User Interface Design

Lecture #4

Part-B

Agenda

- Principles on User Interface Design
  - Principle 1: Recognize the Diversity
    - Usage Profiles
    - Task Profiles
    - Interaction styles
  - **Principle 2: Eight Golden Rules**
  - **Principle 3: Prevent Errors**

Principle 2: Eight Golden Rules

- *Ben Shneiderman* in his classic books on Human Computer Interaction proposes eight rules as the underlying principles on effective interface design

- The rules are derived heuristically from experience

Principle 2: Eight Golden Rules

- **Objective of the rules**
  - Increase the productivity of the user
    - Less user's error
    - Subjective satisfaction
  - Increase feeling of competence
  - Increase mastery over the system
  - Increase control over the system

Eight Golden Rules

- The eight golden rules of design those are applicable in interactive systems

1. Strive for consistency
2. Enable frequent users to use shortcuts
3. Offer informative feedback
4. Design dialogues to yield closure
5. Offer error prevention and simple error handling
6. Permit easy reversal of actions
7. Support internal locus of control
8. Reduce short-term memory load

1: Strive for Consistency

- Consistency implies same thing in similar situation

Example 1:

Consistent Actions	Inconsistent Actions
Insert | Delete character	Type | Erase character
Insert | Delete word	Bring | Remove word
Insert | Delete line	Create | Destroy line
Insert | Delete paragraph	Birth | Kill paragraph

1: Strive for Consistency

- There are many form of consistency

Example 2:

Inconsistent Interface Design

1: Strive for Consistency

- There are many form of consistency

Example 1:

Consistent interface design

1: Strive for Consistency

- There are many form of consistency

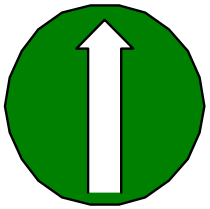
Example 1:

Better consistency in an interface design

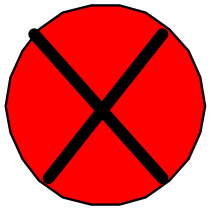
1: Strive for Consistency

- There are many form of consistency

Example 1:



Start



Stop

Another better consistency in an interface design

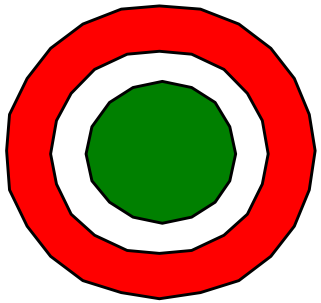
1: Strive for Consistency

- The inconsistency in interface results
  - Longer time to learn
  - Will cause more errors
  - Will slow down users
  - Will be harder for users to remember

1: Strive for Consistency

- The Rule 1 advices us to follow
  - Consistent sequence of actions should be used in similar situations
  - Identical terminology should be used in prompts, menus, help screens etc.
  - Consistent color, layout, capitalization, fonts etc. should be employed throughout

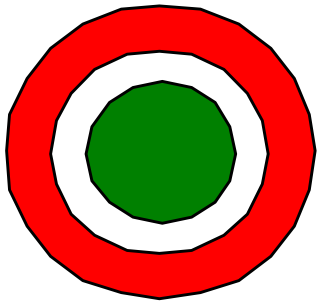
and so on …..



2: Enable to Use Shortcuts

- For most frequently used actions, reduce the number of interactions
  - Pace of interaction
  - Short response time
  - Faster display rates
- To achieve these goals, a good UID should have
  - A set of familiar abbreviations
  - Special keys for most frequently used tasks
  - Hidden commands
  - Macro facilities

  etc.



3: Offer Informative Feedback

- System should response immediately with respect to a user's system
  - For frequent and minor actions, the response can be modest

    Example: To save a file as .HTML type

  - For infrequent and major actions, the response should be more substantial

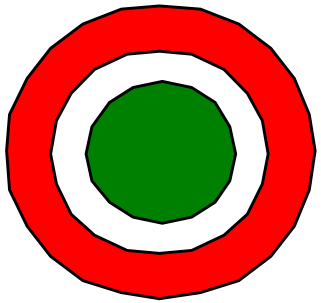
    Example: Installation of a device or software

3: Offer Informative Feedback

- Visual representation of the objects of interest provides a convenient environment for showing change

  Example: Double-click on .PDF icon to open the file in Adobe Acrobat 4.0 and above

- The informative feedback at the completion of a group of actions give users
  - the satisfaction of accomplishment
  - a sense of relief
  - the signal to drop contingency plan and options from their minds
  - an indication that the way is clear to prepare for their next group of actions



4: Design Dialogs

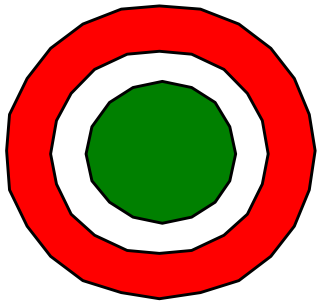
- Sequence of actions to be organized into a beginning, middle and end

  Example:

  - Progress bar while user burns a CD
  - Time left etc.

- Brief and to-the-point dialog boxes to guide the users towards their goal

  Example: Help Assistant in Microsoft Office



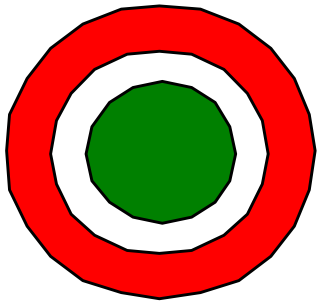
5: Error Prevention and Handling

- Design the system (and hence interface) such that user cannot make a serious error

  Example: Perform menu selection than to form fill-in

- If users make an error, the system should detect the error and offer simple, constructive and specific instructions for recovery
  - System should highlights the right steps to go ahead

    Example: How to create a master in Power Point

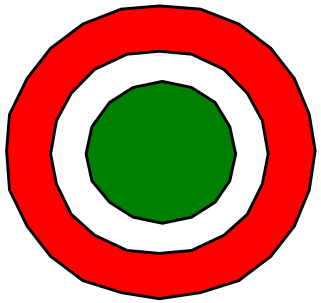


6: Permit Easy Reversal of Actions

- As much as possible, actions should be reversible

  Example: Undo/Redo

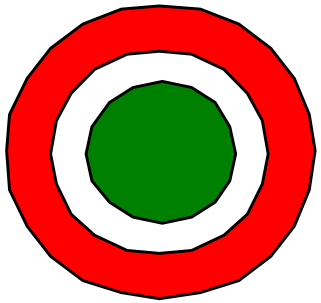
- This feature relieves anxiety, since the user knows that error can be undone, thus encouraging exploration of unfamiliar options



7: Internal Locus of Control

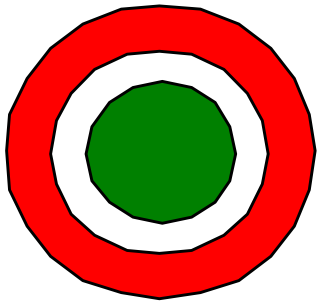
- Interface should be designed to relief anxiety and dissatisfaction from
  - Surprising system response
  - Inability or difficulty in obtaining necessary information
  - Inability to accomplish a desire task

- Users strongly desire the sense that the system is user friendly and it responds to their actions (as applied by the users according to their perceptions)



8: Reduce Short-term Memory Load

- To encompass the limitation of human information processing short-term memory
  - Displays be kept simple
  - Multiple page displays be consolidated
  - Windows-motion frequency be reduced
  - Online access to command-syntax forms, abbreviations, codes and other information should be provided



Principle 3: **Prevent Errors**

No medicine can prevent death

No rule can prevent error

- Sources of errors
  - User errors
    - Inexperienced users
    - Expectation of infeasible task
  - Design errors
    - Bad design (design with intuition only, not adhere to any theory or models)
    - Design that does not follow any principles

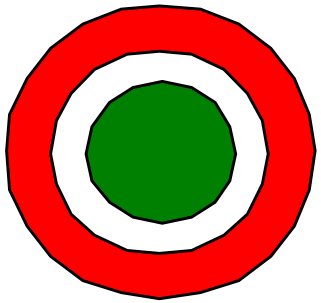
Principle 3: **Prevent Errors**

- To deal with errors
  - Error messages should be provided by the system
    - Experimental study reveals that proper error messages led to improve success as repairing errors, lower error rates and increased subjective satisfaction (in fact user can learn the system from error messages)
  - Superior error messages
    - More specific (unambiguous)
    - Constructive (telling the user what to do rather than merely reporting the errors)

Principle 3: **Prevent Errors**

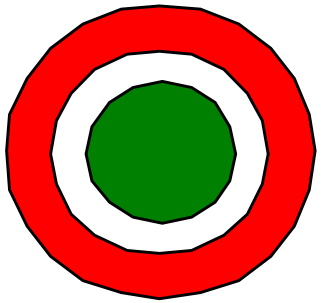
- Other than the error messages, more effective approach to prevent errors from occurring
  - Understand the nature of errors
    - People make mistakes or "slips" that designers help them to avoid by organizing screen, menus etc.
  - More design guidelines (Norman, 1983)
    - Do not have mode (such as edit, insert etc.)
    - Do offer feedback about the state of the system
    - To design for consistency in command

    and so on….



Summary

- Designing user interface is a complex and highly creative process that blends intuition, experience and careful consideration of numerous technical issues (such as theory, models etc.)
- Designer must begin with a thorough task analysis
- Designer must begin with a careful specification of the user communities
- Varieties of interaction styles can be blend together to obtain the most effective human-computer interface
- Designer must adhere to the underlying principles on user interface design so far the strategies of effective human-computer interaction are concerned
- Ben Shneidreman's Eight Golden Rules can be taken as a metric for evaluations usability



Recommended Materials

- My Home page

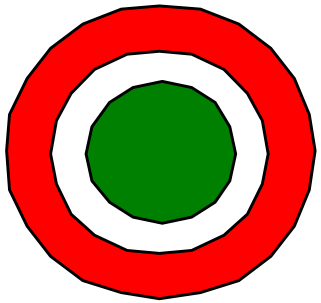
  http://facweb.iitkgp.ernet.in/~dsamanta

  (For the presentation slides of the current lecture

- Book

  Designing the User Interface: Strategies for Effective Human-Computer Interaction (3rd Ed.) **Chapter 2**

  Ben Shneiderman, Pearson Education, New Delhi, 2004



Next lecture will be on

Interaction Design with Direct Manipulation