Human Computer Interaction

Interactive Design Basics

Lecture # 7

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Bad Design

Bad Design

- What's wrong with the design of this knife?
- Although you can tell which end is the handle and which end is the blade, it isn't clear which side of the blade cuts

Bad Design

- What's wrong with the design of this stove?

- It is difficult to tell which control goes with which burner

Good Design

- Arrange the controls in the same configuration as the burners. It is quite easy to tell which burner goes with which control (Figure 1)

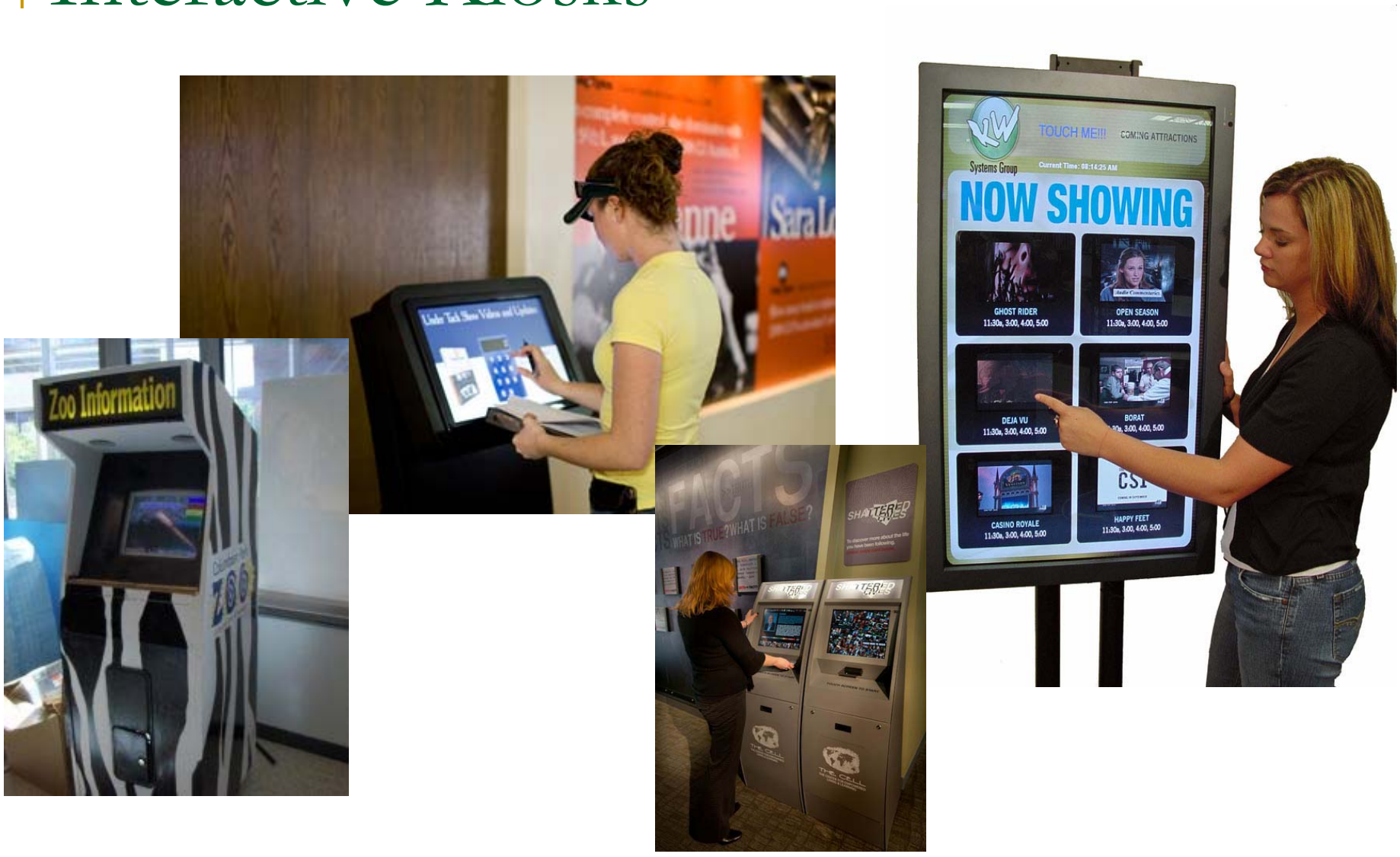
OR

- Use supplementary information (Figure 2)

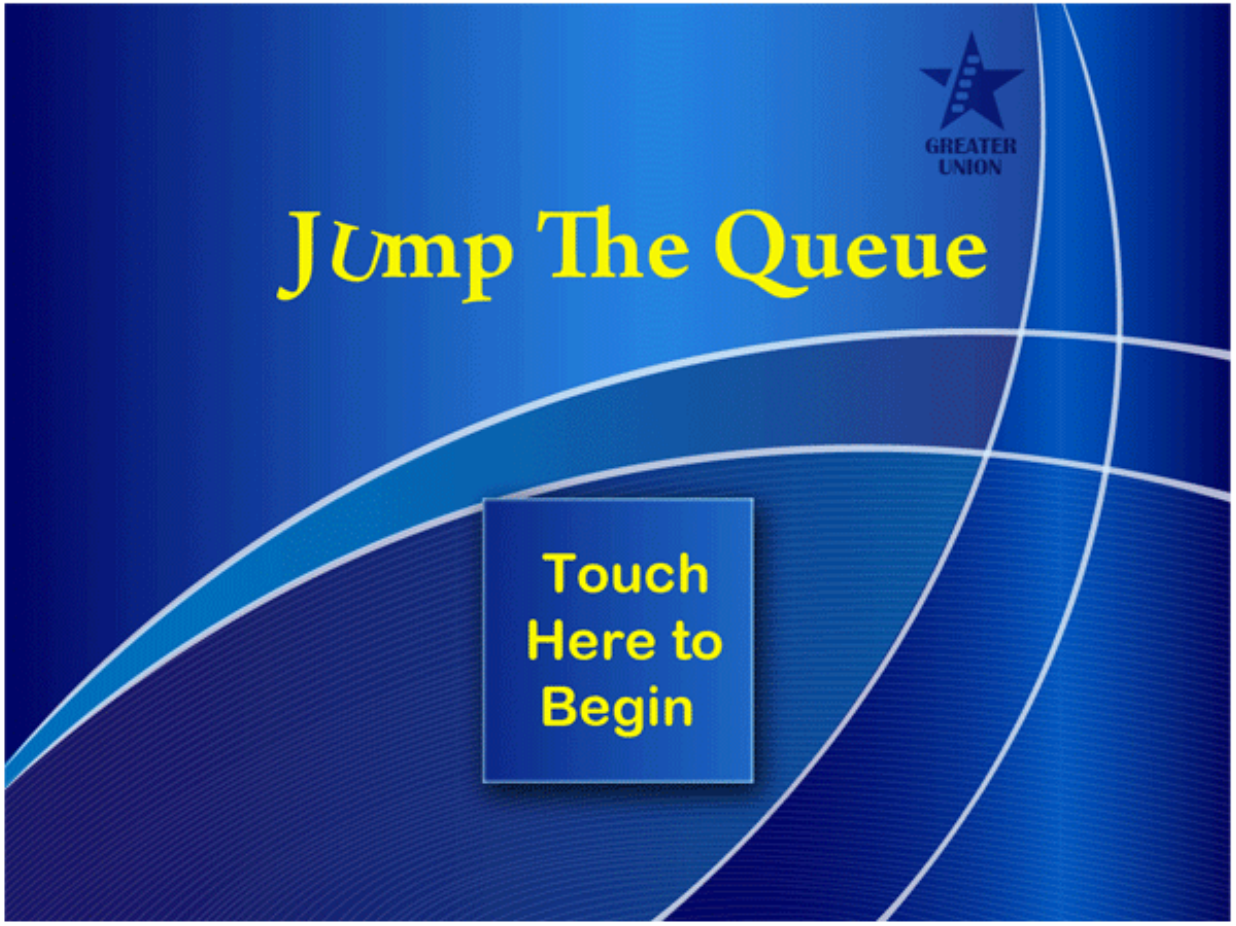
Figure 1

Figure 2

Interactive Kiosks



Cinema Information Kiosk



Cinema Information Kiosk

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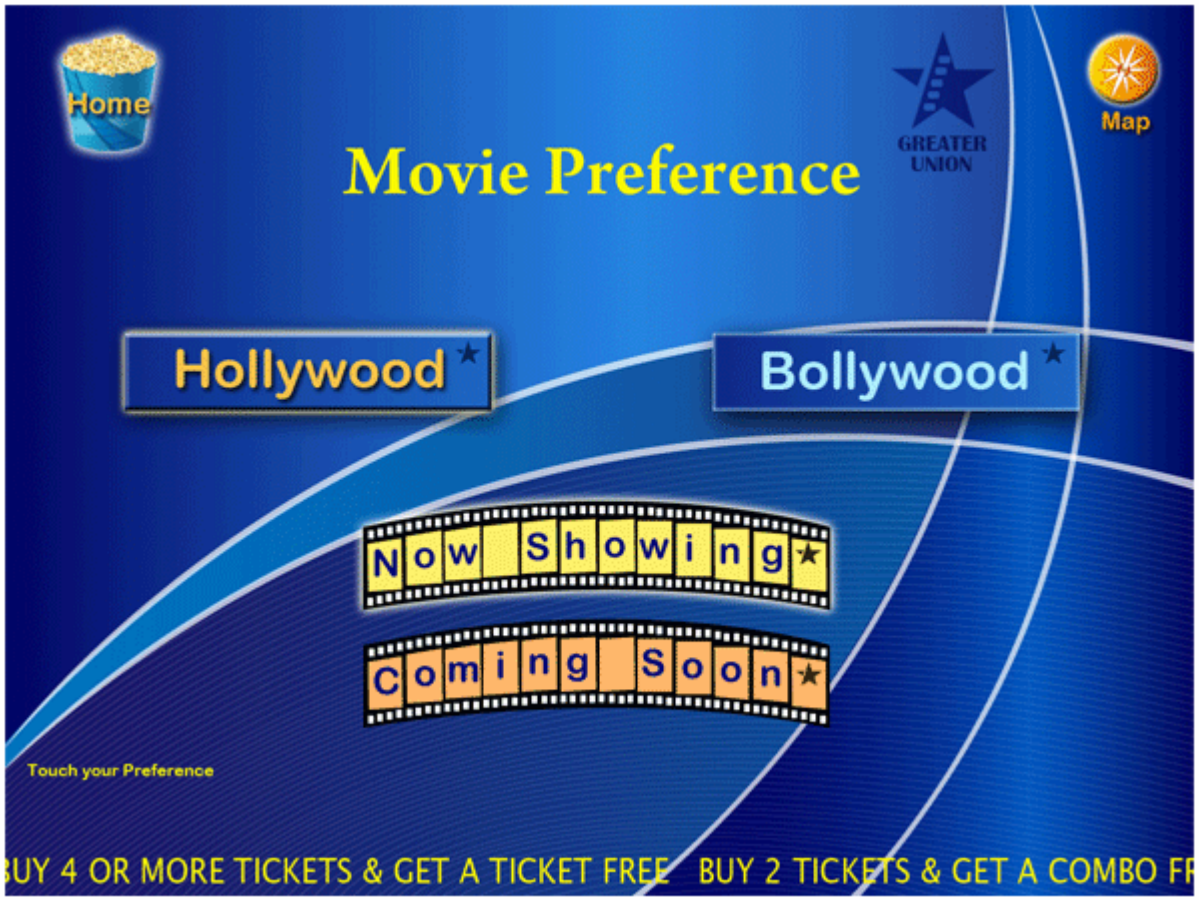
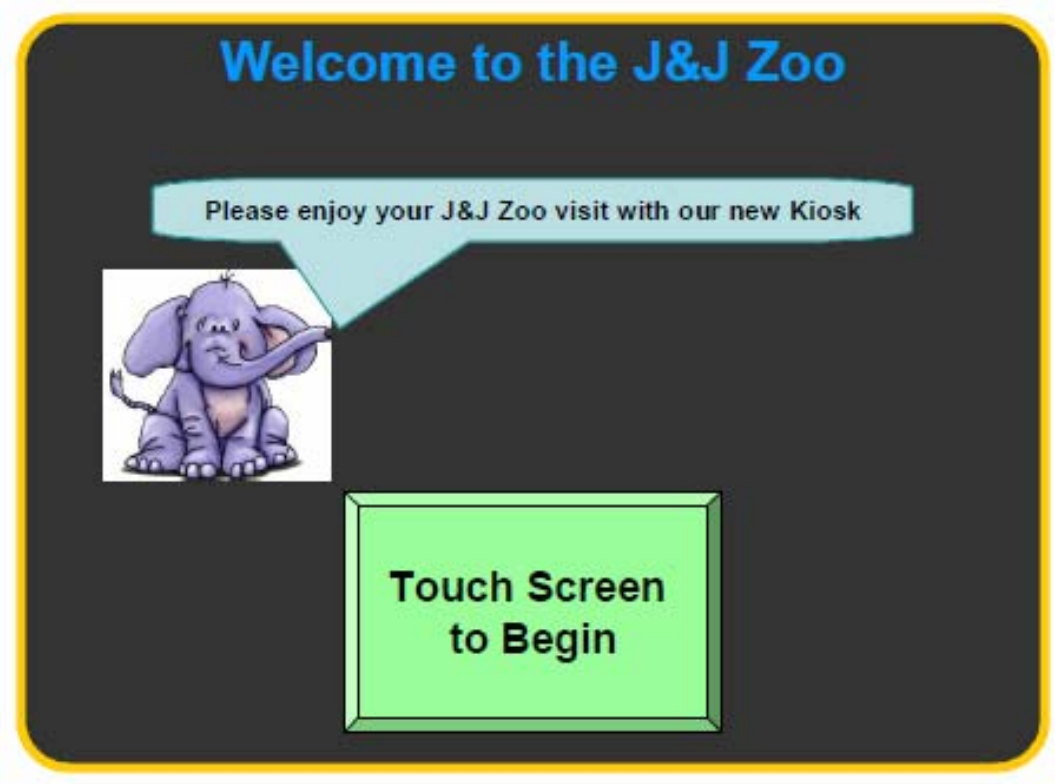


Zoo Information Kiosk

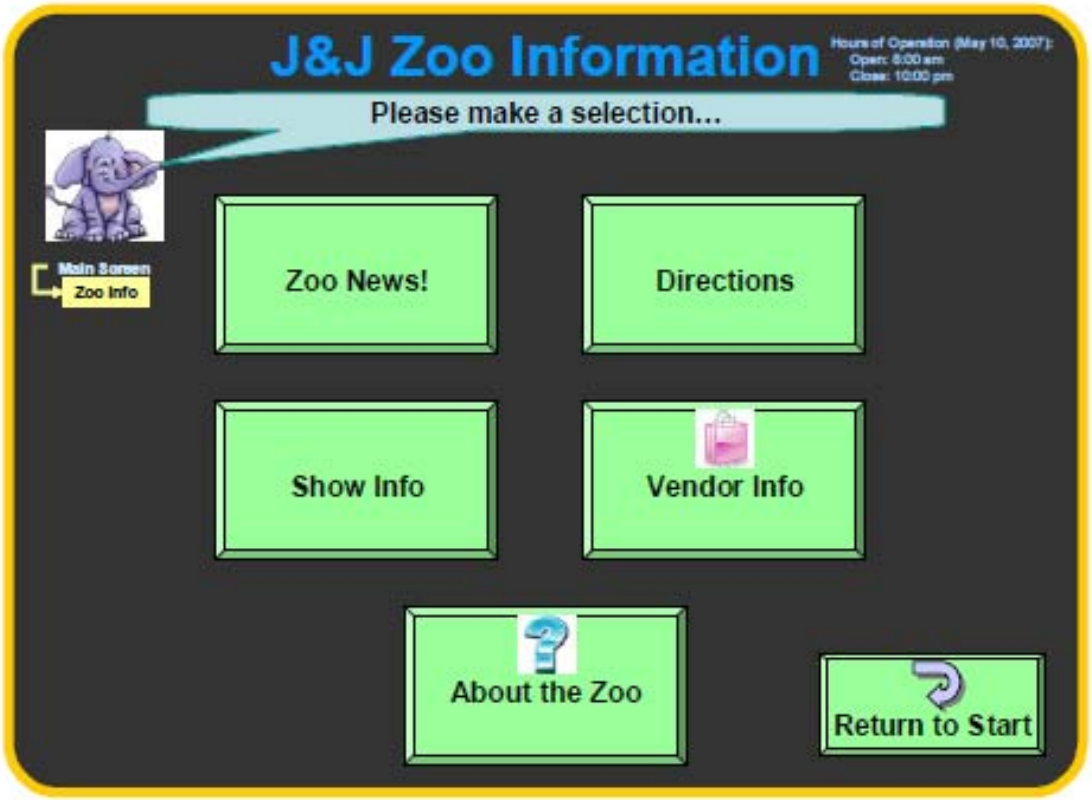


Idle Screen

Zoo Information Kiosk

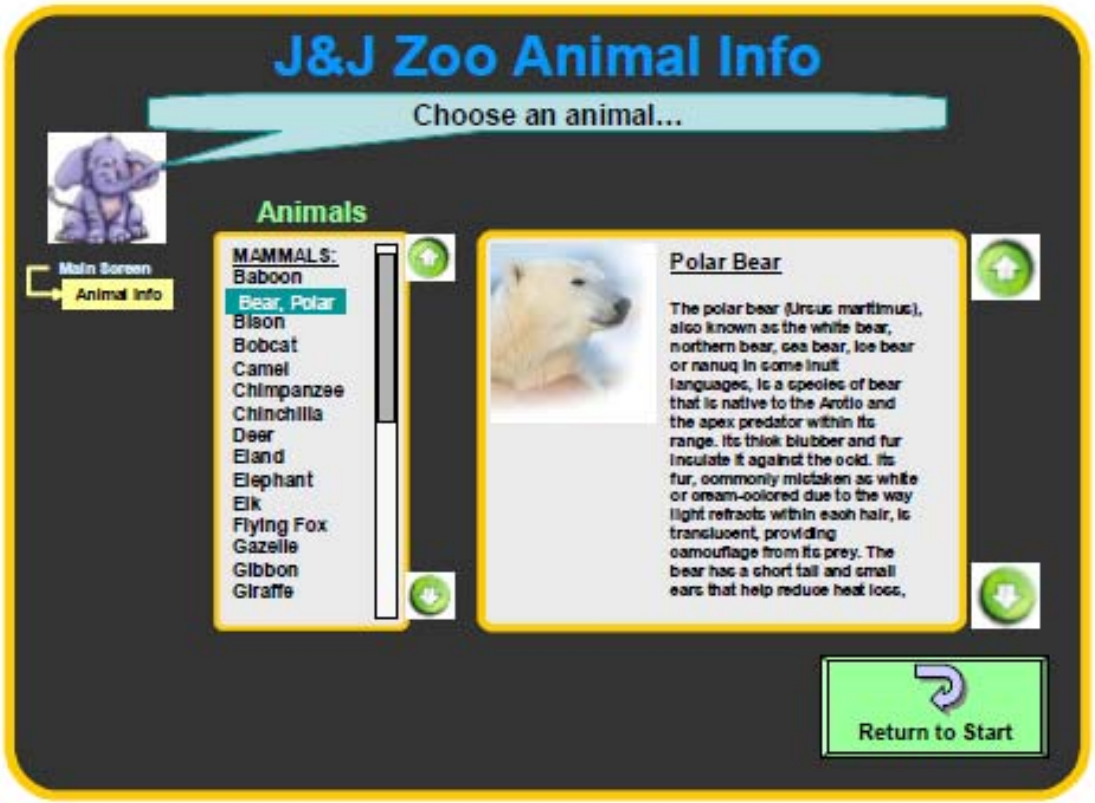
Main Screen

Zoo Information Kiosk



Zoo Information Screen

Zoo Information Kiosk



Animal Information Screen

Tourist Information Kiosk

Video Rental Kiosk

Design

- What is Design?
  - Achieving goals within constraints
- Goals – purpose
  - Who is it for, why do they want it
- Constraints
  - Materials, platforms, budget
- Trade-offs

Golden Rule of Design

Understand your materials

- Physical Design
  - Steel chairs vs. Wooden Chairs



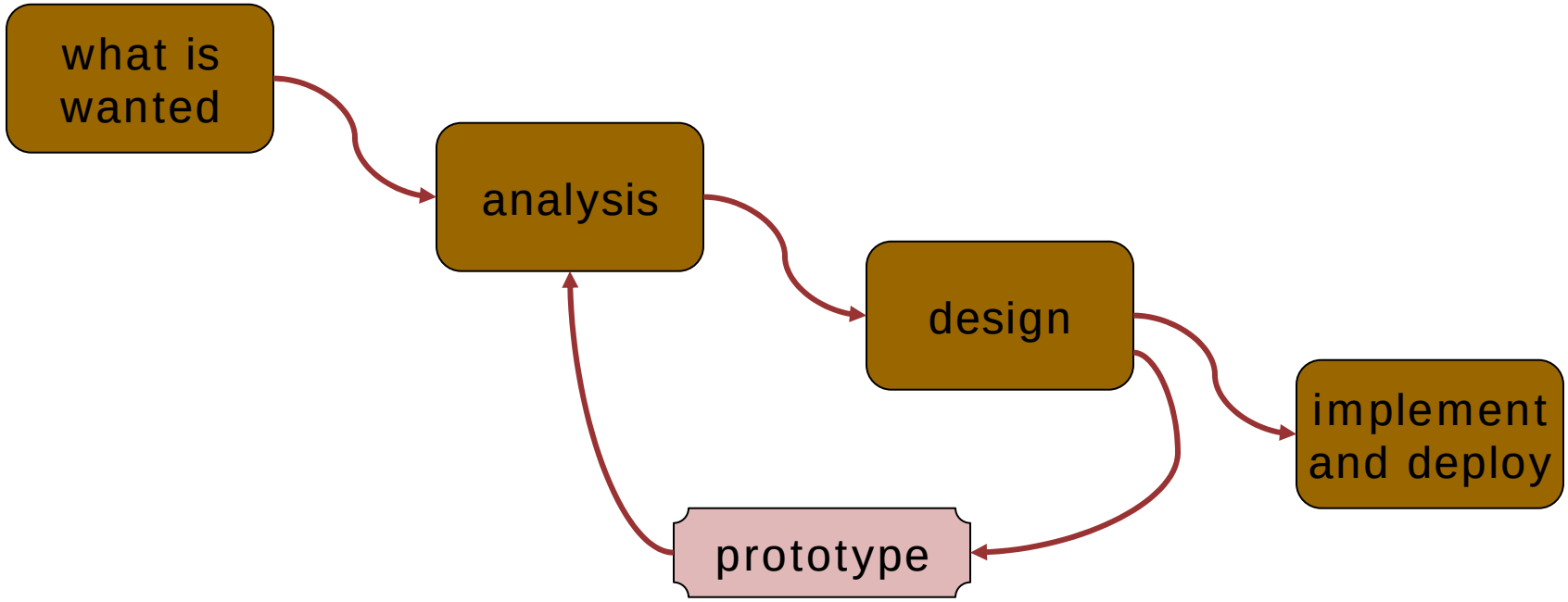

Golden Rule of Design

- For Human Computer Interaction
  - Understand computers
    - Limitations, capacities, tools, platforms
  - Understand people
    - Psychological, social aspects human error
  - And their interaction …

To Err is Human

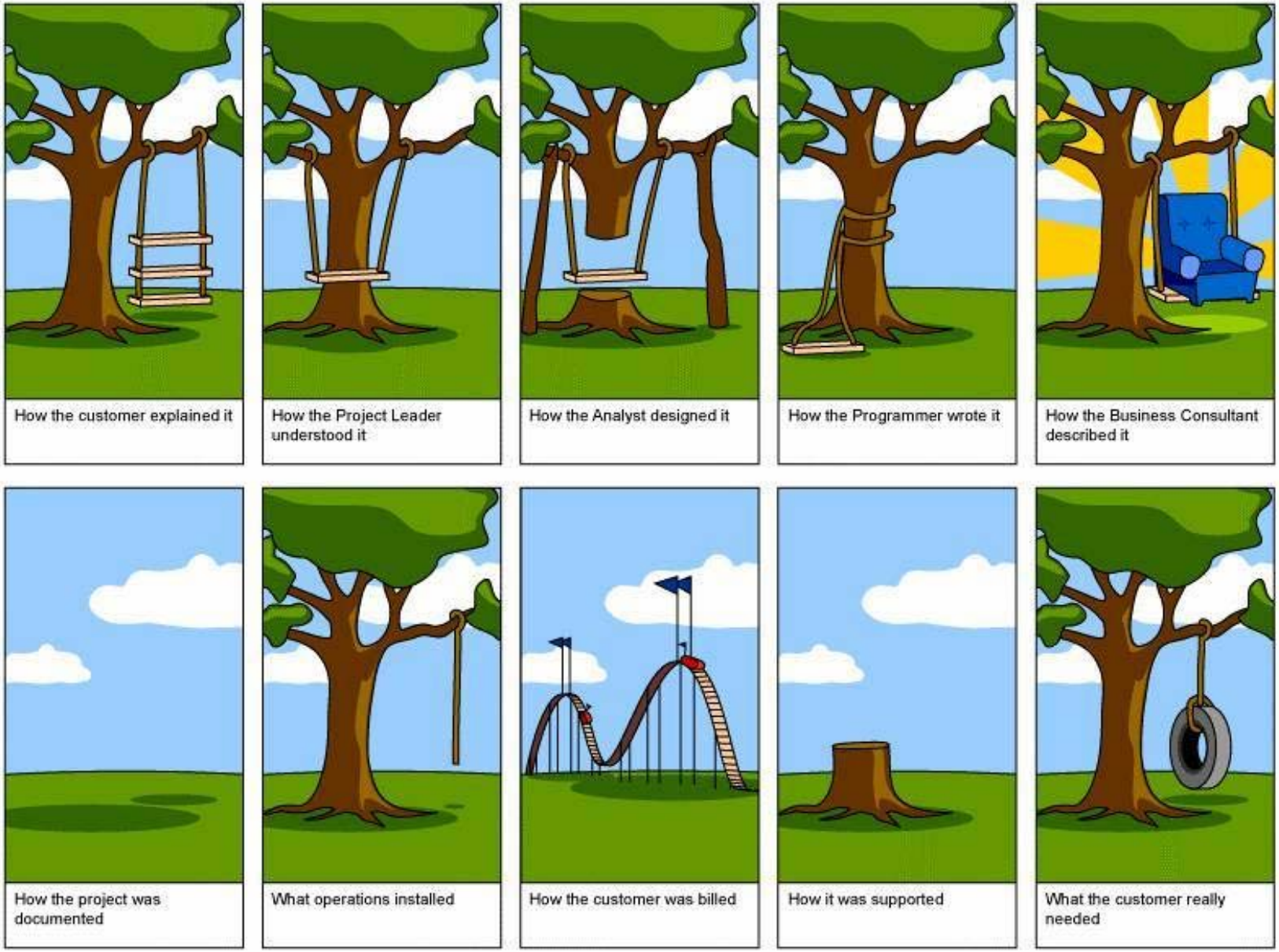
- Accident reports ..
  - Aircrash, industrial accident, building collapse
  - Enquiry … blames … ‘human error’
  - More often: Cause is bad design/installation
- We know how users behave under stress
  - So design for it!
- Building collapse
  - Concrete lintel breaks because too much weight
  - Blame ‘lintel error’ ?
  - No – design error

The Process of Design



Design Steps

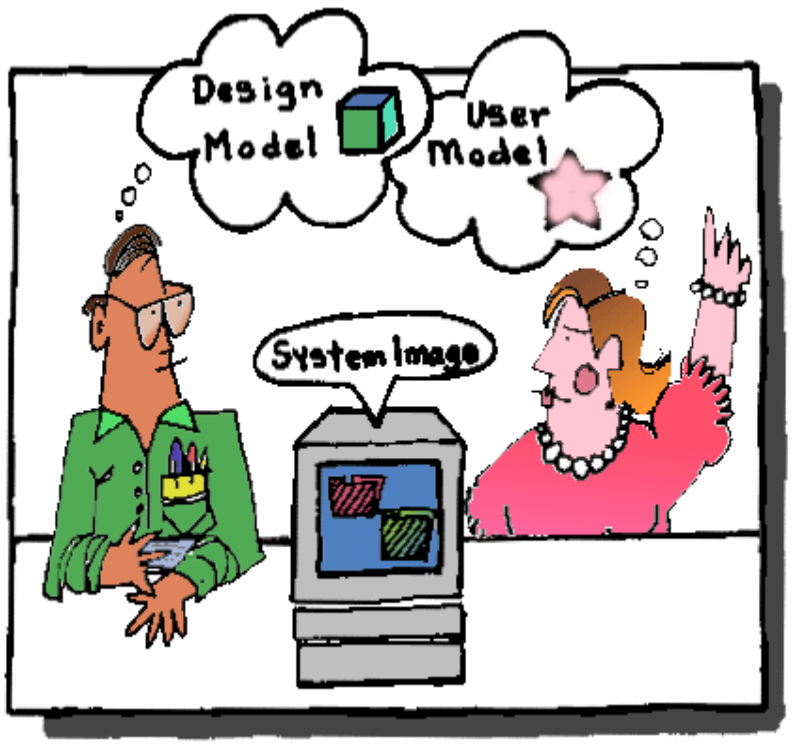
- Requirements
  - What is there and what is wanted …
- Analysis
  - Ordering and understanding
- Design
  - How to do
- Iteration and prototyping
  - Evaluate and improve design
- Implementation and deployment
  - Create and deploy


How the customer explained it
How the Project Leader understood it
How the Analyst designed it
How the Programmer wrote it
How the Business Consultant described it
How the project was documented
What operations installed
How the customer was billed
How it was supported
What the customer really needed

User Focus

Know your users!

- Who are they?
- Probably not like you!
- Talk to them
- Observe them
- Discuss observation with them
- Use your imagination



Persona

- Description of an ‘example’ user
  - Not necessarily a real person
- Example Persona

  Betty is 37 years old, She has been Warehouse Manager for five years and worked for Simpkins Brothers Engineering for twelve years. She didn’t go to university, but has studied in her evenings for a business diploma. She did part of an introductory in-house computer course some years ago…….

Scenarios

Scenarios

- Stories for design
- What will users want to do?
- Step-by-step walkthrough
  - What can they see (sketches, screen shots)
  - What do they do (keyboard, mouse etc.)
  - What are they thinking?

Scenario – Movie Player

Brian would like to see the new film “Moments of Significance” and wants to invite Alison, but he knows she doesn’t like “arty” films. He decides to take a look at it to see if she would like it and so connects to one of the movie sharing networks. He uses his work machine as it has a higher bandwidth connection. After it downloads to his machine he takes out his new personal movie player. He presses the ‘menu’ button and on the small LCD screen he scrolls using the arrow keys to ‘bluetooth connect’ and presses the select button. On his computer the movie download program now has an icon showing that it has recognized a compatible device and he drags the icon of the film over the icon for the player. On the player the LCD screen says “downloading now”, a percent done indicator and small whirling icon. … … …

Scenarios

- Text based
- Augmented by sketches, screen shots – Story Boards

Scenarios – Play Act

- Mock up device
- Pretend you are doing it
- Internet-connected Swiss army knife

Use toothpick as stylus

But where is that thumb?

Scenarios – Play Act

- Swiss knife

Scenarios – Explore the Depths

- Explore interaction
  - What happens when…
- Explore cognition
  - What are the users thinking
- Explore architecture
  - What is happening inside

Navigation Design

Local Structure – Single Screen
Global Structure – Whole Site

Levels of Interaction

- Widget
  - Menus, buttons etc.
- Screen design
  - Things on the screen, logical grouping of buttons
- Application navigation design
  - What happens when a button is pressed etc., where the user is in the interaction
- Environment
  - O/S, Read from disk/network

The Web

- Widget choice
- Screen design
- Navigation design
- Environment

- Form elements and buttons
- Page design
- Site structure
- The web, browser, external links

Physical Devices

- Widget choice
- Screen design
- Navigation design
- Environment

- Controls
  - Buttons, knobs, dials
- Physical layout
- Modes of device
- The real world

Structure

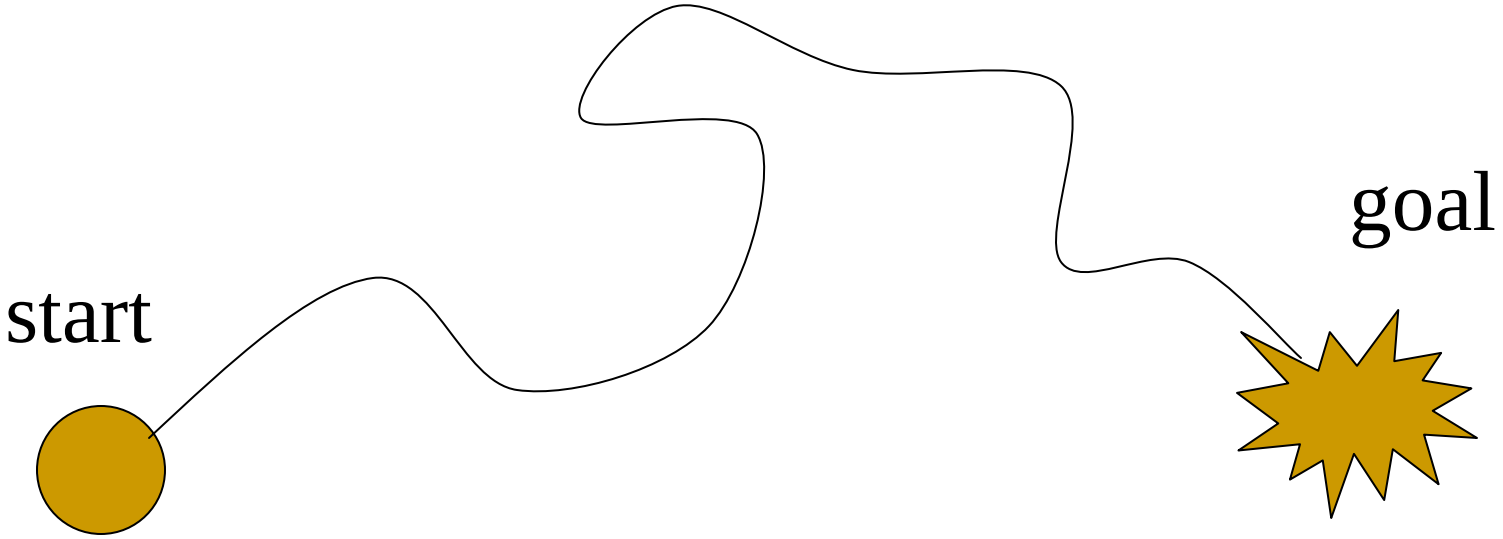
- Local
  - Looking from this screen out
- Global
  - Structure of site, movement between screens

Local Structure

- Goal Seeking

Local Structure

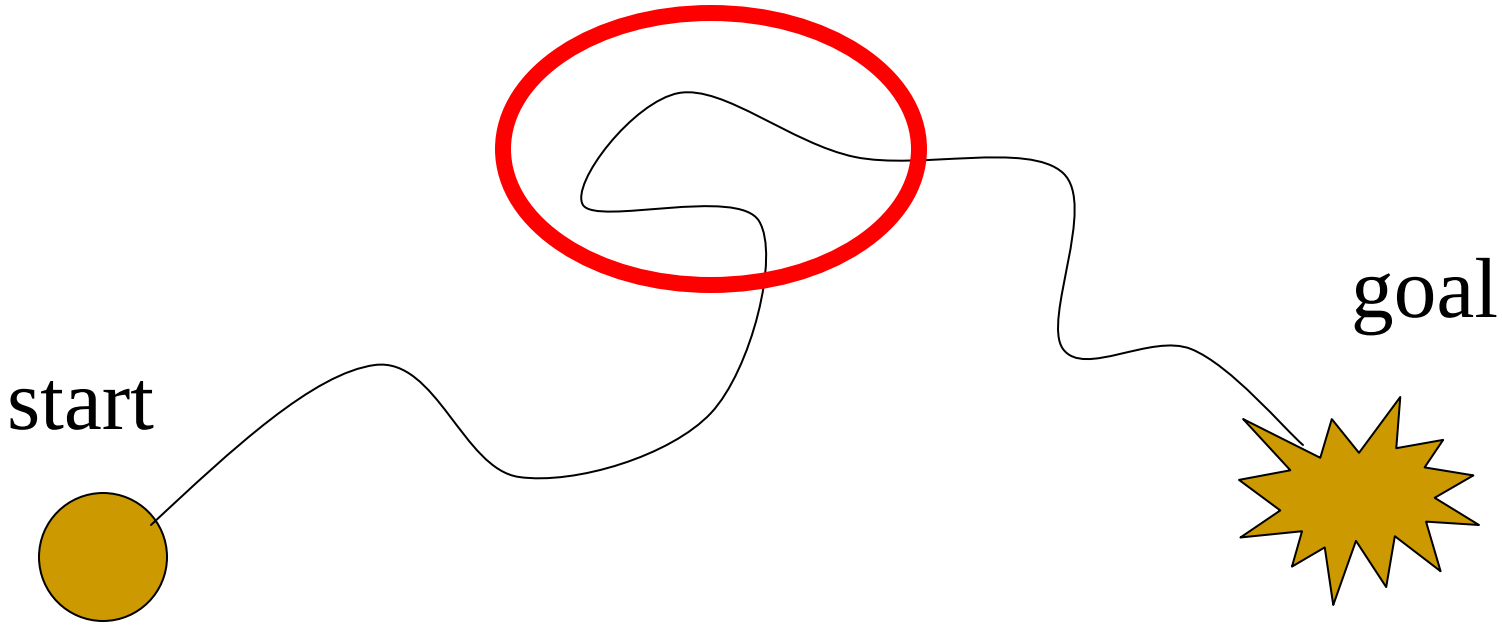
- Goal Seeking



... but can get to the goal

Local Structure

- Goal Seeking



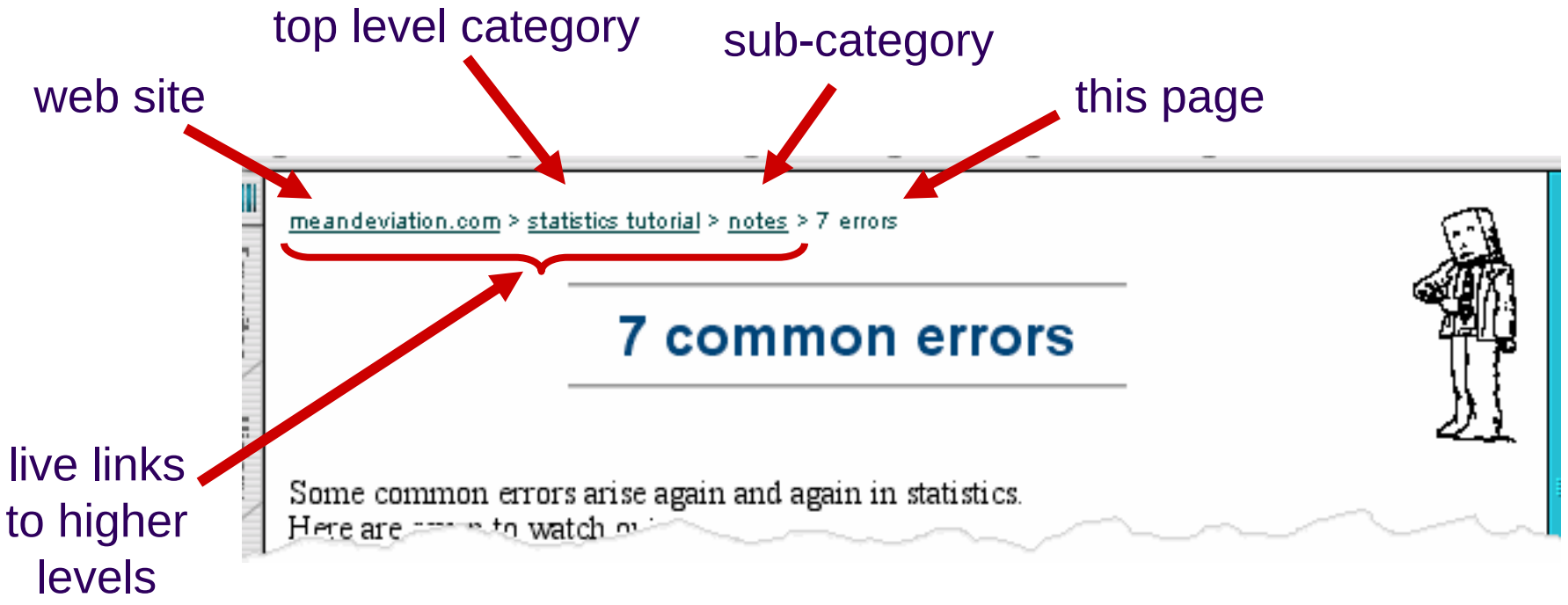
... try to avoid these bits!

Local Structure – Four Golden Rules

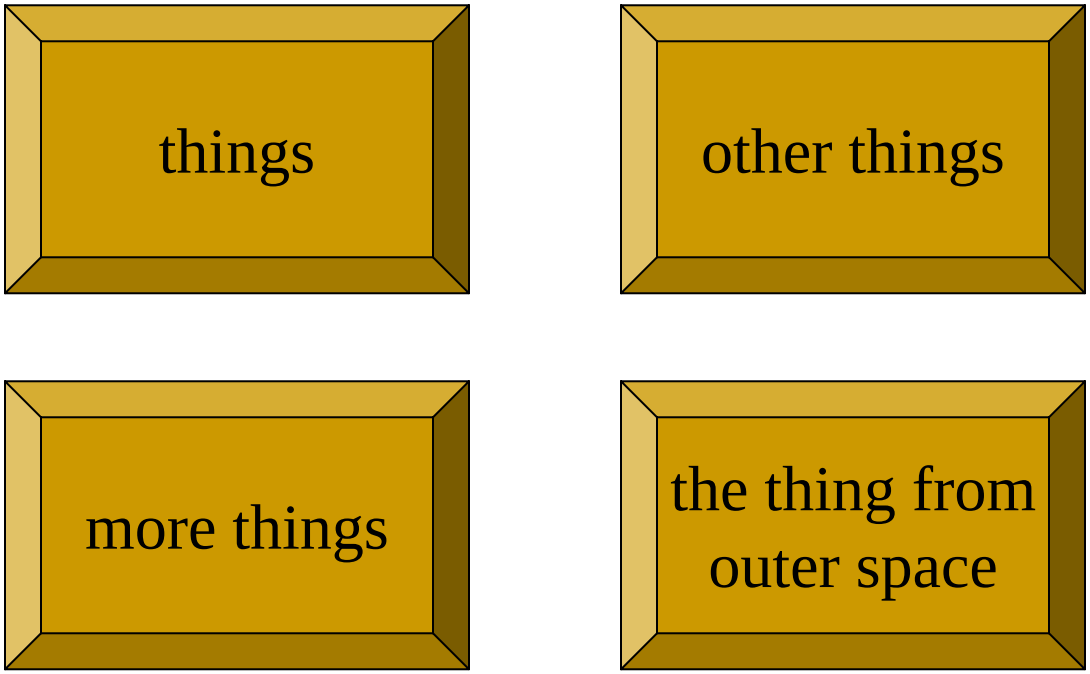
- Knowing where you are
- Knowing what you can do
- Knowing where you are going
  - Or what will happen
- Knowing where you've been
  - Or what you've done

Where are you - Breadcrumbs

Shows path through web site hierarchy



The Big Button Trap



- Where do they go?
  - lots of room for extra text!

Modes

- Lock to prevent accidental use …
  - Remove lock - ‘c’ + ‘yes’ to confirm
  - Frequent practiced action
- If lock forgotten
  - In pocket ‘yes’ gets pressed
  - Goes to phone book
  - In phone book …

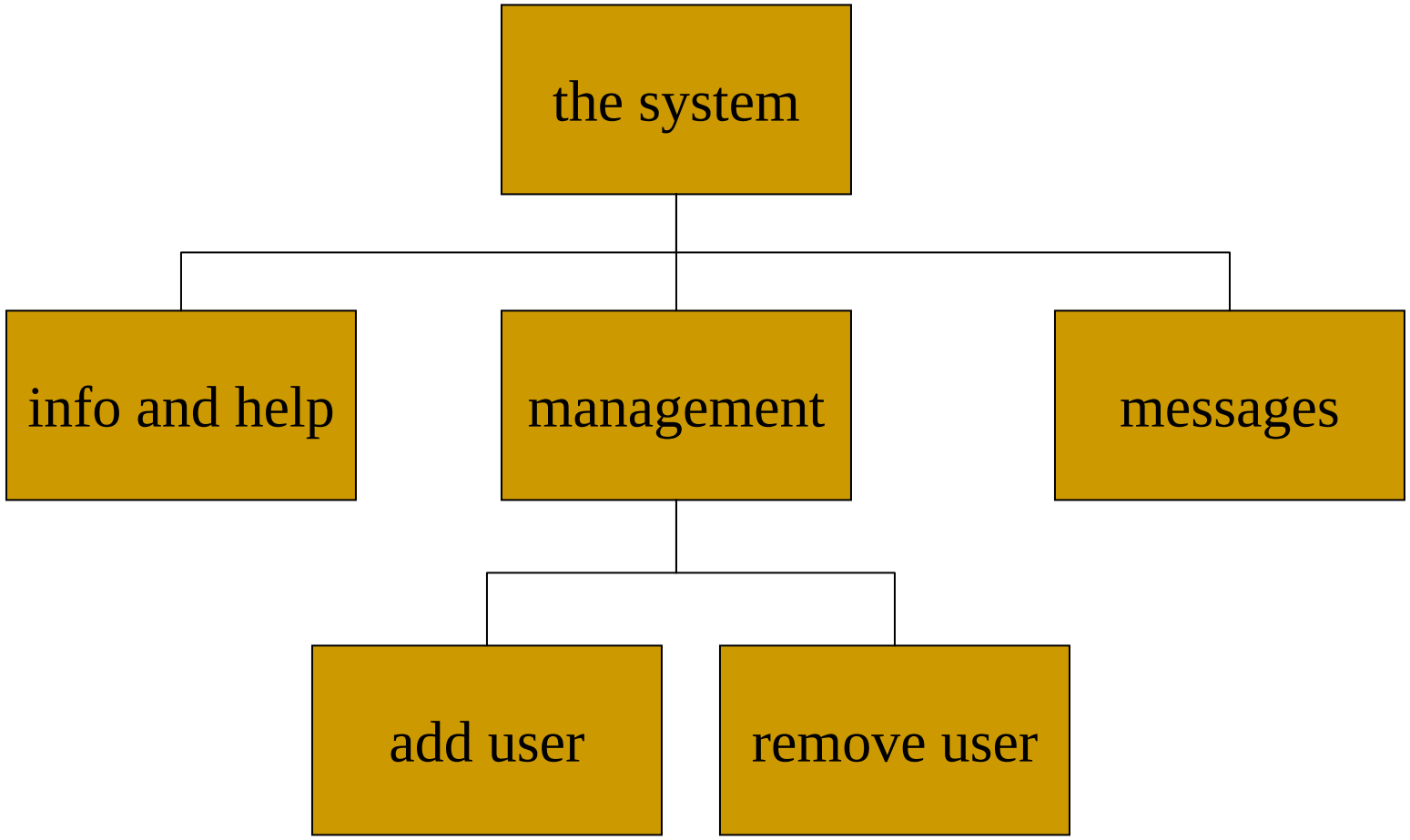
    ‘c’ – delete entry

    ‘yes’ – confirm

    … oops !

Global Structure - Hierarchical Diagrams

- Linking screens, pages etc. in logical groupings



Global Structure - Hierarchical Diagrams

- Deep hierarchies – Difficult to Navigate
- Misuse of Miller's 7 ± 2
  - Short term memory, not menu size
- Optimal?
  - Many items on each screen
  - But structured within screen – Eye can easily find the right one

Global Structure - Dialog

Minister: do you *name* take this woman …

Man: I do

Minister: do you *name* take this man …

Woman: I do

Minister: …

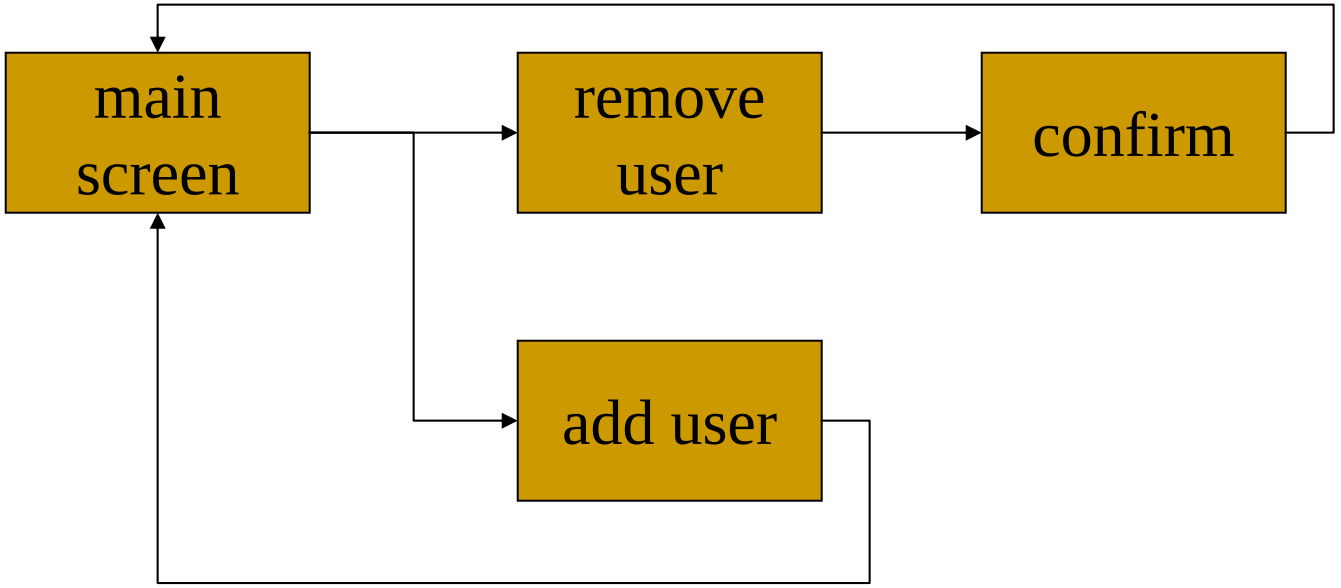
What does it mean in UI design?

Global Structure - Dialog

Minister: do you *name* take this woman …

- Marriage service
  - General flow, generic – blanks for names
  - Pattern of interaction between people
- Computer dialogue
  - Pattern of interaction between users and system
  - But details differ each time

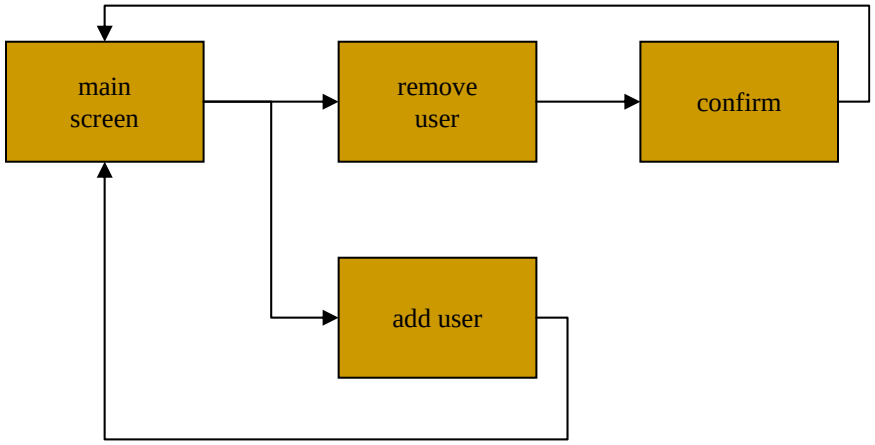
Global Structure – Network Diagrams



- Show Different Paths through the system

Global Structure – Network Diagrams

- What leads to what
- What happens when…
- More task oriented then hierarchy



References

- Chapter 5 - Human Computer Interaction by Dix et al.
- HCI Paradigms and User Centred Design, Yan Liu, Wright State University
- User Interface Hall of Fame/Shame