DESIGN RULES

Design Rules
- We require design rules, which are rules a designer can follow in order to increase the usability of the eventual software product.
- We can classify these rules along two dimensions based on the rule's authority and generality.
- By authority, we mean an indication of whether or not the rule must be followed in design or whether it is only suggested.
- By generality, we mean whether the rule can be applied to many design situations or whether it is focused on a more limited application situation. For example: Your software must be user friendly, may it be mobile or web based application.

Designing for maximum usability – the goal of interaction design

- Principles of usability - general understanding
- Standards and guidelines - direction for design
- Design patterns - capture and reuse design knowledge

Types of Design Rules

- principles - abstract design rules, low authority and high generality
- standards - specific design rules, high authority and limited application
- guidelines – low authority and more general application

Principles to support usability

- Learnability - the ease with which new users can begin effective interaction and achieve maximal performance
- Flexibility - the multiplicity of ways the user and system exchange information
- Robustness - the level of support provided the user in determining successful achievement and assessment of goal-directed behaviour

Principles of learnability

Predictability
- determining effect of future actions based on past interaction history
- operation visibility

Synthesizability
- assessing the effect of past actions
- immediate vs. eventual honesty

Familiarity
- how prior knowledge applies to new system\
- guessability; affordance

Generalizability
- extending specific interaction knowledge to new situations

Consistency
- likeness in input/output behaviour arising from similar situations or task objectives

Principles of flexibility

Dialogue initiative
- freedom from system imposed constraints on input dialogue
- system vs. user pre-emptiveness

Multithreading
- ability of system to support user interaction for more than one task at a time
- concurrent vs. interleaving; multimodality

Task migratability
- passing responsibility for task execution between user and system

Substitutivity
- allowing equivalent values of input and output to be substituted for each other
- representation multiplicity; equal opportunity

Customizability
- modifiability of the user interface by user (adaptability) or system (adaptivity)

Principles of robustness

Observability
- ability of user to evaluate the internal state of the system from its perceivable representation
- browsability; defaults; reachability; persistence; operation visibility

Recoverability
- ability of user to take corrective action once an error has been recognized
- reachability; forward/backward recovery; commensurate effort

Responsiveness
- how the user perceives the rate of communication with the system
- Stability

Task conformance
- degree to which system services support all of the user's tasks
- task completeness; task adequacy

Using Design Rules
- design and guidelines to direct design activity

Design rules
- suggest how to increase usability
- differ in generality and authority

Standards
- set by national or international bodies to ensure compliance by a large community of designers standards require sound underlying theory and slowly changing technology
    - underlying theories (physiology or ergonomics/human factor, etc)
    - change: less in H/W as compare to software.=
- hardware standards more common than software high authority and low level of detail
- ISO 9241 defines usability as effectiveness, efficiency and satisfaction with which users accomplish tasks
- Usability: The effectiveness, efficiency and satisfaction with which specified users achieve speficied goals in particular environments.

Guidelines
- more suggestive and general
- many textbooks and reports full of guidelines
- abstract guidelines (principles) applicable during early life cycle activities
- detailed guidelines (style guides) applicable during later life cycle activities
- understanding justification for guidelines aids in resolving conflicts

Golden rules and heuristics

- " Broad brush" design rules (not applicable to every specific situation but) a <u>useful check list</u> for design
- Useful check list for good design
- Better design using these than using nothing!
- Different collections e.g. Nielsen's 10 Heuristics, Shneiderman's 8 Golden Rules and Norman's 7 Principles

Shneiderman's 8 Golden Rules
1. Strive for consistency
2. Enable frequent users to use shortcuts
3. Offer informative feedback
4. Design dialogs 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

Norman's 7 Principles
1. Use both knowledge in the world and knowledge in the head.
2. Simplify the structure of tasks.
3. Make things visible: bridge the gulfs of Execution and Evaluation.
4. Get the mappings right.
5. Exploit the power of constraints, both natural and artificial
6. Design for error.
7. When all else fails, standardize.

HCI design patterns
- An approach to reusing knowledge about successful design solutions
- Originated in architecture: Alexander
- A pattern is an invariant solution to a recurrent problem within a specific context.
- Examples:
  a. Light on Two Sides of Every Room (architecture)
  b. Go back to a safe place (HCI)
- Patterns do not exist in isolation but are linked to other patterns in languages which enable complete designs to be generated.

Characteristics of patterns
- capture design practice not theory
- capture the essential common properties of good examples of design
- represent design knowledge at varying levels: social, organisational, conceptual, detailed
- embody values and can express what is humane in interface design
- are intuitive and readable and can therefore be used for communication between all stakeholders
- a pattern language should be generative and assist in the development of complete designs.