7.1 User Centred Design

- Software development should focus on the needs of users
  - Understand your users
  - Design software based on an understanding of the users' tasks
  - Ensure users are involved in decision making processes
  - Design the user interface following guidelines for good usability
  - Have users work with and give their feedback about prototypes, on-line help and draft user manuals

The importance of focusing on users

- Reduced training and support costs
- Reduced time to learn the system
- Greater efficiency of use
- Reduced costs by only developing features that are needed
- Reduced costs associated with changing the system later
- Better prioritizing of work for iterative development
- Greater attractiveness of the system, so users will be more willing to buy and use it

7.2 Characteristics of Users

- Software engineers must develop an understanding of the users
  - Goals for using the system
  - Potential patterns of use
  - Demographics
  - Knowledge of the domain and of computers
  - Physical ability
  - Psychological traits and emotional feelings

7.3 Basics of User Interface Design

- User interface design should be done in conjunction with other software engineering activities.
- Do use case analysis to help define the tasks that the UI must help the user perform.
- Do *iterative* UI prototyping to address the use cases.
- Results of prototyping will enable you to finalize the requirements.

Usability vs. Utility

- Does the system provide the *raw capabilities* to allow the user to achieve their goal?
  - This is *utility*.

- Does the system allow the user to *learn and to use* the raw capabilities *easily*?
  - This is *usability*.

- *Both utility and usability are essential*
  - They must be measured in the context of particular types of users.

Aspects of usability

- Usability can be divided into separate aspects:
  - Learnability
    - The speed with which a new user can become proficient with the system.
  - Efficiency of use
    - How speed with which an expert user can do their work.
  - Error handling
    - The extent to which it prevents the user from making errors, detects errors, and helps to correct errors.
  - Acceptability.
    - The extent to which users *like* the system.

7.7 Difficulties and Risks in UI Design

- **Users differ widely**
  - *Account for differences among users when you design the system.*
  - *Design it for internationalization.*
  - *When you perform usability studies, try the system with many different types of users.*
- **User interface implementation technology changes rapidly**
  - *Stick to simpler UI frameworks widely used by others.*
  - *Avoid fancy and unusual UI designs involving specialized controls that will be hard to change.*

Difficulties and Risks in UI Design

- **User interface design and implementation can often take the majority of work in an application**:
  - *Make UI design an integral part of the software engineering process.*
  - *Allocate time for many iterations of prototyping and evaluation.*
- **Developers often underestimate the weaknesses of a GUI**
  - *Ensure all software engineers have training in UI development.*
  - *Always test with users.*
  - *Study the UIs of other software.*