4.1 System Requirements

* Feature that must be included in an information system to satisfy business requirements
  + Benchmarks to measure overall acceptability
* Requirements engineering activities
  + Gathering/Representing/Validating and verifying requirements
* Types of requirements
  + Classified according to characteristics
  + Functional and non-functional
* Requirements challenges
  + Imprecision
  + Agreement
  + Creep
* Additional Considerations
  + Scalability: ability to handle increased business volume and transactions
  + Security: make systems harder to infiltrate
  + Total cost of ownership: direct and indirect costs

4.2 Team-based Techniques

* Joint application development
  + Brings users into the development process as active participants
* User Involvement
  + Active roles
  + Formal or informal
* JAD participants and roles
  + Project leader and one or more members
* JAD advantages and disadvantages
  + Disadvantages
    - More expensive than traditional methods
    - Can be cumbersome if the group is too large
  + Advantages
    - Allows key users to participate effectively
    - Users are more likely to feel a sense of ownership
    - Produces a more accurate statement of system requirements, a better understanding of common goals, and a stronger commitment to the success of the new system.
* Rapid Application Development
  + Uses a group approach like JAD
  + End product: new information system
  + Complete methodology
    - Includes a four-phase life cycle that parallels the traditional SDLC
    - Reduces cost and development time
    - Increases the probability of success
    - Relies on prototyping and user involvement
  + RAD objectives
    - Cut dev time and expense
      * Involve users in every phase of development
  + RAD advantages and disadvantages
    - Advantage
      * Helps develop systems quickly with cost savings
    - Disadvantages
      * Does not emphasize strategic business needs
      * Less time to develop quality, consistency, and design standards
* Agile Methods
  + Attempt to develop a system incrementally by building a series of prototypes and adjusting them to user requirements
  + Developers revise, extend, and merge earlier versions into the final product
  + Emphasize continuous feedback
    - Each incremental step is affect by what was learned in the prior steps
  + Scrum sessions
    - Specific guidelines emphasize time blocks, interaction, and team-based activities that results in deliverable software
  + Agile method advantages and disadvantages
    - Advantages
      * Very flexible and efficient in dealing with change
      * Frequent deliverables constantly validate the project and reduce risk
    - Disadvantages
      * Team members need a high level of technical and interpersonal skills
      * Lack of structure and documentation can introduce risk factors
      * May be subject to significant change in scope

4.3 Gathering Requirements

* First step in requirements engineering process
  + Requirements elicitation or fact-finding
    - Who/What/Where/When/How

4.4 Gathering Requirements through Interviews

* The interview process:
  + Determine the people to interview
    - Select the right people and ask the right questions
      * Consider candidates from both formal and informal structures
    - Decide on group and/or individual interviews
  + Establish objectives for the interview
    - Determine areas to be discussed
    - List facts that need to be gathered
    - Objectives depend on the role of the person being interviewed
  + Develop interview questions
    - Decide what to ask and how to phrase it
      * Avoid leading questions
      * Open-ended questions encourage spontaneous and unstructured responses
      * Close-ended questions limit the response
      * Range-of-response questions limit the response
  + Prepare for the interview
    - Careful preparation is essential
    - Limit the interview to no more than one hour
    - Verify time, place, length, and topics
    - If there are questions about documents, ask the interviewee to have samples available at the meeting
  + Conduct the interview
    - Develop a specific plan for the meeting
    - Begin by introducing yourself, describing the project, and explaining your interview objectives
    - Practice engaged listening
    - Allow the person enough time to think about the question and arrive at an answer
    - After an interview, summarize the session and seek a confirmation
  + Document the interview
    - Note taking should be kept to a minimum
    - After conducting the interview record the information quickly
    - Send memo to the interviewee expressing your appreciation
  + Evaluate the interview
    - In addition to recording the facts obtained in an interview, try to identify any possible biases

4.5 Gathering requirements using other techniques

* Document Review
  + Review current documentation
* Observation
  + Provides additional perspective and a better understanding of the system procedures
  + Should be planned in advance
* Questionnaires and surveys
  + Make sure questions collect the right data in a form that can be used to further the fact finding effort
  + Can be traditional forms, fill-in forms, or on the Internet or a company intranet.
* Interviews versus questionnaires
  + Interview is more familiar and personal
    - Costly and time-consuming process
  + Questionnaire gives the opportunity to provide input and suggestions
    - Recipients can answer questions at their convenience
* Brainstorming: small group discussion of a specific problem, opportunity, or issue
  + Structured brainstorming
    - Each participant speaks when it is his or her turn
  + Unstructured brainstorming
    - Anyone can speak at any time
* Sampling
  + Systematic sample: selection of every tenth customer for review
  + Stratified sample: selection of five customers from each of four postal codes
  + Random sample: selection of any 20 customers
  + Objective of a sample: ensure it represents the overall population accurately
* Research
  + Internet, IT magazines, and books
    - Used to obtain background information, technical material, and news about industry trends and developments
  + Attending professional meetings, seminars, and discussions with other IT professionals
  + Site visits

4.6 Gathering Requirements in Agile Projects

* Agile methods used for requirements gathering
  + Variation on interviews that focuses on features, user stories, scenarios, and storyboards is used
  + Requirements are gathered and successively refined

4.7 Representing Requirements

* Principles for documentation
  + Record information as soon as it is obtained
  + Use the simplest recording method
  + Record findings in a way that they can be understood by someone else
  + Organize documentation so related material is located easily
* Natural language
  + Vast majority of requirements are represented using unstructured natural language
* Diagrams
  + Graphical methods and nontechnical language that represent the system at various stages
* Functional decomposition diagrams
  + Top-down representation of a function or process
* Models
  + Provide a more formal representation of system requirements
  + Unified Modeling Language (UML)
* Use case diagram
  + Visually represents the interaction between users and the information system
* Sequence diagram
  + Shows timing of interactions between objects

4.8 Validating and Verifying Requirements

* Requirements validation and verification (V&V)
  + Concerned with demonstrating that the requirements define the system that the customer really wants
    - Validation: Are the correct requirements stated?
    - Verification: Are the requirements stated correctly?

4.9 Tools

* All requirements can be helped through the judicious use of tools
  + Productivity software
  + Personal information manager
  + Word processing software
  + Spreadsheet software
  + Database management software
  + Presentation graphics software
  + Collaboration software
  + Graphic modeling tools