Human-Computer Interaction IS4300

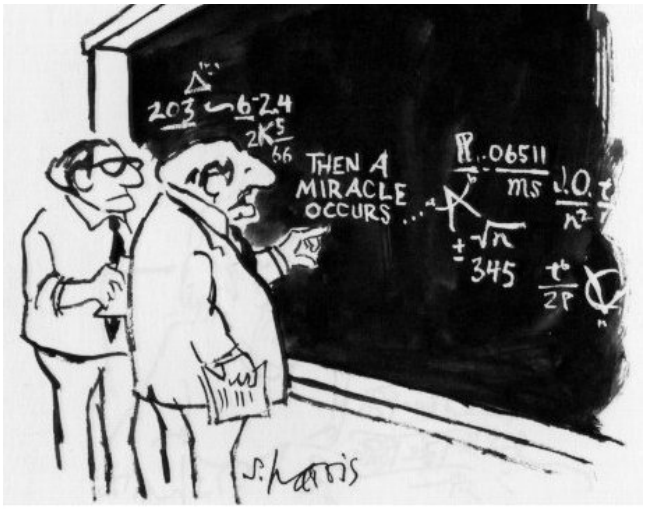
1

Projects P2

- User analysis.
  - Identify stakeholders (primary, secondary, tertiary, facilitating)
- Task analysis
  - 3+ representative tasks
  - For each
    - Hierarchical Task Analysis
- Problem scenarios

3

Design



interactions and interventions

design interactions not just interfaces

not just the immediate interaction

designing interventions not just artifacts

not just the system, but also ...

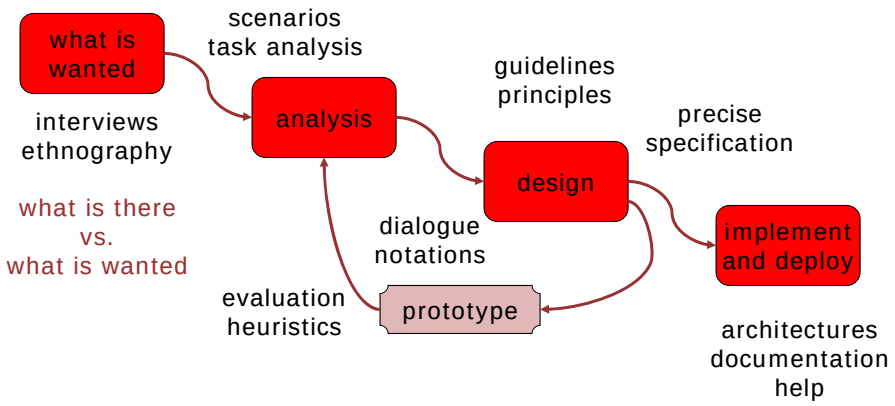
- documentation, manuals, tutorials
- what we say and do as well as what we make

what is design?

achieving goals within constraints

- goals - purpose
  - who is it for, why do they want it
- constraints
  - materials, platforms
- trade-offs

The process of design



persona

- description of an ‘example’ user
  - not necessarily a real person
- use as surrogate user
  - what would Betty think
- details matter
  - makes her ‘real’

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 has two children aged 15 and 7 and does not like to work late. She did part of an introductory in-house computer course some years ago, but it was interrupted when she was promoted and could no longer afford to take the time. Her vision is perfect, but her right-hand movement is slightly restricted following an industrial accident 3 years ago. She is enthusiastic about her work and is happy to delegate responsibility and take suggestions from her staff. However, she does feel threatened by the introduction of yet another new computer system (the third in her time at SBE).

What do you do if you don't have access to users?

How to find out requirements?

How to do formative evaluation?

12

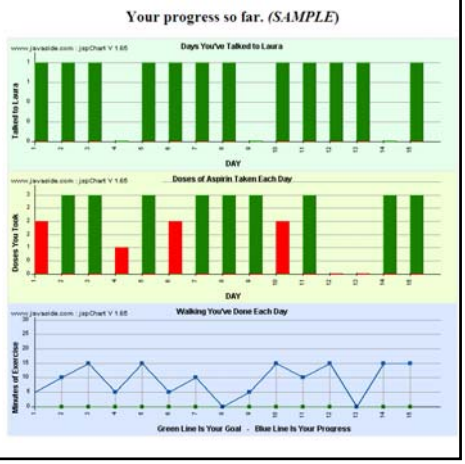
Example: Antipsychotic Medication Adherence for Young Adults with Schizophrenia

13

Antipsychotic Medication Adherence for Young Adults with Schizophrenia

Funded by Eli Lilly Pharmaceuticals – In collaboration with University of Pittsburgh School of Nursing

- 30 day, pre-post design study
- Pilot study: 20 subjects
- Intervening on three behaviors in parallel:
  - System use
  - Medication adherence
  - Physical activity



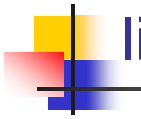
Maintaining Reality: Relational Agents for Antipsychotic Medication Adherence
Interacting with Computers, 2010, 22(4) 276-288

cultural probes

- direct observation
  - sometimes hard
    - in the home
    - psychiatric patients, ...
- probe packs
  - items to prompt responses
    - e.g. glass to listen at wall, camera, postcard
  - given to people to open in their own environment they record what is meaningful *to them*
- used to ...
  - inform interviews, prompt ideas, enculture designers

Scenarios example – 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, but feels a bit guilty. He knows he will be getting an illegal copy of the film, but decides it is OK as he is intending to go to the cinema to watch it. 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 recognised 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. ... ...



Problem with scenarios: linearity

Scenarios – one linear path through system

Pros:

- life and time are linear
- easy to understand (stories and narrative are natural)
- concrete (errors less likely)

Cons:

- no choice, no branches, no special conditions
- miss the unintended

- So:
  - use several scenarios
  - use several methods

also play act ...

- role play
- mock up device
- pretend you are doing it

Screen design and layout

- Defer two classes!

21

Activity Design

Rosson & Carrol Ch 3

- aka “conceptual design”
- First phase of design reasoning

- Current practice is transformed into new ways of behavior
- Focus on *what* the system will do, without the complexity of UI concerns
- Goal: specify system functionality

22

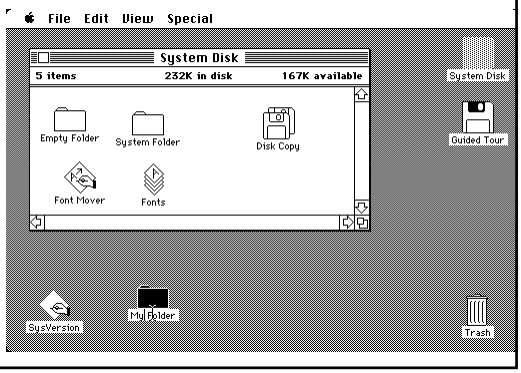
Activity Design

- How do we design activities that users can readily understand?
  - Maximize visibility
  - Allow easy construction of valid conceptual models

23

Interaction metaphors

- Making the interaction seem like something the user is already familiar with
  - Desktop, Trash can, etc.
  - Shopping Mall
  - Direct Manipulation



Interaction metaphors

- Interface metaphors evoke an *initial* mental model in users of the system's structure and operation.
- Metaphors should relate to users' past experiences and should be consistent.
- Q: What dimension of usability do metaphors most help with?

25

VSF Activity	Real-World Metaphor	Implications for VSF Activities
Constructing an exhibit is like writing a . . .	Lab journal	Informal and personal notes, raw data, work in progress
	Documentary	Carefully constructed "story" of how the project happened
Coaching a student is like being a . . .	Peer (colleague)	Social support, reactions to ideas, suggestions
	Director	Specific directions about exhibit content or layout
Visiting the fair is like going to a . . .	Study room	Quiet and focused attention to pieces of information
	Public lecture	Receiving preorganized information as part of a group
	Cocktail party	Informal discussions, moving from one group to another
Judging exhibits is like making a . . .	Balance sheet	Mathematical model of data, equations, results
	Discussion	Extended conversations about reactions, values, criteria
Summarizing the fair is like creating a . . .	Report card	Assessment on well-established categories of achievement
	Guided tour	Interactive visit of best sites with helpful commentary
	Thank-you note	Personal recognition of participants, mentors, judges, etc.

Agent Metaphor

- A natural UI metaphor for an intelligent agent may be an anthropomorphic character
- Advantages?
- Are there downsides to this?

Metaphors

- Multiple metaphors can be mixed (e.g., windows and desktops)
- One metaphor is better than another if it leads to more correct predictions about a system's behavior.
- You don't *have* to use metaphors.

Choosing the right metaphor

- Understand how the system works / is supposed to work.
- Figure out what kinds of problems users have.
  (watch them use similar systems)
  (create prototypes and watch users)
- Generate metaphors and examine their properties.
- Key question: will users "get it"? How do you tell?

Problems with metaphors?

- Sometimes they break conventional and cultural rules
  - e.g. recycle bin placed on desktop
- Can overly constrain designers in the way they conceptualize a problem space
- Forces users to understand the system in terms of the metaphor
- Use of metaphor – as with any aspect of design – should be tentative and subject to change if it tests poorly.

Exercise

- List some metaphors for the optometrist web site.
- Representative Tasks:
  - T1. Find the cost of these:

  - T2. Find the standard warranty on Ray Ban frames.
  - T3. Order 3 red, 3 green of these: given the following payment info ...

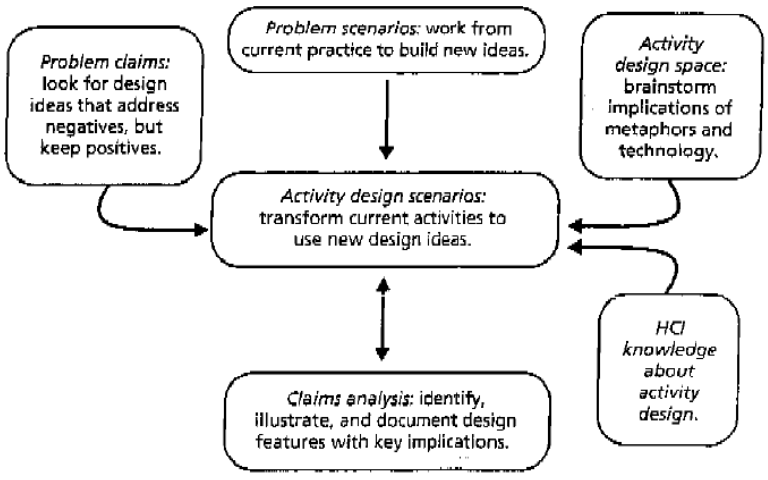
Group Exercise

- Groups of 2-3
- Pick one of your ethnographic study tasks
- Identify 3 metaphors you could use
  - Pros & Cons of each
  - In what ways do they lack metaphoric consistency (when do they break)?

32

Activity Design

Problem Scenarios -> Activity Scenarios



33

Activity Scenarios

- For each Problem Scenario
  - Think how your interaction metaphors & technology can be introduced to address the problem
  - Think through how the actor(s) will use them
  - Document the new story as an Activity Scenario
  - Document key features/issues and pros/cons of each in a claims analysis
- Don't discuss interface design yet!

Example Problem Scenario	Transformed into Activity Design Scenario
1) Sally plans her exhibit on black holes.	*1) Sally plans her exhibit on black holes.*
Background on Sally, her motivations, . . .	Background on Sally, her motivations, . . .
Sally is a bit worried about the space and materials that are provided to everyone—a standard 4'×6' posterboard, with a two-foot shelf underneath for supporting physical materials or models. This year she has explored some new methods, for example, an Authorware simulation that illustrates her theory of black hole formation. But she knows from past years that there are few electrical outlets in the gym, and she doesn't have a laptop to use in the exhibit anyway. She checks with the organizer, Rachel Berris, just in case, but Rachel confirms that the school district has no money for special resources such as laptops, and that she will be able to use only battery-powered equipment.	Sally is curious about how creating a virtual exhibit will be different from the ones she has created in the past. She hopes that she will have more flexibility in presenting her ideas, and thinks she might be able to come up with some interactive elements that she knows the judges will like. In fact, she has already developed an Authorware simulation that illustrates her theory of black hole formation, and she wants to include this in her virtual exhibit.
As she studies her simulation, Sally thinks of	When Sally goes to the exhibit construction area, she finds a template with a suggested layout—title page, abstract, slide show, detailed results, project report, and bibliography. At first she is worried that this will not fit the materials she has already created. But when she starts adding material,

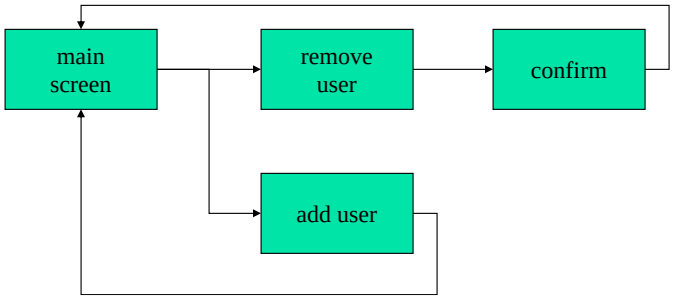
Proposed Activity Design Feature	Hypothesized Pros (+) or Cons (–) of the Feature
Putting exhibits online	+ remove many constraints regarding space and diversity in layout + facilitates an iterative process of design, construction, and editing + simplifies access to the exhibits by people separated in space and time – but may lead to a decreased emphasis or interest in physical components – but exhibitors may try to include too much, making exhibits complex
An exhibit template with traditional science project components	+ simplifies and guides the exhibit planning process + builds on prior exhibiting experience of fair participants + enhances consistency and comparability of exhibits for viewers and judges – but may discourage more inventive and creative exhibit structures

Update Task Hierarchies

- As you design your interaction you may need to change the Task Hierarchies from Requirements Analysis to reflect a new way of doing things.
- Alternate representations (Dix et al, Stone, et al)...

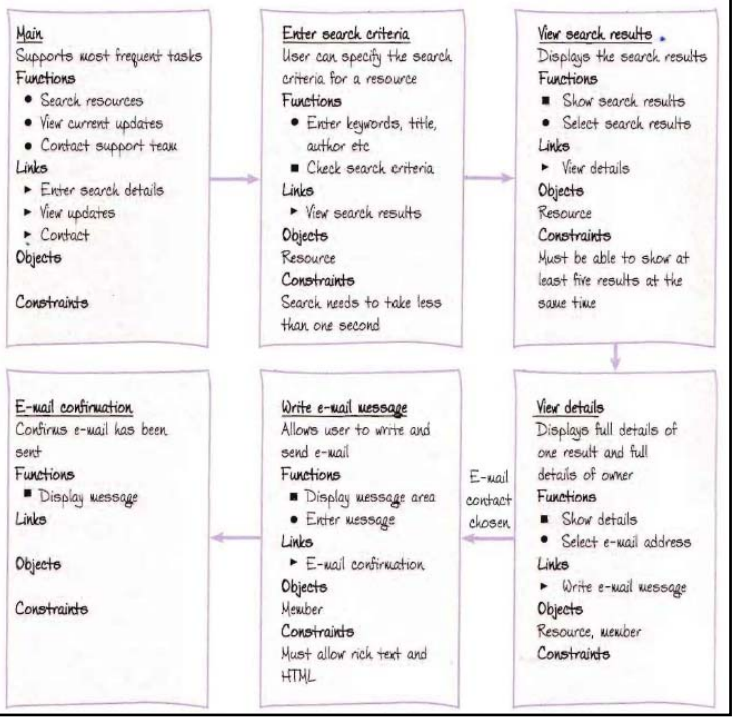
37

network diagrams



- show different paths through system

Container diagram



Exercise

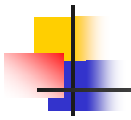
- Same groups and task
- Pick your favorite overall metaphor and write an activity scenario
- Sketch a Task Hierarchy or Network Diagram

40

P3 – Conceptual Design (1 wk)

- Convert task scenarios and hierarchical task analyses into a conceptual design.
- Metaphors.
  - Make a list of possible interaction metaphors for your interface (per the examples in class). For each of your task scenarios list at least two options for interaction metaphors and some of the implications of your choice.
- Activity Design Scenarios
  - Transform each of your problem scenarios into an activity design scenario, documenting analyses of design features, following the examples in Rosson & Carroll Ch 3, Figures 3.4 and 3.5.

41



P3 – Conceptual Design (1 wk)

- At this stage you should still be focused on the abstract steps of each task, including user input and system output actions, and should not be thinking about the details of your interface's appearance yet.
- What to Post. Your report should include three detailed activity scenarios. At this stage you should still be focused on the abstract steps of each task, including user input and system output actions, but should not be thinking about the details of your interface's appearance yet. If you have updated your task models during this exercise please provide them as well.

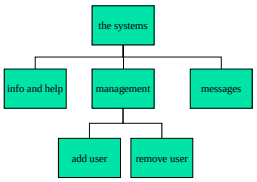
42

To Do

- Read
  - 3 CHI papers
  - Rosson Ch 4 & 5 (optional)
  - Clinical trial search engine (optional)
  - Swing events, read all except
    - *Implementing Listeners for Commonly Handled Events*
      - Only need to read *How to Write an Action Listener*
- Project
  - P3 – Conceptual design – due in 1 week
- Homework
  - I4 – Swing restaurant UI applet – DUE NEXT CLASS

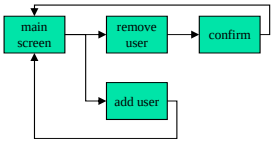
43

navigation design



local structure – single screen

global structure – whole site/app



levels

- widget choice
  - menus, buttons etc.
- screen design
- application navigation design
- environment
  - other apps, O/S

think about structure

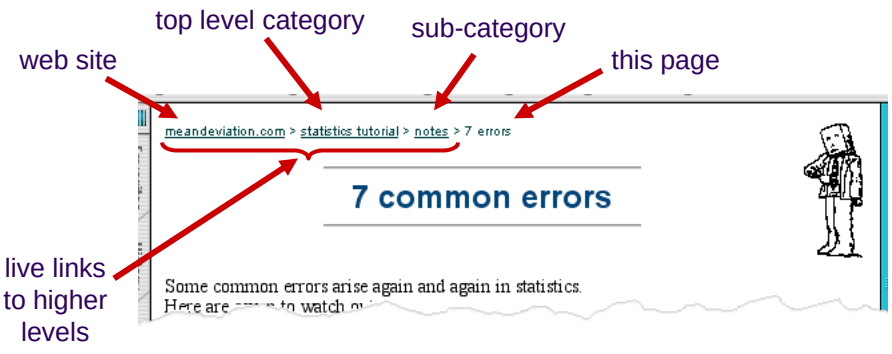
- within a screen
  - later ...
- local
  - looking from this screen out
- global
  - structure of site, movement between screens
- wider still
  - relationship with other applications

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

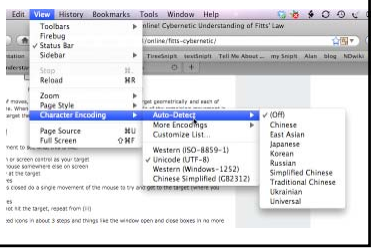
where you are – breadcrumbs

shows path through web site hierarchy

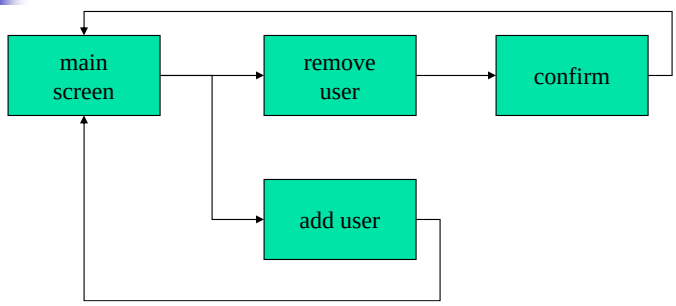


navigating hierarchies

- deep is difficult!
- misuse of Miller's 7 ± 2
  - short term memory, not menu size
- optimal?
  - many items on each screen
  - but structured within screen



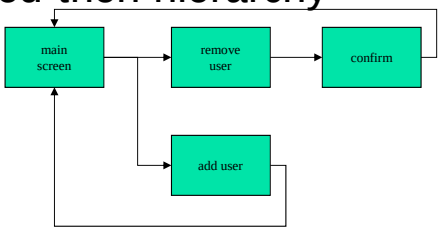
network diagrams

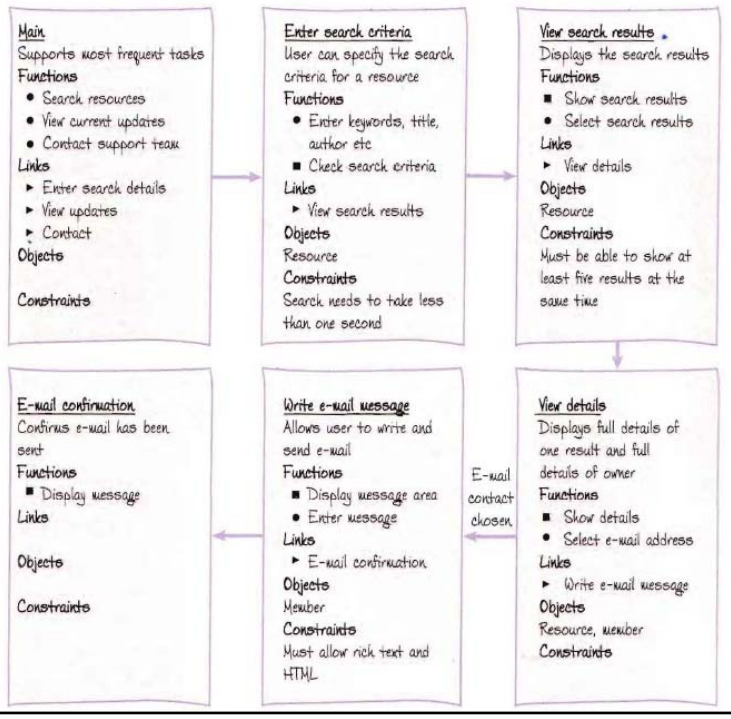


- show different paths through system

network diagrams ctd.

- what leads to what
- what happens when
- including branches
- more task oriented then hierarchy



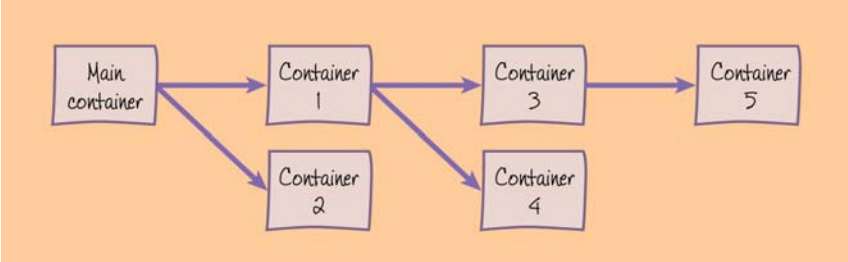


54

Conceptual Design

- The process of establishing the underlying organization and structure of a UI

  Content diagram – low fidelity prototype that represents the organization and structure of the user interface from the designer's perspective.



Content Diagram

- To make one:
  - Start with concrete use cases (hierarchical task analyses)
  - Identify primary task objects, attributes, actions
  - Identify the containers and the task objects in each one
  - Link containers to show navigation flow.

Content Diagram

A Container is an abstract representation of part of the user's work and the functions that are required to do that part of the work.

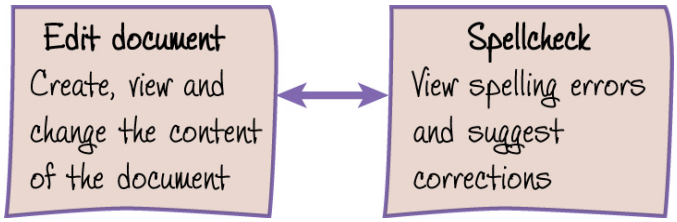
Template for Containers

Name
Purpose
Functions
- {performed by the user}
- {performed by the computer system}

Links
- {single link}
- {double link}

Objects
Constraints

Content Diagram



Double Link

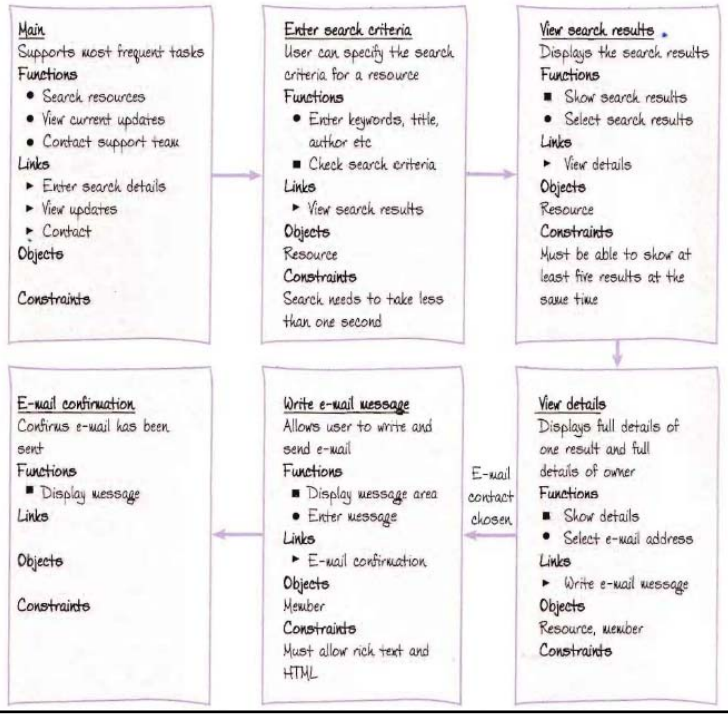
Task Objects, Attributes, Actions

- Task Objects
  - units of information or data with which the users interact to carry out their tasks.
- Attributes
  - task object components / properties / child objects
- Actions
  - actions performed on task objects

Marking up Concrete Use Cases / Task Scenarios / HTNs

- Identify objects & attributes
  - Task objects – single underline
  - Attributes of objects – double underline

User action	System response
Academic enters one or more of the search parameters for the CD-ROM: title, year and platform	The system displays the search results
The academic selects a search result	The system displays the full details of the CD-ROM and the contact details for its owner, who is a research student
The academic chooses the e-mail address	The system displays a message area
The academic writes and sends the e-mail request	The system confirms the sending of the request



61

Exercise

- Specify container diagram for optometrist web site
- Representative Tasks:
  - T3. Order 3 red, 3 green of these: given the following payment info ...

62