Lecture 16. Design Issues

1. Design Strategies

Custom Development
• Allows for meeting highly specialized requirements
• Allows flexibility and creativity in solving problems
• Easier to change components
• Builds personnel skills
• May tax firm’s resources
• May add significant risk

Packaged Software
• Software already written
• May be more efficient
• May be more thoroughly tested and proven
• May range from components to tools to whole enterprise systems
• Must accept functionality provided
• May require change in how the firm does business
• May require significant “customization” or “workarounds”

System Integration
• The process of combining packages, legacy systems, and new software
• Key challenge is integrating data
• Write data in the same format
• Revise existing data formats
• Develop “object wrappers”

Outsourcing
• Hire external firm to create system
• May have more skills
• May extend existing resources
• Never outsource what you don’t understand
• Carefully choose vendor
• Prepare contract and payment style carefully

Outsourcing Guidelines
• Keep lines of communication open with outsourcer
• Define and stabilize requirements before signing a contract
• View outsourcing relationship as partnership
• Select outsourcing vendor carefully
• Assign person to manage relationship
• Don’t outsource what you don’t understand
• Emphasize flexible requirements, long-term relationships, and short-term contracts
Selecting a Design Strategy

- Business need
- In-house experience
- Project skills
- Project management
- Time frame

2. User Interface Design

Principles for User Interface Design

- Layout
- Content awareness
- Aesthetics
- User experience
- Consistency
- Minimal user effort

Layout Concepts

- The screen is often divided into three boxes
  - Navigation area (top)
  - Status area (bottom)
  - Work area (middle)
- Information can be presented in multiple areas
- Like areas should be grouped together
- Areas and information should minimize user movement from one to another
- Ideally, areas will remain consistent in
  - Size
  - Shape
  - Placement for entering data
  - Reports presenting retrieved data

Content Awareness

- All interfaces should have titles
- Menus should show
  - where you are
  - where you came from to get there
- It should be clear what information is within each area
- Fields and field labels should be selected carefully
- Use dates and version numbers to aid system users

Aesthetics

- Interfaces need to be functional and inviting to use
- Avoid squeezing in too much, particularly for novice users
• Design text carefully
  — Be aware of font and size
  — Avoid using all capital letters
• Colors and patterns should be used carefully
  — Test quality of colors by trying the interface on a black/white monitor
  — Use colors to separate or categorize items

User Experience
• How easy is the program to learn?
• How easy is the program to use for the expert?
• Consider adding shortcuts for the expert
• Where there is low employee turnover, some training can lessen the impact of less precise interfaces

Consistency
• Enables users to predict what will happen
• Reduces learning curve
• Considers items within an application and across applications
• Pertains to many different levels
  — Navigation controls
  — Terminology
  — Report and form design

Minimize Effort
• Three clicks rule
  — Users should be able
    — to go from the start or main menu of a system
    — to the information or action they want in no more than three mouse clicks or three keystrokes

3. Class and Method Design Criteria

Coupling
• Indicates the interdependence or interrelationships of the modules
• Interaction coupling
  — Relationships with methods and objects through message passage

Ideal Class Cohesion
• Contain multiple methods that are visible outside the class
• Have methods that refer to attributes or other methods defined with the class or its superclass
• Not have any control-flow coupling between its methods

Connascence
• Two modules (classes or methods) are so intertwined, that if you make a change in one, it is likely that a change in the other will be required