

- **Definition**
- **Phases**
- **Requirements Expansion**
- **Techniques**
- **Chapter Outline**
- **Exercise**

- **Answers a different development question:**
 - Requirements ask “What do we build?”
 - Design answers “How do we build it?”
- **Application of requirements to a specific solution set**
- **Integrates elements of this set to perform functions within performance limits**
- **Framework for system growth:**
 - Error detection and correction
 - Addition of new functions

- **Preliminary design:**
 - Captures general organization
 - External representation of design elements
 - Transaction focus
- **Detailed design:**
 - Sufficient details for coding
 - Internal representation of design elements
 - Function focus
- **Splitting design into phases reduces errors:**
 - High level view spotlights interface errors
 - Verify on paper no missing elements

Requirements Expansion

- **One requirement may expand into several different design elements**
- **Design for one requirement may impose constraints on other requirements**
- **Requirements engineering demands making “trade-offs” or compromises**
- **Conflict resolution may be employed**

Requirement Expansion Example

- **Requirement: “The system shall collect and store customer addresses.”**
- **Design elements:**
 - **Data entry form**
 - **Validation algorithms**
 - **Processing flow**
 - **Database manager**
 - **Table design and normalization**

Design Techniques

- **How one produces a design will vary depending on the project type: hardware or software**
- **Development tools impose design methods**
- **Some customers may require the use of a specific methodology**
- **Requirements must be translated into design by using an approved technique**

Design Technique Example

- **Preliminary Design:**
 - Object model
 - Sequence diagram (event trace)
 - Object interaction diagram
- **Detailed Design:**
 - Collaboration diagram
 - Pseudo code
 - Database table normalization

Chapter Outline

- **Use Chapter 3 as a base, especially the functional block diagram**
- **Develop a similar diagram showing design areas**
- **First section (3.1) should summarize design**
- **Each sub section (3.2-3.n) should reflect requirements of a design area**
- **Be prepared for a new order and sequence compared to requirements**

Example Design Outline

- **4.1 Design Summary**
- **4.2 Event Manager**
 - **4.2.1 Publish and subscribe**
 - **4.2.2 Notifications**
- **4.3 Object Factory**
 - **4.3.1 Standard templates**
 - **4.3.2 Custom objects**
- **4.4 Report Generation**
 - **4.4.1 Live data**
 - **4.4.2 Audit history**
- **4.5 Other Requirements**

- **Develop a requirements to design trace**
- **Can be X/Y matrix or series of tables**
- **For each requirement, note resulting design elements**
- **Verify all requirements are included**
- **Share this with supervisor**