STYLES OF INTERACTION

Styles Of Interaction

1. *Direct manipulation* The user interacts directly with objects on the screen. Direct manipulation usually involves a pointing device (a mouse, a stylus, a trackball or, on touch screens, a finger) that indicates the object to be manipulated and the action, which specifies what should be done with that object. For example, to delete a file, you may click on an icon representing that file and drag it to a trash can icon.
2. *Menu selection* The user selects a command from a list of possibilities (a menu). The user may also select another screen object by direct manipulation, and the command operates on that object. In this approach, to delete a file, you would select the file icon then select the delete command.
3. *Form fill-in* The user fills in the fields of a form. Some fields may have associated menus, and the form may have action 'buttons' that, when pressed, cause some action to be initiated. You would not normally use this approach to implement the interface to operations such as file deletion. Doing so would involve filling in the name of the file on the form then 'pressing' a delete button.
4. *Command language* The user issues a special command and associated parameters to instruct the system what to do. To delete a file, you would type a delete command with the filename as a parameter.
5. *Natural language* The user issues a command in natural language. This is usually a front end to a command language; the natural language is parsed and translated to system commands. To delete a file, you might type 'delete the file named xxx .

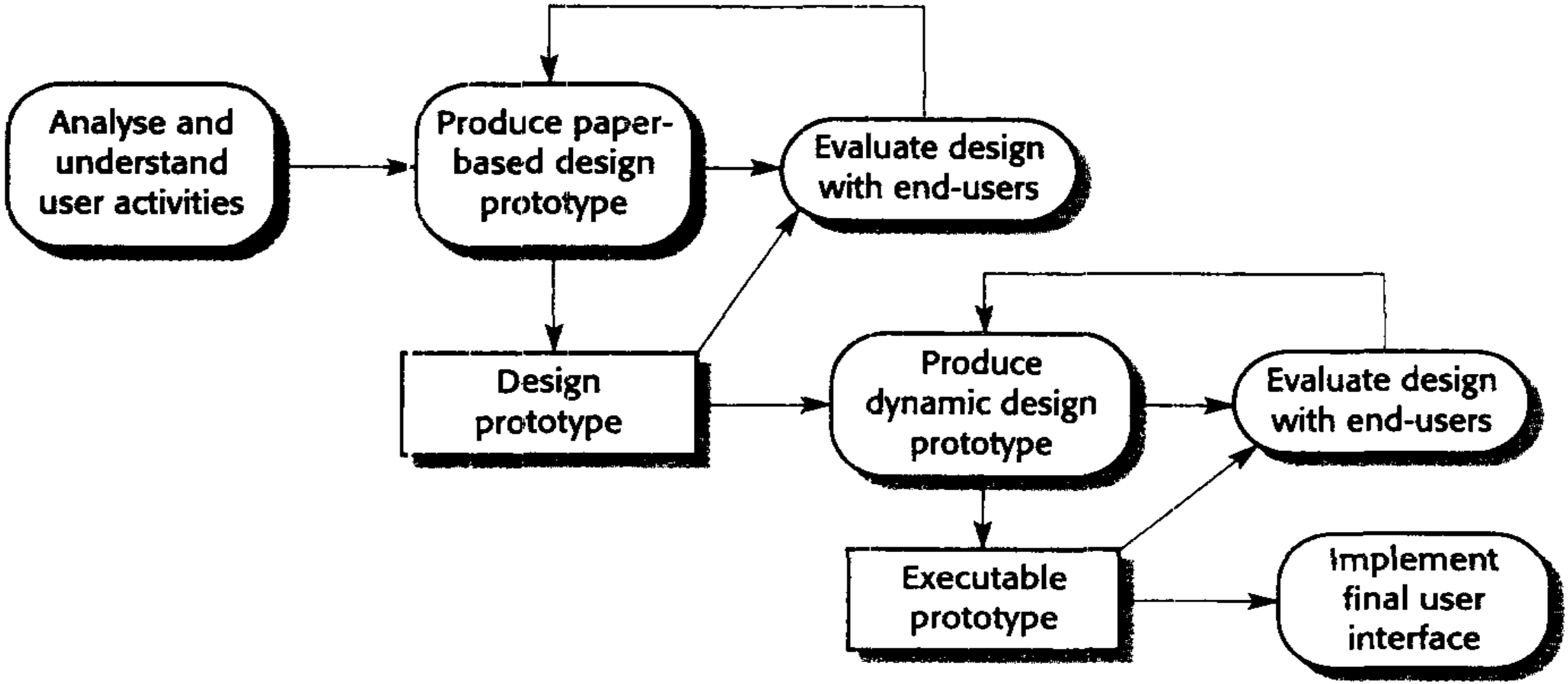
Advantages And Disadvantages Of Interaction Styles

Interaction style	Main advantages	Main disadvantages	Application examples
Direct manipulation	Fast and intuitive interaction Easy to learn	May be hard to implement Only suitable where there is a visual metaphor for tasks and objects	Video games CAD systems
Menu selection	Avoids user error Little typing required	Slow for experienced users Can become complex if many menu options	Most general-purpose systems
Form fill-in Easy to learn Checkable	Simple data entry	Takes up a lot of screen space Causes problems where user options do not match the form fields	Stock control Personal loan processing
Command language	Powerful and flexible	Hard to learn Poor error management	Operating systems Command and control systems
Natural language	Accessible to casual users Easily extended	Requires more typing Natural language understanding systems are unreliable	Information retrieval systems

User Interface Design Process

- It is an interactive process where users interact with designers and interface prototype to decide the features, organisation and the look and the feel of the system user interface
- Sometimes the interface is separately prototyped in parallel with other software engineering activities
- Most commonly the user interface design proceeds incrementally as the software is developed
- Before you start programming there should be some paper based designs developed
- The overall user interface design process is given in the figure

User Interface Design Process



Core Activities In The User Design Process

1. *User analysis* In the user analysis process, you develop an understanding of the tasks that users do, their working environment, the other systems that they use, how they interact with other people in their work and so on. For products with a diverse range of users, you have to try to develop this understanding through focus groups, trials with potential users and similar exercises.

2. *System prototyping* User interface design and development is an iterative process. Although users may talk about the facilities they need from an interface, it is very difficult for them to be specific until they see something tangible. Therefore, you have to develop prototype systems and expose them to users, who can then guide the evolution of the interface.

3. *Interface evaluation* Although you will obviously have discussions with users during the prototyping process, you should also have a more formalised evaluation activity where you collect information about the users actual experience with the interface.

User Analysis

- A critical UI design activity is the analyses of the user activities that are to be supported by the computer system.
- To develop the understanding between the users requirements with the system techniques such as task analysis ethnographic studies, user interviews and observations or a commonly a mixture of all these
- A challenge for the engineers involved in the user analysis is to find a way to describe user analyses so that they communicate the essence of tasks to other designers and to the users

User Analysis

- UML sequence charts may be able to describe user interactions and are ideal for communicating with software engineers
- The other users may think that the charts are technical and hence will not be able to understand them but it is very important to engage the users in the design process and hence the engineer has to develop a natural language to describe user activities
- Following is the library interaction scenario

Library Interaction Scenario

Jane is a religious studies student writing an essay on Indian architecture and how it has been influenced by religious practices. To help her understand this, she would like to access pictures of details on notable buildings but can't find anything in her local library. She approaches the subject librarian to discuss her needs and he suggests search terms that she might use. He also suggests libraries in New Delhi and London that might ha e this material, so he and Jane log on to the library catalogues and search using these terms. They find some source material and place a request for photocopies of the pictures with architectural details, to be posted directly to Jane.

User Analysis

- The above figure is an example of natural language scenario that is developed during the specification and design process.
- It describes a situation where a student need to retrieve information from another library
- From the scenario a designer can see following requirements
  - Users might not be aware of appropriate search terms and may need to access ways of helping them choose search terms
  - Users have to be able to select collections to search
  - Users need to be able to carry out searches and request copies of relevant material
- The user analysis does not generate very specific user interface requirements but just helps to understand the needs and concerns of the system users
- There are various techniques of user analysis but the most commonly used is hierarchical task analysis
- The following figure illustrates how HTA helps in the problem for library interaction scenario

Hierarchical Task Analysis