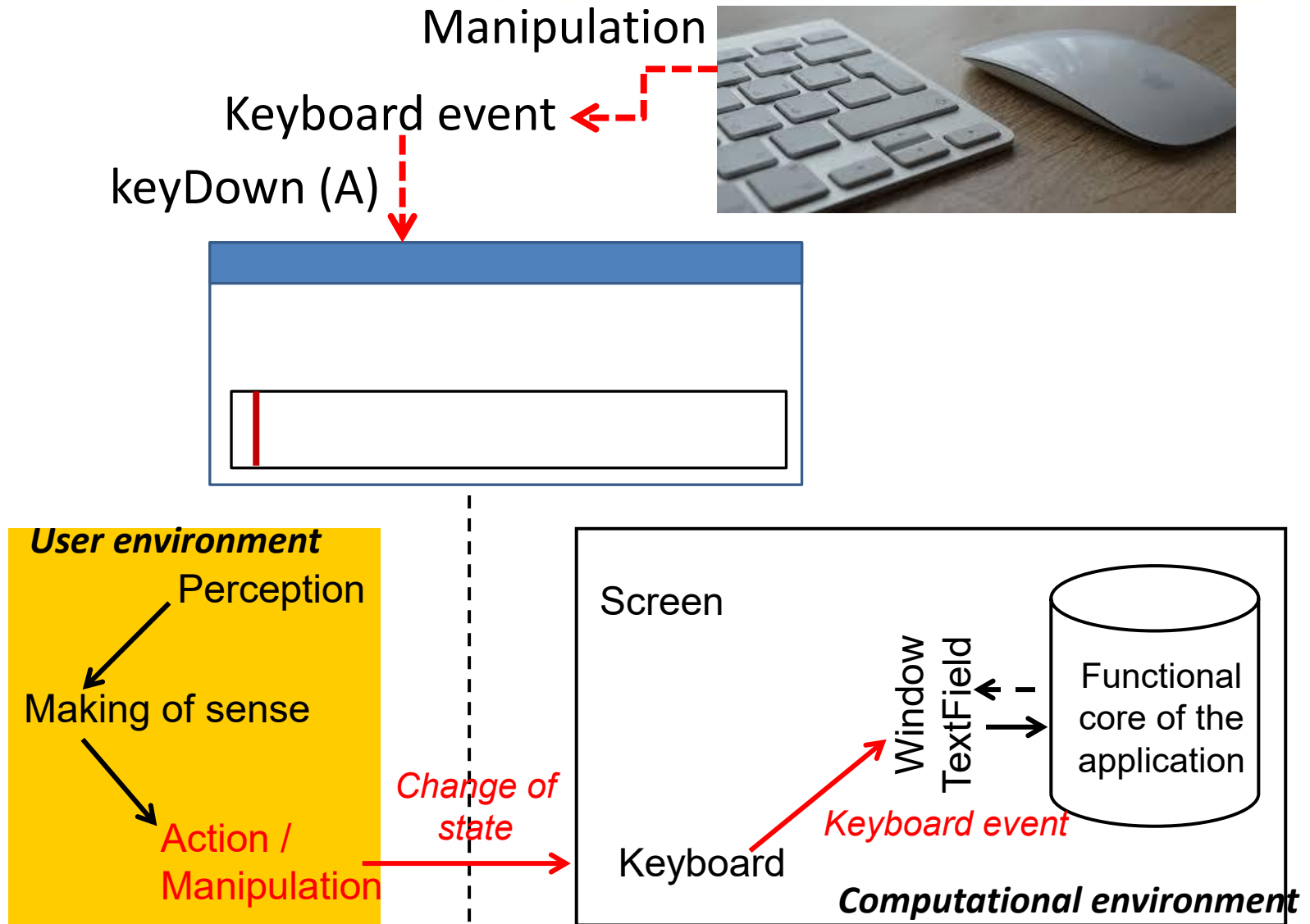


Change of state



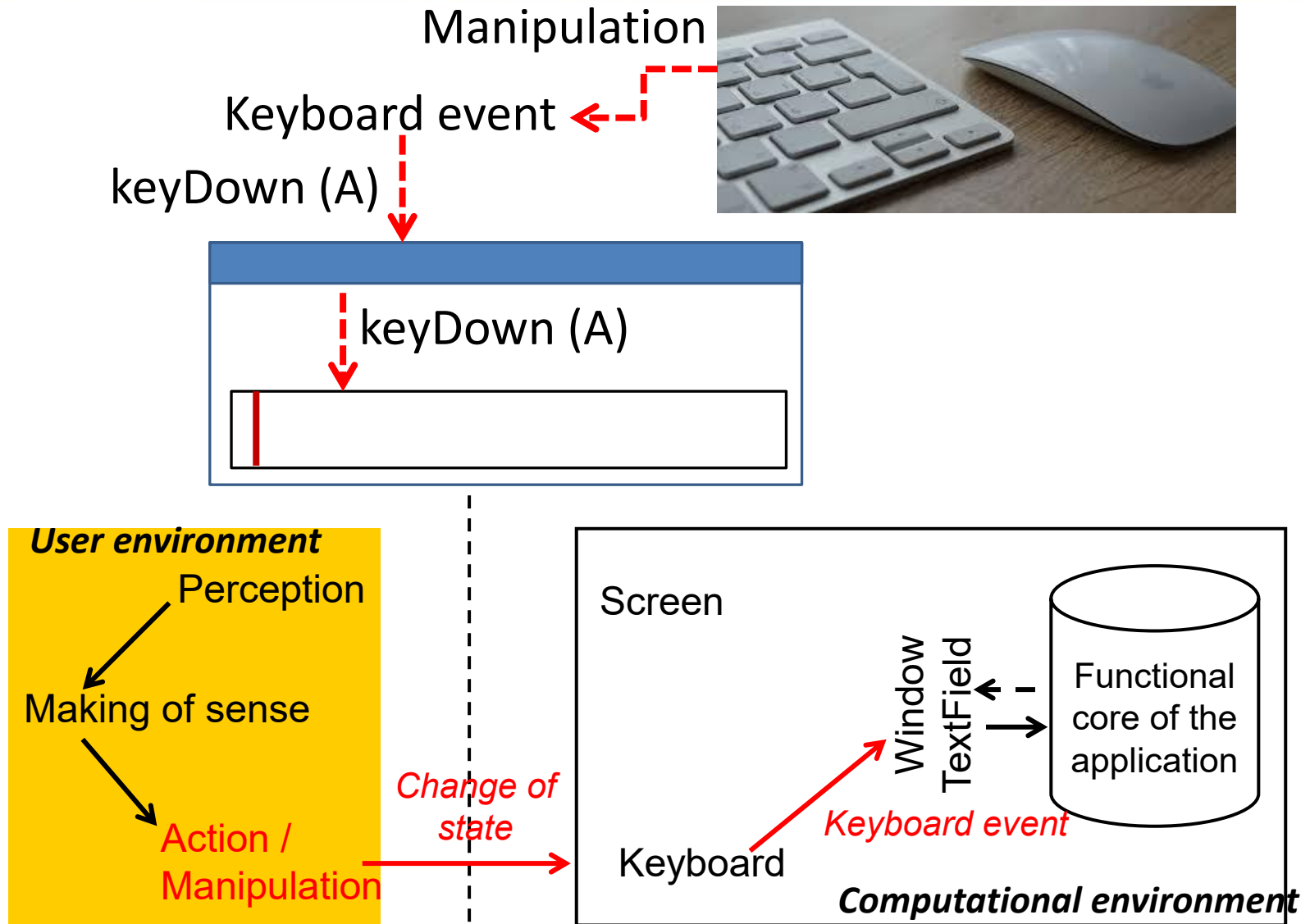
Interaction cycle explained

Event handling



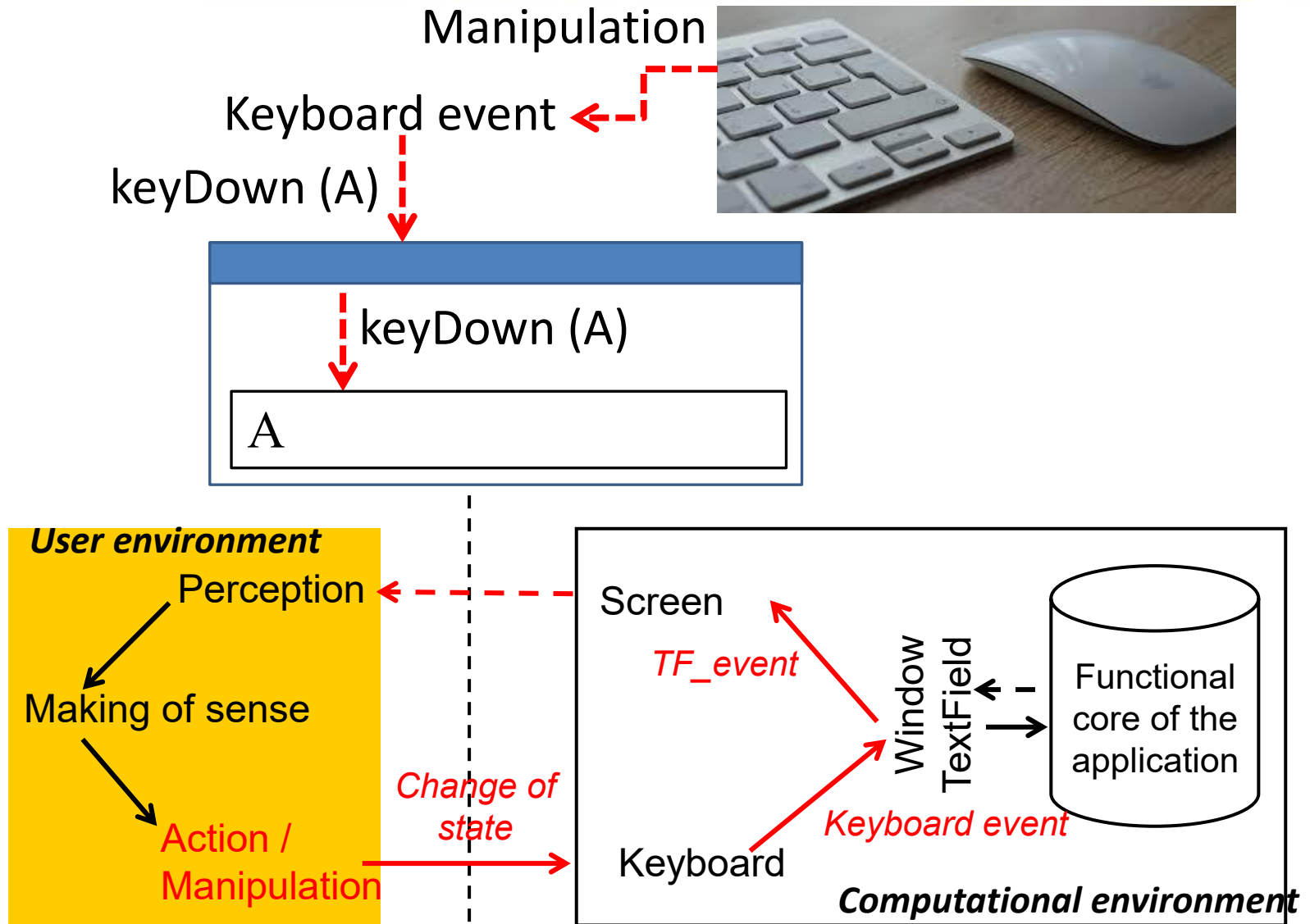
Interaction cycle explained

Event handling (cont.)



Interaction cycle explained

Event handling (cont.)





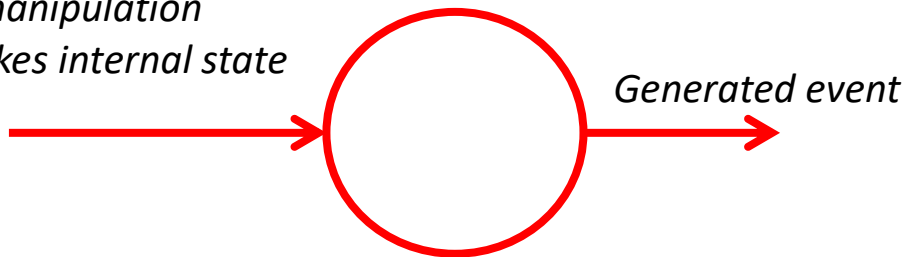
Events and UI programming

Sources of events

❖ Everything that generates events to indicate internal state changes

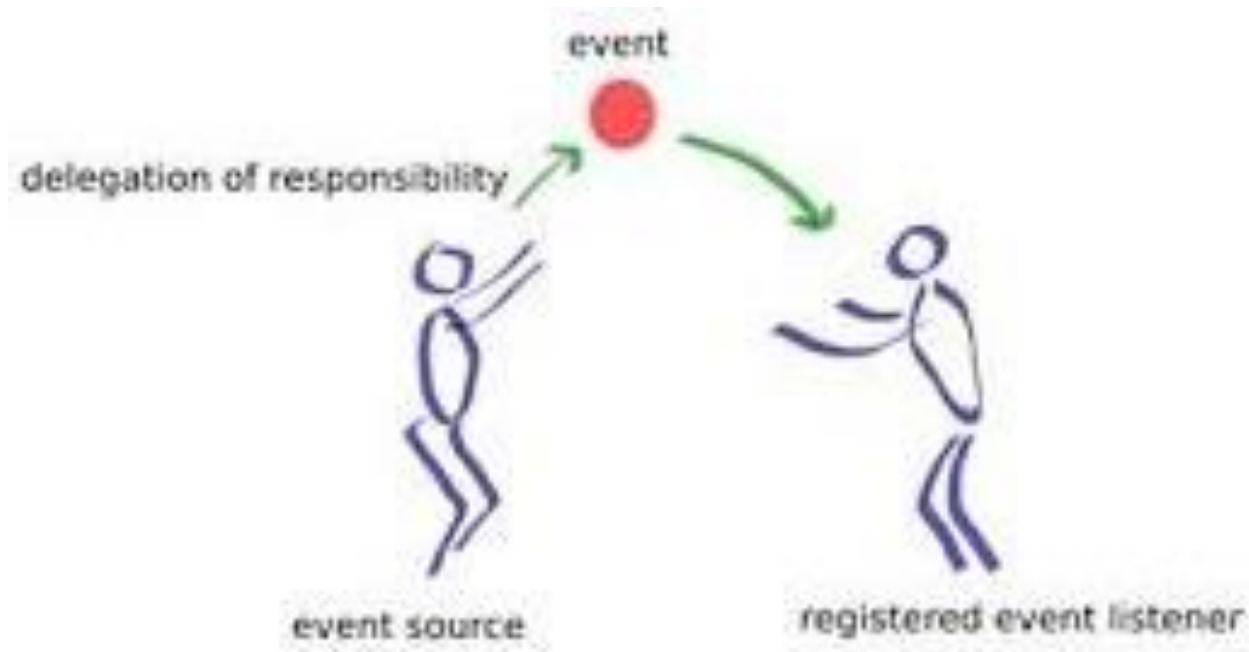
- Events are generated when
 - ✓ Keyboard keys are pressed or released
 - ✓ Mouse is moved, mouse buttons are pressed / released, etc.
 - ✓ Buttons, textfields or menus change state

*(Human) manipulation
which invokes internal state
change*



Event handlers

- ❖ Routines designed to handle / respond to specific events

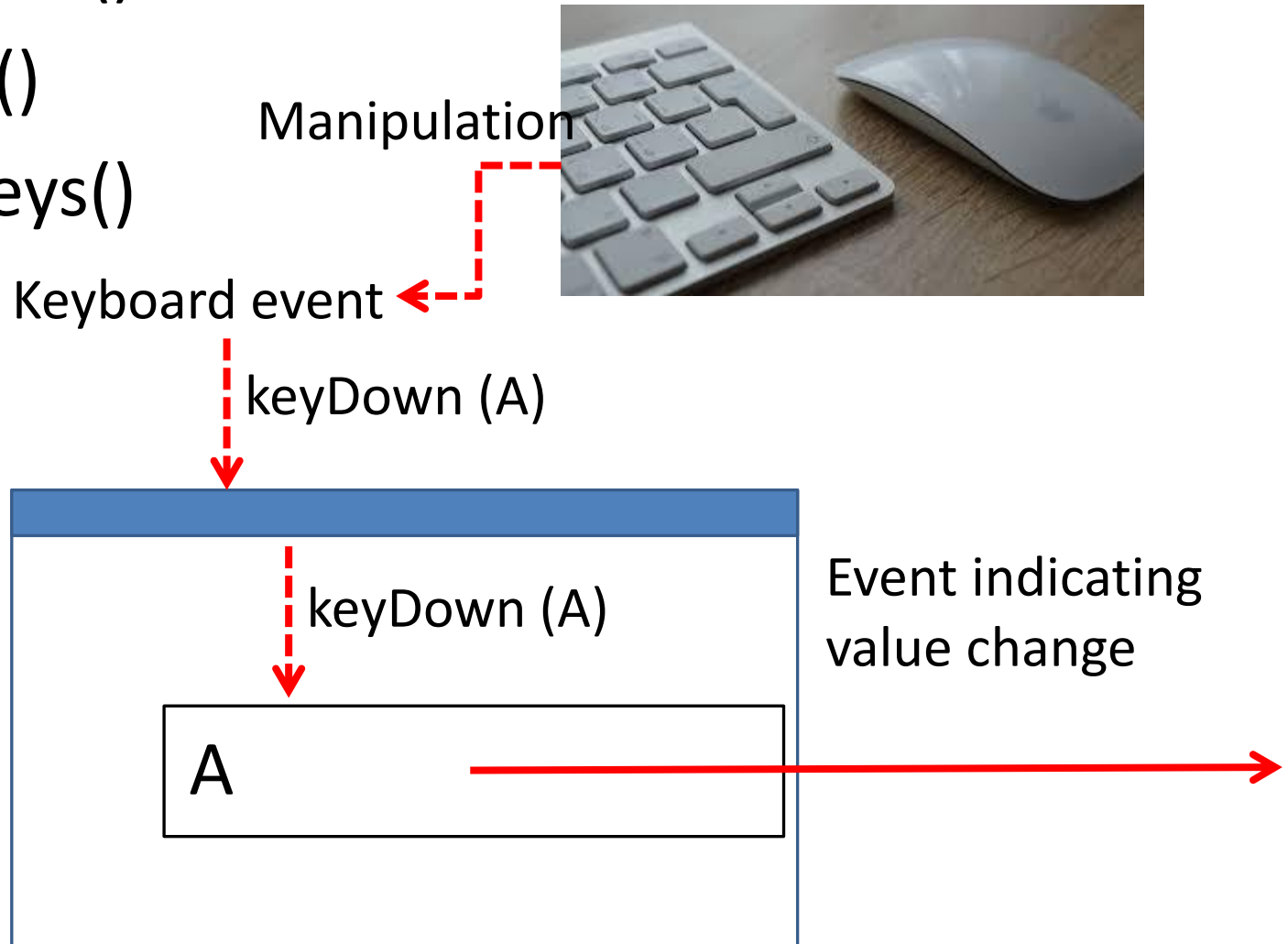


Example - Keyboard

❖ KeyDown()

❖ KeyUp()

❖ SendKeys()



Event processing

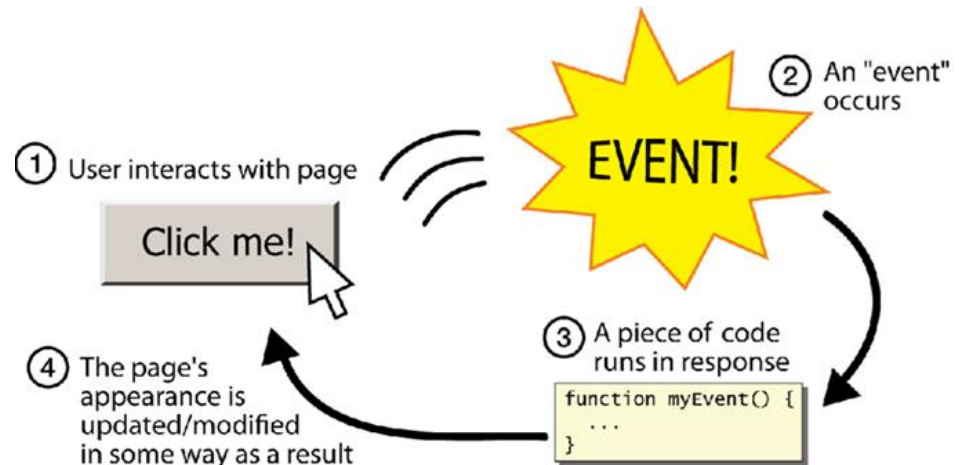
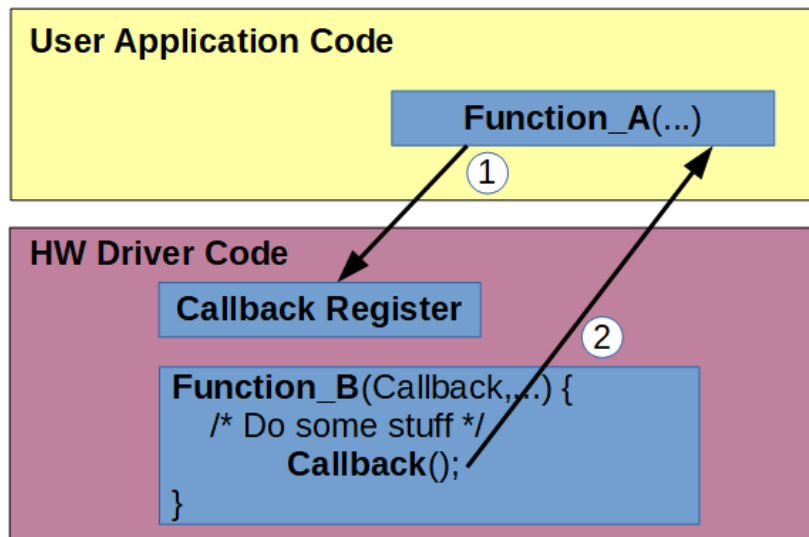
❖ Event loop

```
main(){  
    ... set up application data structures...  
    ... set up GUI....  
    // enter event loop  
    while(true){  
        Event e = get_event();  
        process_event(e); // event dispatch routine  
    }  
}
```

❖ Programmers typically control the process_event() method

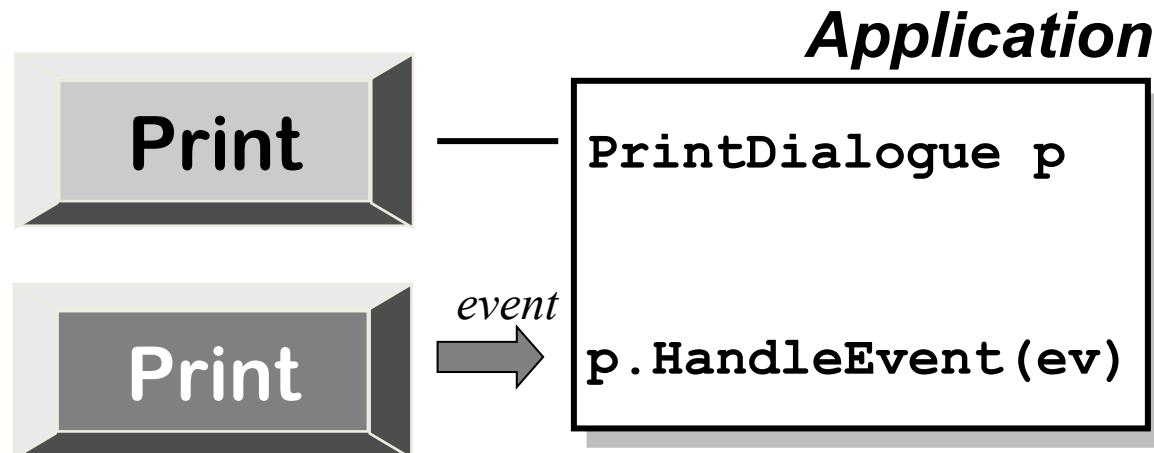
Callbacks

- ❖ A routine (code) that is called by another piece of code
 - Function passed as an argument to another function



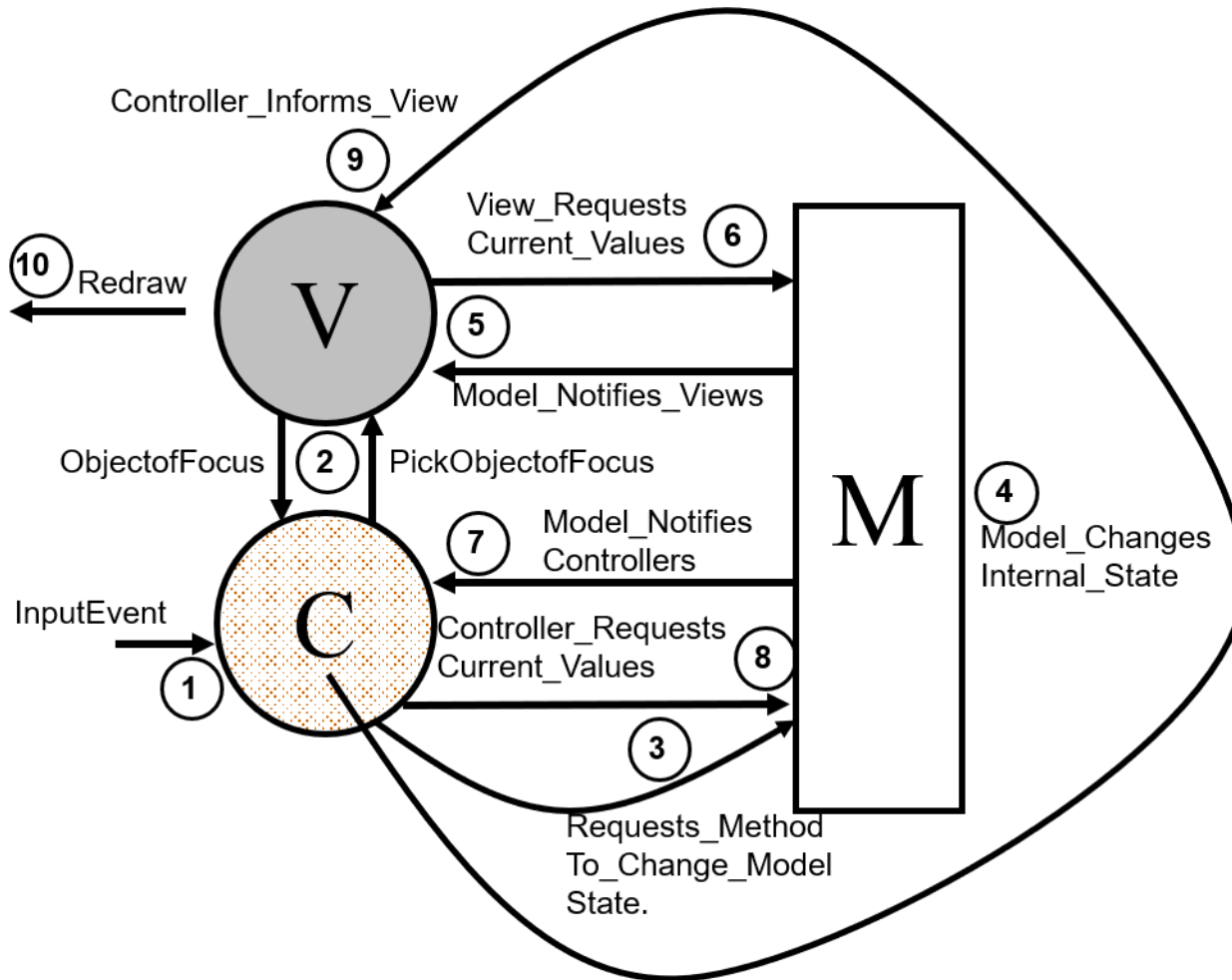
Listener objects

- ❖ Instead of callback functions, listener objects which handle events



MVC pattern

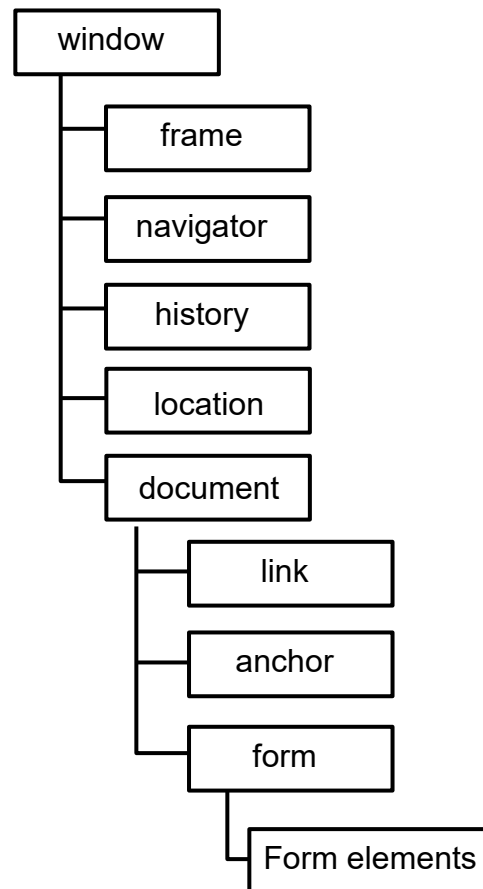
❖ Object-oriented tradition



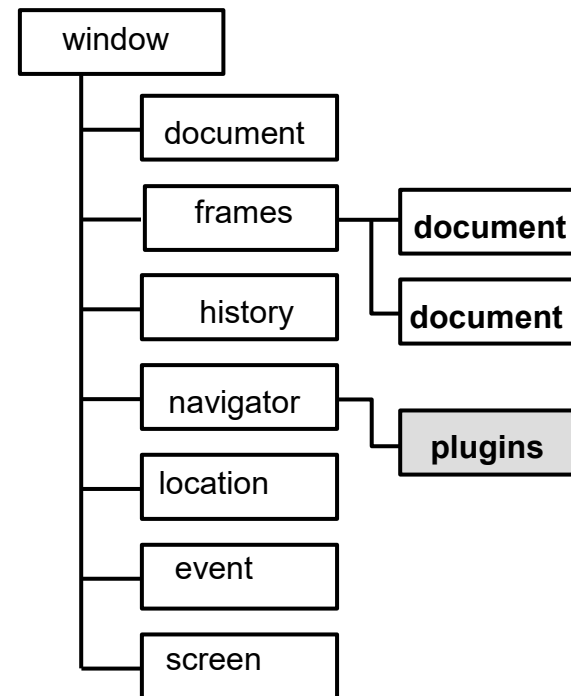
UI Toolkit

❖ Libraries of implemented widgets

JavaScript Object Hierarchy



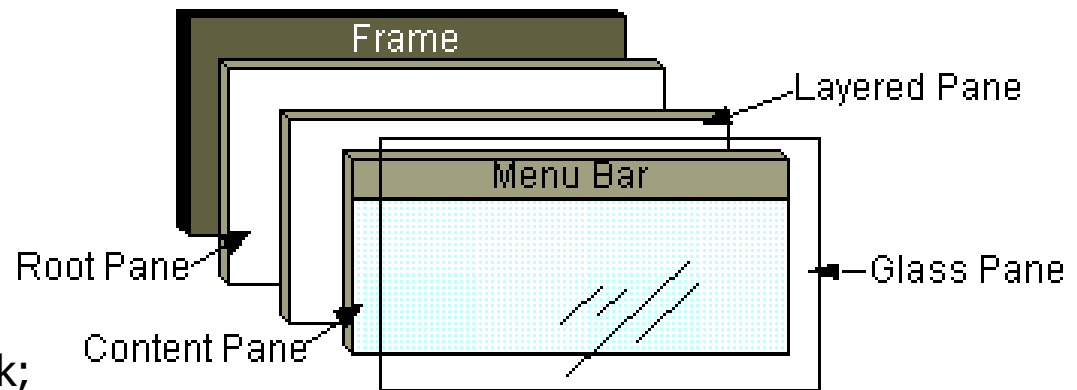
Microsoft Object Hierarchy



Widgets

❖ Implemented libraries of reusable code

```
PushButton {  
    Color BackGround;  
    int MarginLeft;  
    int MarginRight;  
    int BorderWidth;  
    Pixmap ArmPixmap;  
    Boolean FillOnArm;  
    CallbackList ActivateCallback;  
}
```



Example UI

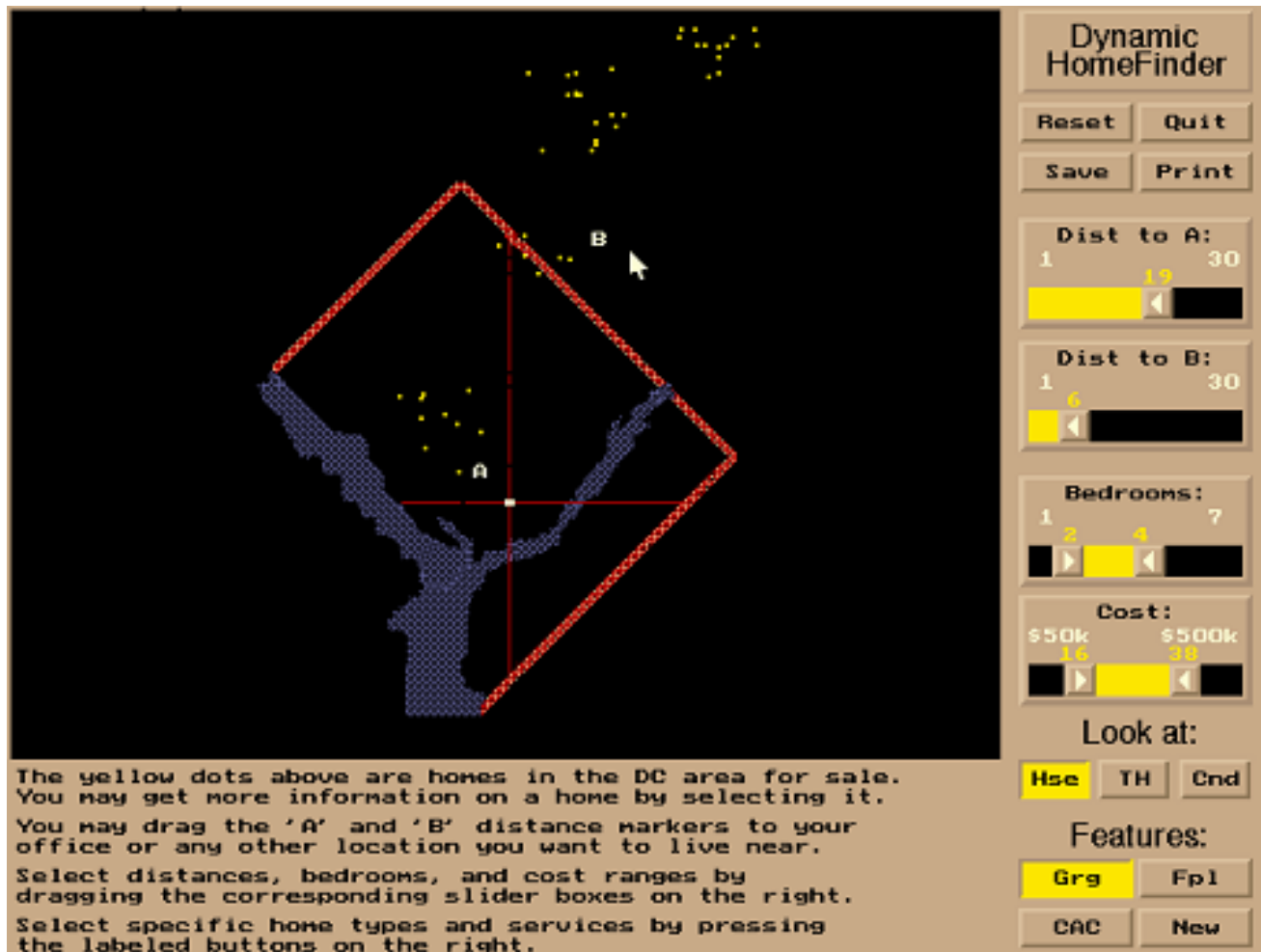


Example UI (cont.)



Example UI (cont.)

❖ HomeFinder



The yellow dots above are homes in the DC area for sale. You may get more information on a home by selecting it. You may drag the 'A' and 'B' distance markers to your office or any other location you want to live near. Select distances, bedrooms, and cost ranges by dragging the corresponding slider boxes on the right. Select specific home types and services by pressing the labeled buttons on the right.

Dynamic HomeFinder

Reset Quit

Save Print

Dist to A:
1 30
19

Dist to B:
1 30
6

Bedrooms:
1 7
2 4

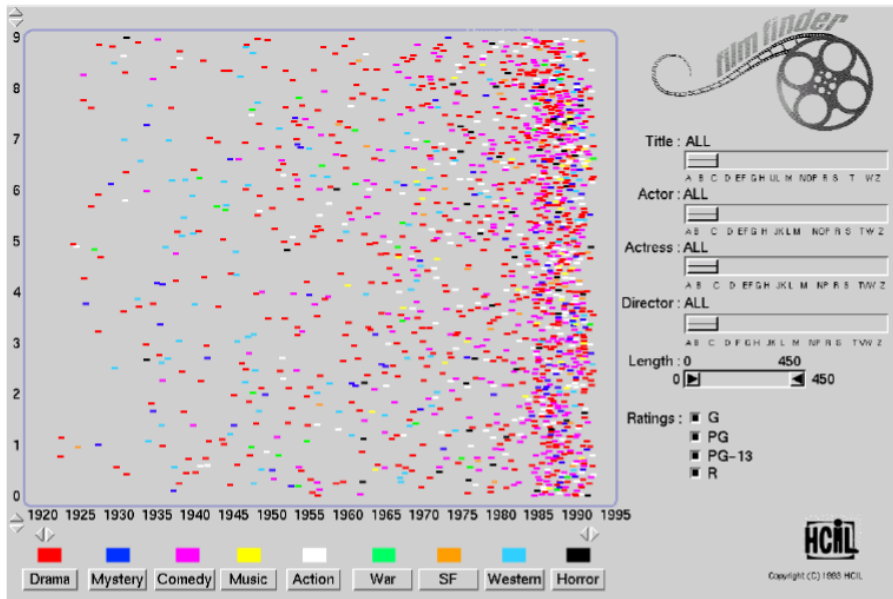
Cost:
\$50k \$500k
16 38

Look at:
Hse TH Cnd

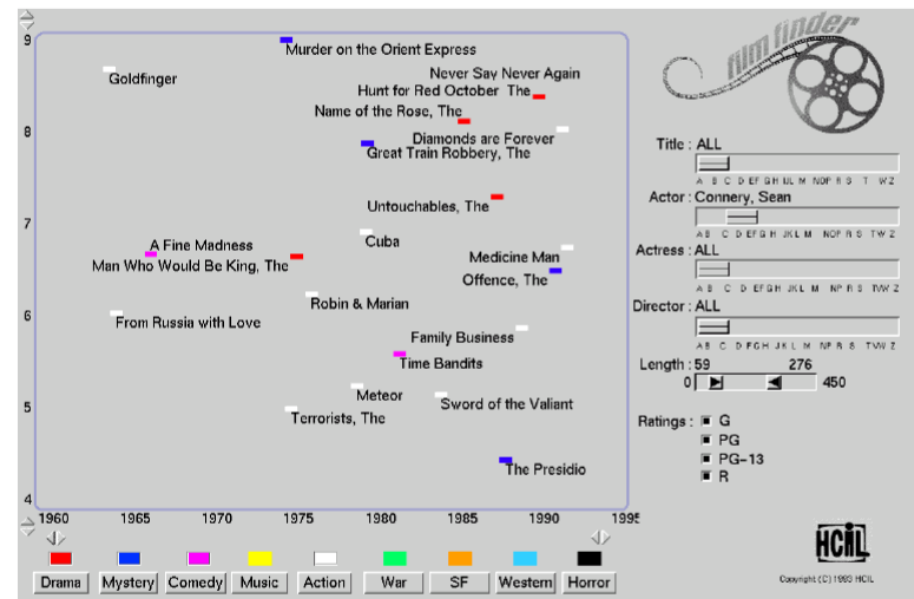
Features:
Grp Fp1
CAC New

Example UI (cont.)

❖ FilmFinder



Ahlberg & Shneiderman, Color plate 1. The FilmFinder.



Ahlberg & Shneiderman, Color plate 2. Categories have been selected, the displayed is zoomed

Example UI (cont.)

❖ Job opportunities

Y

Category:

- ☐ Administration
- ☐ Service
- ☐ Grupp/Pe
- ☐ Sjukvård
- ☐ Handel
- ☐ Teknisk/Samhäl
- ☐ Kommunikation
- ☐ Tillverkning
- ☐ Lant/Skogsbruk

Profession:

ALL

A B CD EF GH JLMOR ST U

Salary:

7100 25000

Education:

- ☐ 2-årigt gym
- ☐ Eftergymn u
- ☐ 3- eller 4-årigt gym
- ☐ Under gym

Length of educ.:

- ☐ 0 ☐ 3
- ☐ 2 ☐ 4

Experience:

4 16

Work hours:

- ☐ Deltid
- ☐ Heltid och deltid
- ☐ Heltid

TC Reset Quit

X

Example UI (cont.)

❖ Metaphoric interaction

archivus

You can now browse this book or search inside it?

Reset
Repeat
Help
Exit

lssco-mtg-35 - chapter 3

Susan: Well, I have a point on that too. That wasn't – it's sor- that comes into my principles too. Because we have to not f- forget about the colour of the carpet .. Which is somewhat similar to what we have here, though we have much more blue in it.

Andrei: mhm

Susan: Here we have a ... A grey but that also tends to blue. In the room ... it's much more blue with grey.

Agnes: True.

16

lssco-mtg-35 - chapter 3

Susan: And – and red with blue and grey, like in the picture that we have in the Google culture, if you look at that picture, then you see that there's this red bl- big blue ball, and there's these red sofas and it's all sort of busy and moving around and uh the hallway décor is even uh worse because there you have uh -

Oh. Oh, colour version. Bicycles and – and everything else so -

Well – yeah, but I mean in the hallway décor you have for insta-

17

Close book

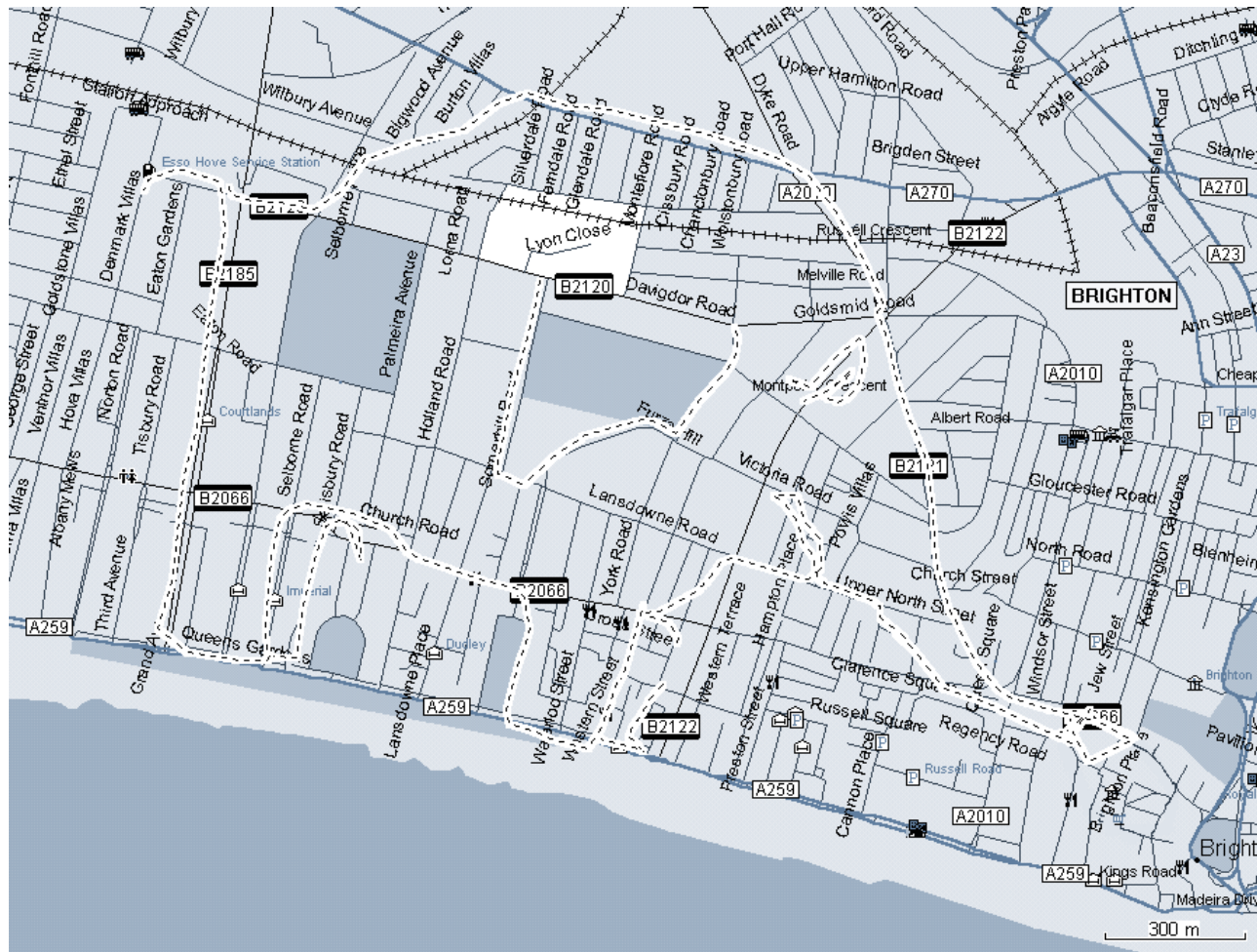
Show me the video for this section

Icon	Attribute	Value
	Date	07/04/04
	Place	
	Participant	Denis Lalanne
	Topic	Red sofa
	Dialogue Element	Discussion
	Document	
	Event	
	Type	Discuss
	Name	Denis Lalanne

Change labels

Example UI (cont.)

❖ Map-based interaction



Example UI (cont.)

❖ Web Book (Card, Robertson & York)



Example UI (cont.)

❖ HomeBay

Dynamic
Queries

Radar
Overview

Progressive
details on
demand

The screenshot displays the HomeBay application window. On the left, there are search filters for Price Range, Square Footage, Property Type, and Advanced options like Number of Bedrooms, Number of Bathrooms, Age of Property, and Description Keywords. Below these is a table of search results. On the right, a map shows the location of properties in Calgary, with a mini map inset. A property detail popup is visible for a two-story house in North Crowchild.

Search Results Table:

#	Price	Area	Property Type
01	\$154,888	Marlborough Park	Bungalow
02	\$199,900	North Crowchild	Two-Story
03	\$199,900	Westgate	Bungalow
04	\$199,900	Coventry Hills	Two-Story
05	\$199,900	Brentwood	Bungalow
06	\$239,735	Inglewood	Condo
07	\$239,000	Tuscany	Mansion
08	\$249,900	Capitol Hill	Duplex
09	\$249,900	Arbour Lake	Townhouse
10	\$249,900	Banff Trail	Bungalow
11	\$288,000	Strathcona Park	Two-Story
12	\$288,900	Patterson	Townhouse
13	\$310,000	Arbour Lake	Two-Story

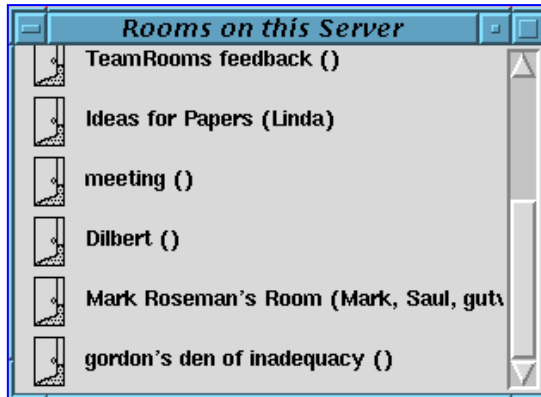
Property Detail Popup:

Price: \$199,900
Area: North Crowchild
Type: Two-Story

Example UI (cont.)

❖ TeamRooms

List of rooms

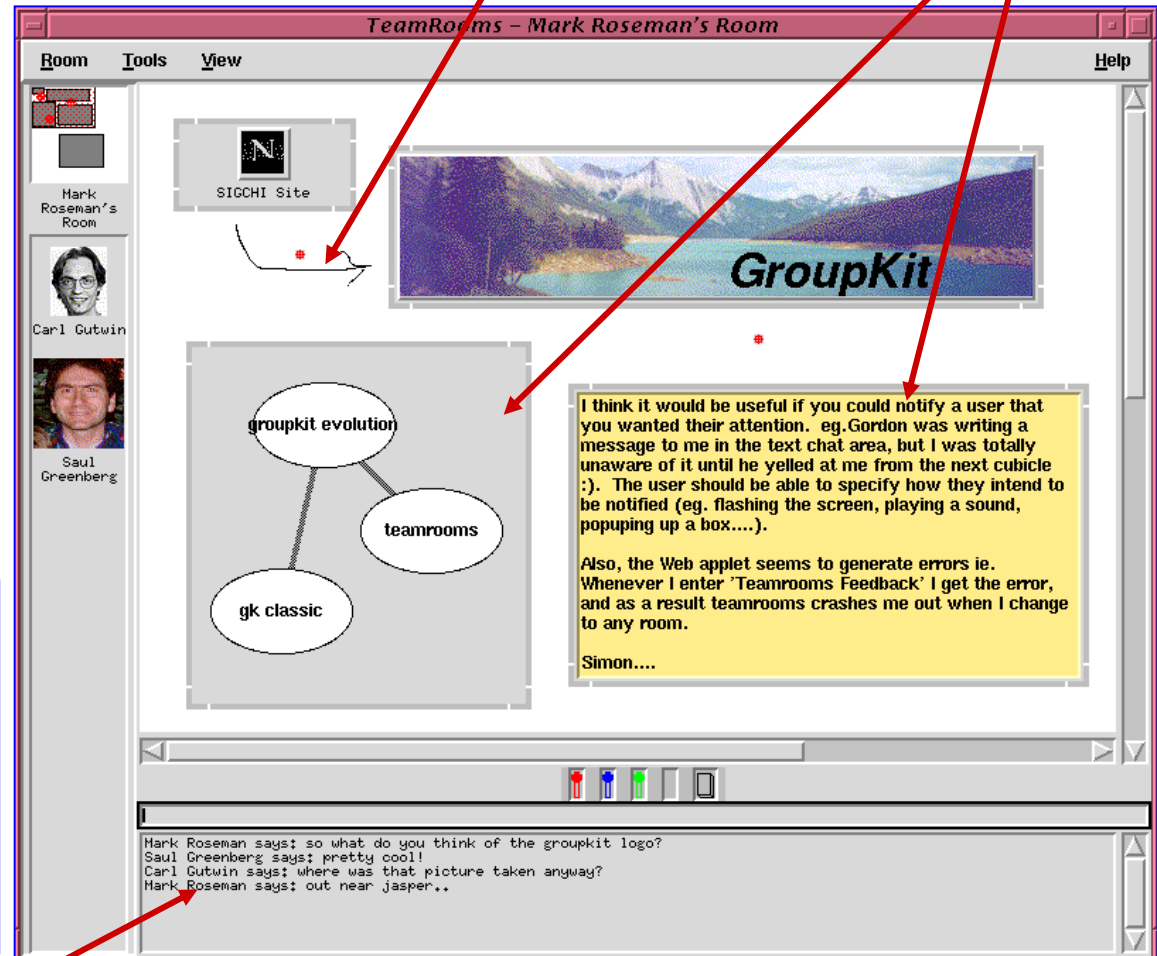


List of users



shared whiteboard

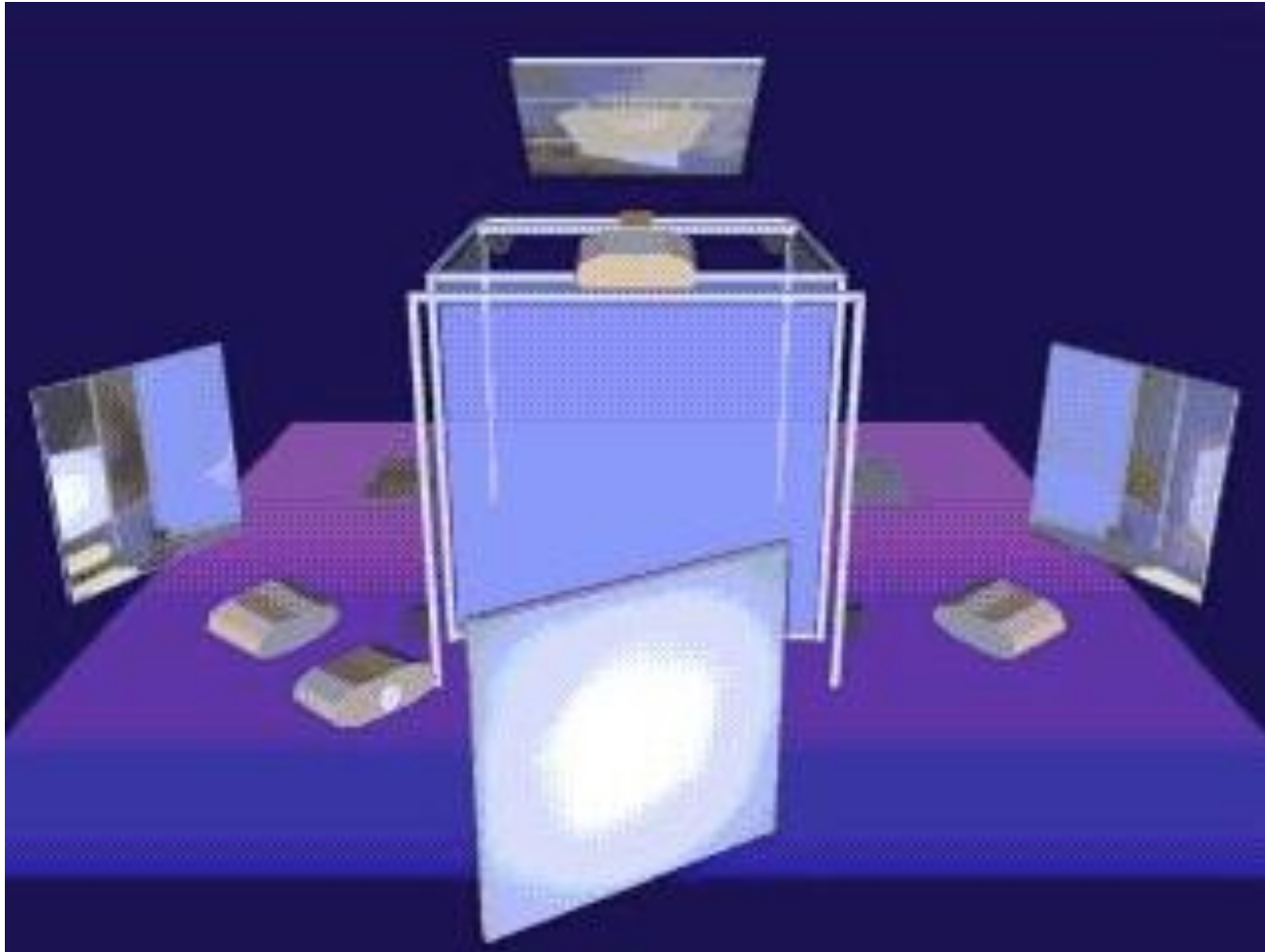
applets



chat tool

Example UI (cont.)

❖ 3D



Example UI (cont.)

❖ Virtual / augmented reality

