

# Requirements Analysis and Negotiation

Lecture # 13

# Recap of Last Lecture

- Discussed requirements analysis, which is an iterative activity and checks for incomplete and inconsistent requirements
- Three stages of requirements analysis (necessity checking, completeness and consistency checking, and feasibility checking)
- Studied analysis checklists as a technique for requirements analysis

# Today's Topics

- ◉ We'll spend some time discussing interaction matrices, another requirements analysis technique
- ◉ We'll talk about requirements negotiation

# Requirements Interactions - 1

- A very important objective of requirements analysis is to discover the interactions between requirements and to highlight requirements conflicts and overlaps
- A requirements interaction matrix shows how requirements interact with each other, which can be constructed using a spreadsheet

# Requirements Interactions - 2

- Each requirement is compared with other requirements, and the matrix is filled as follows:
  - > For requirements which conflict, fill in a 1
  - > For requirements which overlap, fill in a 1000
  - > For requirements which are independent, fill in a 0
- Consider an example

# An Interaction Matrix

| Requirement | R1   | R2 | R3   | R4   | R5 | R6   |
|-------------|------|----|------|------|----|------|
| R1          | 0    | 0  | 1000 | 0    | 1  | 1    |
| R2          | 0    | 0  | 0    | 0    | 0  | 0    |
| R3          | 1000 | 0  | 0    | 1000 | 0  | 1000 |
| R4          | 0    | 0  | 1000 | 0    | 1  | 1    |
| R5          | 1    | 0  | 0    | 1    | 0  | 0    |
| R6          | 1    | 0  | 1000 | 1    | 0  | 0    |

# Comments on Interaction Matrices - 1

- ◉ If you can't decide whether requirements conflict, you should assume that a conflict exists. If an error is made it is usually fairly cheap to fix; it can be much more expensive to resolve undetected conflicts

# Comments on Interaction Matrices - 2

- ◉ In the example, we are considering, we can see that R1 overlaps with R3 and conflicts with R5 and R6
- ◉ R2 is an independent requirement
- ◉ R3 overlaps with R1, R4, and R6



# Comments on Interaction Matrices - 3

- ◉ The advantage of using numeric values for conflicts and overlaps is that you can sum each row and column to find the number of conflicts and the number of overlaps
- ◉ Requirements which have high values for one or both of these figures should be carefully examined

# Comments on Interaction Matrices - 4

- A large number of conflicts or overlaps means that any changes to that requirement will probably have a major impact of the rest of the requirements
- Interaction matrices work only when there is relatively small number of requirements, as each requirement is compared with every other requirement

# Comments on Interaction Matrices - 5

- ◉ The upper limit should be about 200 requirements
- ◉ These overlaps and conflicts have to be discussed and resolved during requirements negotiation, which we'll discuss next

# Requirements Negotiations

# Requirements Negotiation - 1

- ◉ Disagreements about requirements are inevitable when a system has many stakeholders. Conflicts are not 'failures' but reflect different stakeholder needs and priorities
- ◉ Requirements negotiation is the process of discussing requirements conflicts and reaching a compromise that all stakeholders can agree to

# Requirements Negotiation - 2

- ◉ In planning a requirements engineering process, it is important to leave enough time for negotiation. Finding an acceptable compromise can be time-consuming

# Requirements Negotiation - 3

- The final requirements will always be a compromise which is governed by the needs of the organization in general, the specific requirements of different stakeholders, design and implementation constraints, and the budget and schedule for the system development

# Requirements Negotiation Stages

- ◉ Requirements discussion
- ◉ Requirements prioritization
- ◉ Requirements agreement



# Requirements Discussion

- Requirements which have been highlighted as problematic are discussed and the stakeholders involved present their views about the requirements

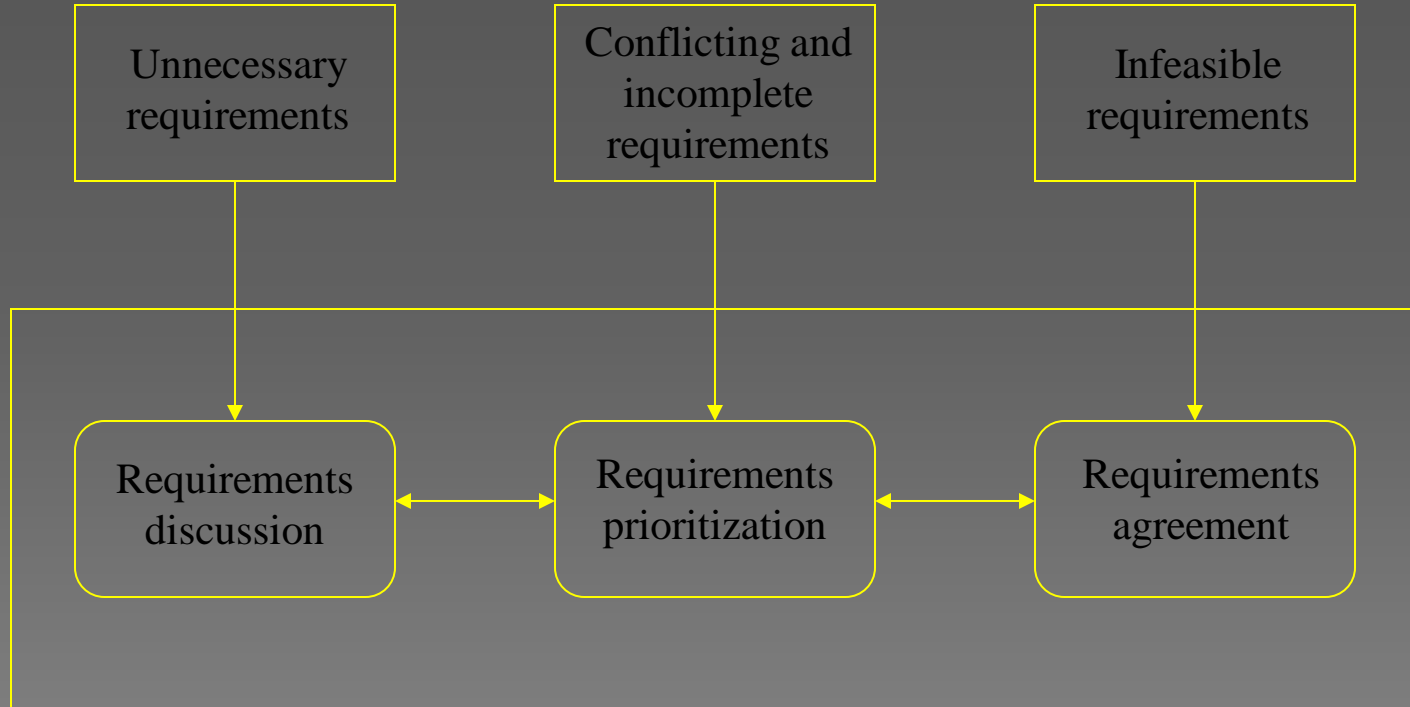
# Requirements Prioritization

- Disputed requirements are prioritized to identify critical requirements and to help the decision making process

# Requirements Agreement

- Solutions to the requirements problems are identified and a compromised set of requirements are reached. Generally, this will involve making changes to some of the requirements

# Requirements Negotiation Process



Requirements Negotiation

# Comments on Requirements Negotiation - 1

- ◉ In principle, requirements negotiation should be an objective process
- ◉ The judgments should be the requirements for the system should be based on technical and organizational needs
- ◉ Reality is, however, often different

# Comments on Requirements Negotiation - 2

- ◉ Negotiations are rarely conducted using only logical and technical arguments
- ◉ They are influenced by organizational and political considerations, and the personalities of the people involved

# Comments on Requirements Negotiation - 3

- ◉ A strong personality may force their priorities on other stakeholders
- ◉ Requirements may be accepted or rejected because they strengthen the political influence in the organization of some stakeholders
- ◉ End-users may be resistant to change and may block requirements, etc.

# Comments on Requirements Negotiation - 4

- ◉ The majority of time in requirements negotiation is usually spent resolving requirements conflicts. A requirement conflicts with other requirements if they ask for different things
- ◉ Example of access of data in a distributed system



# Comments on Requirements Negotiation - 5

- ◉ Even after years of experience, many companies do not allow enough time for resolution of conflicts in requirements
- ◉ Conflicts should not be viewed as 'failures', they are natural and inevitable – rather healthy

# Resolution of Requirements Conflicts

- Meetings are the most effective way to negotiate requirements and resolve requirements conflicts
- All requirements which are in conflict should be discussed individually
- Negotiation meetings should be conducted in three stages

# Stages of Negotiation Meetings

- ◉ Information stage
- ◉ Discussion stage
- ◉ Resolution stage

# Information Stage

- An information stage where the nature of the problems associated with a requirement is explained

# Discussion Stage

- A discussion stage where the stakeholders involved discuss how these problems might be resolved
  - > All stakeholders with an interest in the requirement should be given the opportunity to comment. Priorities may be assigned to requirements at this stage

# Resolution Stage

- A resolution stage where actions concerning the requirement are agreed
  - > These actions might be to delete the requirement, to suggest specific modifications to the requirement or to elicit further information about the requirement

# Summary

- ◉ Interaction matrices are very useful for capturing interactions among requirements
- ◉ Requirements negotiation is always necessary to resolve requirements conflicts and remove requirements overlaps. Negotiation involves information interchange, discussion and resolution of disagreements