CHAPTER 3

Requirements Modeling
(Phase 2: Systems Analysis)

Jakrapop Maisen
Figure 1 The systems analysis phase consists of requirements modeling, data and process modeling, and consideration of development.
JOINT APPLICATION DEVELOPMENT

Joint application development (JAD) is a popular fact-finding technique that brings Users into the development process as active participants.

User Involvement

During the development process, the IT staff would collect information from users, define system requirements, and construct the new system. At various stages of the process, the IT staff might ask users to review the design, offer comments, and submit changes.
## Typical JAD Participants and Roles

<table>
<thead>
<tr>
<th>JAD PARTICIPANT</th>
<th>ROLE</th>
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<tbody>
<tr>
<td>JAD project leader</td>
<td>Develops an agenda, acts as a facilitator, and leads the JAD session</td>
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<tr>
<td>Top management</td>
<td>Provides enterprise-level authorization and support for the project</td>
</tr>
<tr>
<td>Managers</td>
<td>Provide department-level support for the project and understanding of how the project must support business functions and requirements.</td>
</tr>
<tr>
<td>user</td>
<td>Provide operational-level input on current operations, desired changes, input and output requirements, user interface issues, and how the project will support day-to-day tasks</td>
</tr>
<tr>
<td>System analysts and Other IT staff members</td>
<td>Provide technical assistance and resources for JAD team members on issue such as security, backup, hardware, software, and network capability</td>
</tr>
<tr>
<td>Recorder</td>
<td>Document results of JAD sessions and works with systems analysts to build system models and develop CASE tool documentation</td>
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**Figure 2** Typical JAD Participants and Roles
### Typical JAD Session Agenda

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibilities</th>
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</table>
| Project leader                            | • Introduce all JAD team members  
• Discuss ground rules, goals and objectives for the JAD sessions  
• Explain methods of documentation and use of CASE tools, if any |
| Top management (sometimes called the project owner or sponsor) | • Explain the reason for the project and express top management authorization and support |
| Project leader                            | • Provide overview of the current system and proposed project scope and constraints  
• Present outline of specific topics and issues to be investigated |
| Open discussion session, Moderated by project leader | • Review the main business processes, tasks, user roles, input, and output  
• Identify specific areas of agreement or disagreement  
• Break team into smaller groups to study specific issues and assign group leaders |

**Figure 3** Typical agenda for a JAD session
**Typical JAD Session Agenda (continued)**

| JAD team member working | • Discuss and document all system requirements  
| In smaller group sessions, Supported by IT staff | • Develop models and prototypes  
| Group leaders | • Report on results and assigned tasks and topics  
| | • Present issues that should be addressed by the overall JAD team  
| Open discussion session, Moderated by project leader | • Review reports from small group sessions  
| | • Reach consensus on main issues  
| | • Document all topics  
| Project leader | • Present overall recap of JAD session  
| | • prepare report that will be sent to JAD team members  

**Figure 3** Typical agenda for a JAD session
JAD Advantages and Disadvantages

Compared with traditional methods, JAD is more expensive and can be cumbersome if the group is too large relative to the size of the project. When properly used, JAD can result in 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

Rapid application development (RAD) is a team-based technique that speeds up information systems development and produces a functioning information system. Like JAD, RAD uses a group approach, but goes much further, While the end product of JAD is a requirements model, the end product of RAD is the new information system.
Task:
• User, managers, and IT staff agree upon business needs, project scope, and systems requirements
• Obtain approval to continue

Task:
• Interact with users
• Build models and prototypes
• Conduct intensive JAD-type sessions

Task:
• Program and application development
• Coding
• Unit, integration, and System testing

Task:
• Data conversion
• Full-scale testing
• System changeover
• User training

Figure 4 The four phases of the RAD model are requirements planning, user design, construction, and cutover. Notice the continuous interaction between the user design and construction phases.
RAD Advantages and Disadvantages

The primary advantage is that systems can be developed more quickly with significant cost savings. A disadvantage is that RAD stresses the mechanics of the system itself and does not emphasize the company’s strategic business needs.
SYSTEM REQUIREMENTS CHECKLIST

A system requirement is a characteristic or feature that must be included in an information system to satisfy business requirements and be acceptable to users.

**Outputs**

- The Web site must report online volume statistics every four hours, and hourly during peak periods.
- The inventory system must produce a daily report showing the part number, description, quantity on hand, quantity allocated, quantity available, and unit cost of all sorted by part number.
- The contact management system must generate a daily remainder list for all sales reps.
- The purchasing system must provide suppliers with up-to-date specifications.
- The sales tracking system must produce a daily fast-moving-item report, listing all products that exceed the forecasted sales volume grouped by style, color, size, and reorder status.
- The customer analysis system must produce a quarterly report that identifies changes in ordering patterns or trends with statistical comparisons to the previous four quarters.
Inputs

- Manufacturing employees must swipe their ID cards into online data collection terminals that record labor costs and calculate production efficiency.

- The department head must enter overtime hours on a separate screen.

- Student grades must be entered on machine-scannable forms prepared by the instructor.

- Each input form must include date, time, product code, customer number, and quantity.

- Data entry screens must be uniform, except for background color, which can be changed by the user.

- A data entry person at the medical group must input patient services into the billing system.
Processes

- The student records system must calculate the GPA at the end of each semester.
- As the final step in year-end processing, the payroll system must update employee salaries, bonuses, and benefits and produce tax data.
- The warehouse distribution system must analyze daily orders and create a routing pattern for delivery trucks that maximizes efficiency and reduces unnecessary mileage.
- The human resources system must interface properly with the existing payroll system.
- The video rental system must not execute new rental transactions for customers who have overdue tapes.
- The prescription system must automatically generate an insurance claim form.
Performance

- The system must support 25 users online simultaneously.
- Response time must not exceed four seconds.
- The system must be operational seven days a week, 365 days a year.
- The accounts receivable system must prepare customer statements by the third business day of the following month.
- The student records system must produce class lists within five hours after the end of registration.
- The online inventory control system must flag all low-stock items within one hour after the quantity falls below a predetermined minimum.
Controls

- The system must provide log-on security at the operating system level and at the application level.
- An employee record must be added, changed, or deleted only by a member of the human resources department.
- The system must maintain separate levels of security for users and the system administrator.
- All transactions must have audit trails.
- The manager of the sales department must approve orders that exceed a customer’s credit limit.
- The system must create an error log file that includes the error type, description, and time.
FACT-FINDING

During requirements modeling you will use various fact finding techniques, including interviews, document review, observation, surveys and questionnaires, sampling, and research.

Who, What, Where, When, How, and Why?

Fact-finding involves answers to five familiar questions: *Who, What, Where, When and How*. For each of those questions you also must ask another very important question: why.

1. *Who?* Who performs each of the procedures within the system? Why? Are the correct people performing the activity? Could other people perform the tasks more effectively?
2. *What?* What is being done? What procedures are being followed? Why is that process necessary? Often, procedures are followed for many years and no one knows why. You should question why a procedure is being followed at all.

3. *Where?* Where are operations being performed? Why? Where could they be performed? Could they be performed more efficiently elsewhere?

4. *When?* When is a procedure performed? Why is it being performed at this time? Is this the best time?

5. *How?* How is a procedure performed? Why is it performed in that manner? Could it be performed better, more efficiently, or less expensively in some other manner?
<table>
<thead>
<tr>
<th>CURRENT SYSTEM</th>
<th>PROPOSED SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who does it?</td>
<td>Why does this person do it?</td>
</tr>
<tr>
<td>What is done?</td>
<td>Why is it done?</td>
</tr>
<tr>
<td>Where is it done?</td>
<td>Why is it done there?</td>
</tr>
<tr>
<td>When is it done?</td>
<td>Why is it done then?</td>
</tr>
<tr>
<td>How is it done?</td>
<td>Why is it done this way?</td>
</tr>
</tbody>
</table>

**Figure 5** Sample questions during requirements modeling as the focus shifts from the current system to the proposed system.
INTERVIEWS

Step 1: Determine the People to Interview

During the preliminary investigation, you talked mainly to middle managers or department heads. Now, during the systems analysis phase, you might need to interview people from all levels of the organization.

Step 2: Establish Objectives for the Interview

You must establish objectives for the session. First, you should determine the general areas to be discussed, and then list the facts you want to gather. You also should try to solicit ideas, suggestions, and opinions during the interview.

Step 3: Develop Interview Questions

Creating a standard list of interview questions helps to keep you on track and avoid unnecessary tangents.
OPEN-ENDED QUESTIONS  Open-ended questions encourage spontaneous and unstructured responses. Such question are useful when you want to understand a larger process or draw out the interviewee’s opinions, attitudes, or suggestions. What are users saying about the new system? How is this task performed? why do you perform the task that way?

CLOSED-ENDED QUESTIONS  Close-ended questions limit or restrict the response. You use closed-ended questions when you want information that is more specific or when you need to verify fact. How many personal computers do you have in this department? Do you review the reports before they are sent out?

RANGE-OF-RESPONSE QUESTIONS  are closed-ended questions that ask the person to evaluate something by providing limited answers to specific responses or on a numeric scale. With 1 the lowest and 10 the highest, how effective was your training? How would you rate the severity of the problem: low, medium, or high? Is the system shutdown something that occurs never, sometimes, often, usually, or always?
Step 4: Prepare for the Interview

When you schedule the interview, suggest a specific day and time and let the interviewee know how long you expect the meeting to last.

Remember that the interview is an interruption of the other person’s routine, so you should limit the interview to no more than one hour.

You should send a list of topics to an interviewee several days before the meeting.

Step 5: Conduct the Interview

When conducting an interview, you should begin by introducing yourself, describing the project, and explaining your interview objectives.

During the interview, ask questions in the order in which you prepared them, and give the interviewee sufficient time to provide thoughtful answers.

After an interview, you should summarize the session and seek a confirmation from the other person.
Step 6 : Document the Interview

Although taking notes during an interview has both advantages and disadvantages, the accepted view is that note taking should be kept to a minimum. Although you should write down a few notes to jog your memory after the interview, you should avoid writing everything that is said.

Tape recorders are effective tools for an interview; however, many people feel uncomfortable when recorders are present. Before using a recorder, you should discuss its use with the interviewee.

After the interview, send a memo to the interviewee expressing your appreciation for his or her time and cooperation. In the memo, you should note the date, time, location, purpose of the interview, and the main points you discussed so the interviewee has a written summary and can offer additions or corrections.

Step 7 : Evaluate the Interview

In addition to recording the facts obtained in an interview, try to identify any possible biases.
OTHER FACT-FINDING TECHNIQUES

- Document Review
  
  Document review can help you understand how the current system is supposed to work. You should obtain copies of actual forms and operation documents currently in use. You also should review blank copies of forms. As well as samples of actual completed forms.

- Observation
  
  The observation of current operating procedures is another fact-finding technique. Seeing the system in action gives you additional perspective and a better understanding of system procedures. Personal observation also allows you to verify statements made in interviews and determine whether procedures really operate as they are described.
**Questionnaires and Surveys**

In projects where it is desirable to obtain input from a large number of people, a questionnaire can be a valuable tool.

Questionnaires can be used to obtain information about a wide range of topics, including workloads, reports received, volumes of transactions handled, job duties, difficulties, and opinions of how the job could be performed better or more efficiently.

**Research**

Research is another important fact-finding technique. Your research can include the Internet, IT magazines, and books to obtain background information, technical material, and news about industry trends and developments. In addition, you can attend professional meetings, seminars, and discussions with other IT professionals, which can be very helpful in problem solving.
DOCUMENTATION

Keeping accurate records of interviews, facts, ideas, and observations is essential to successful systems development.

The Need for Recording the Facts

As you gather information, the importance of a single item can be overlooked or complex system details can be forgotten. The basic rule is to write it down.

- Record information as soon as you obtain it.
- Use the simplest recording method possible.
- Record your findings in such a way that they can be understood by some else.
- Organize your documentation so related material is located easily.

PRODUCTIVITY SOFTWARE

Productivity software includes word processing, spreadsheet, database management, and presentation graphics programs.
Exercise 3

1. What are the five questions typically used in fact-finding? What additional question can be asked during this process?

2. What is a systems requirement, and how are systems requirements classified?

3. What is JAD, how does it differ from traditional methods of fact-finding, and what are some advantages and potential disadvantages of using JAD?

4. What are the three different types of questions? How do those different questions affect the answers given?

5. What is RAD, what are the RAD phases, and what occurs in each phase?

Reference