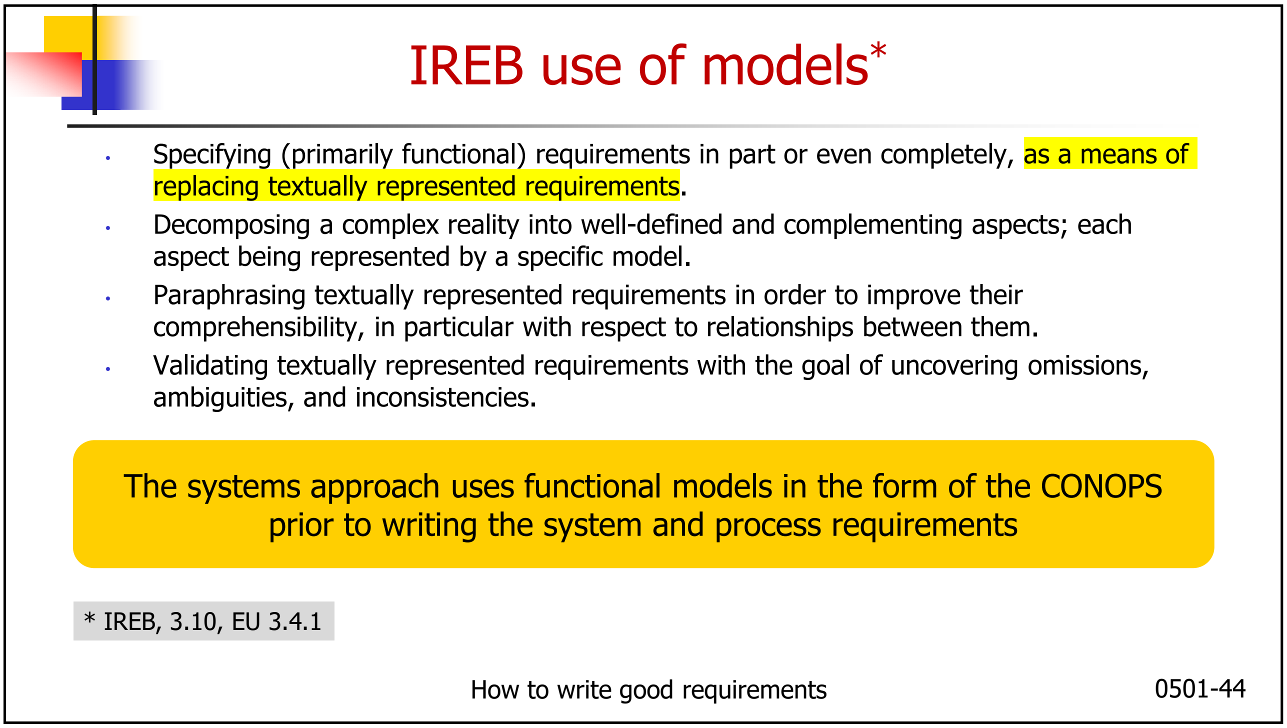
How to write good requirements
Module 5 of 10
Documenting and storing stakeholders' needs
Session 2 of 2

Version 1.2.3

Module topics

- Documenting needs
- Introduction to models
- Some things you should be aware of about models
- Some things you should be aware of about modeling tools
- **Uses, advantages and limitations of models**
- Creating functional models
- Communicating models to stakeholders
- Exercises



IREB use of models*

- Specifying (primarily functional) requirements in part or even completely, as a means of replacing textually represented requirements.
- Decomposing a complex reality into well-defined and complementing aspects; each aspect being represented by a specific model.
- Paraphrasing textually represented requirements in order to improve their comprehensibility, in particular with respect to relationships between them.
- Validating textually represented requirements with the goal of uncovering omissions, ambiguities, and inconsistencies.

The systems approach uses functional models in the form of the CONOPS prior to writing the system and process requirements

* IREB, 3.10, EU 3.4.1

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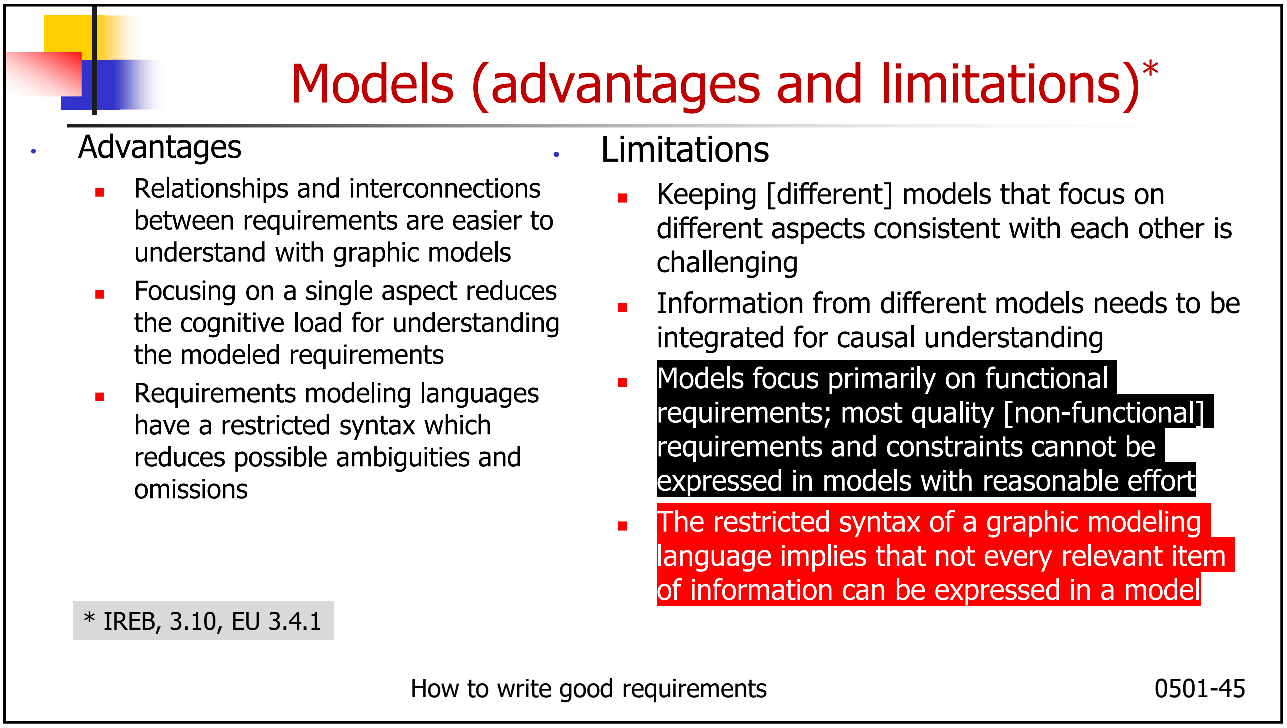

Models (advantages and limitations)*

- Advantages
  - Relationships and interconnections between requirements are easier to understand with graphic models
  - Focusing on a single aspect reduces the cognitive load for understanding the modeled requirements
  - Requirements modeling languages have a restricted syntax which reduces possible ambiguities and omissions
- Limitations
  - Keeping [different] models that focus on different aspects consistent with each other is challenging
  - Information from different models needs to be integrated for causal understanding
  - Models focus primarily on functional requirements; most quality [non-functional] requirements and constraints cannot be expressed in models with reasonable effort
  - The restricted syntax of a graphic modeling language implies that not every relevant item of information can be expressed in a model

* IREB, 3.10, EU 3.4.1

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Building a functional conceptual needs model

- Use current situation as pre-baseline
- Identify objects and relationships in current situation
- Modify to remove undesirability
- Add new desired functionality
- Create scenarios
- Decompose scenarios into functions (Module 4)
- Quantify each function
- Prioritize each function
- Create relationship diagrams
- Combine relationship diagrams
- Use the three ways to maximize completeness (Module 4)
  1. Corresponding inputs and outputs
  2. Corresponding functions
  3. Templates

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Example: "Wants" to scenarios-1

- Generic stakeholder role
  - Faculty
- Specific stakeholder
  - Professor Joseph
- Wanted improvement
  - "when I log in to the SECTS, I want to be taken to the place I was at when I logged out of my previous Module"
- Question (*Generic* HTP)
  - Should this apply to all users, just faculty or just Professor Joseph?
- Answer
  - Make it an option, default to "on" for faculty (implementation domain knowledge) unless other stakeholders have asked for it, or want it when they hear about it
  - Discuss with other stakeholders before SRR

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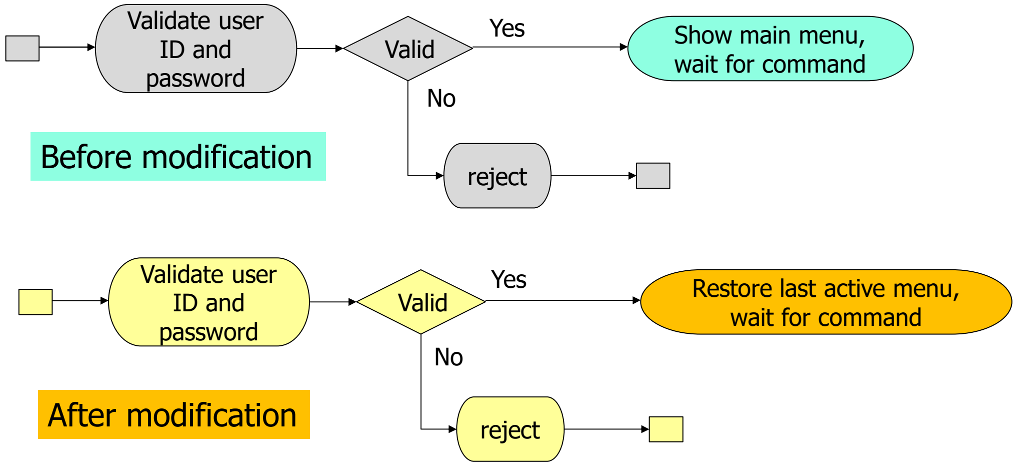
Logging in scenario (focused)


Validate user ID and password
Valid
Yes
Show main menu, wait for command
No
reject
Before modification
Validate user ID and password
Valid
Yes
Restore last active menu, wait for command
No
reject
After modification

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Example: Wants to scenarios-2

- Scenarios affected
  - (applying *Three ways to maximize completeness* from Module 4)
  1. User logs into the system (stakeholder want)
     1. Initial menu changed to last active menu
  2. User logs out of the system
     1. Must remember active menu
  3. New user set up
     1. Must set up option
  4. Disconnect without logging out in all other scenarios
     1. Must remember last active menu
- Other system attributes affected if any
  - Must remember user’s active menu each time a menu is shown
  - Oops, just designed the change in other scenarios

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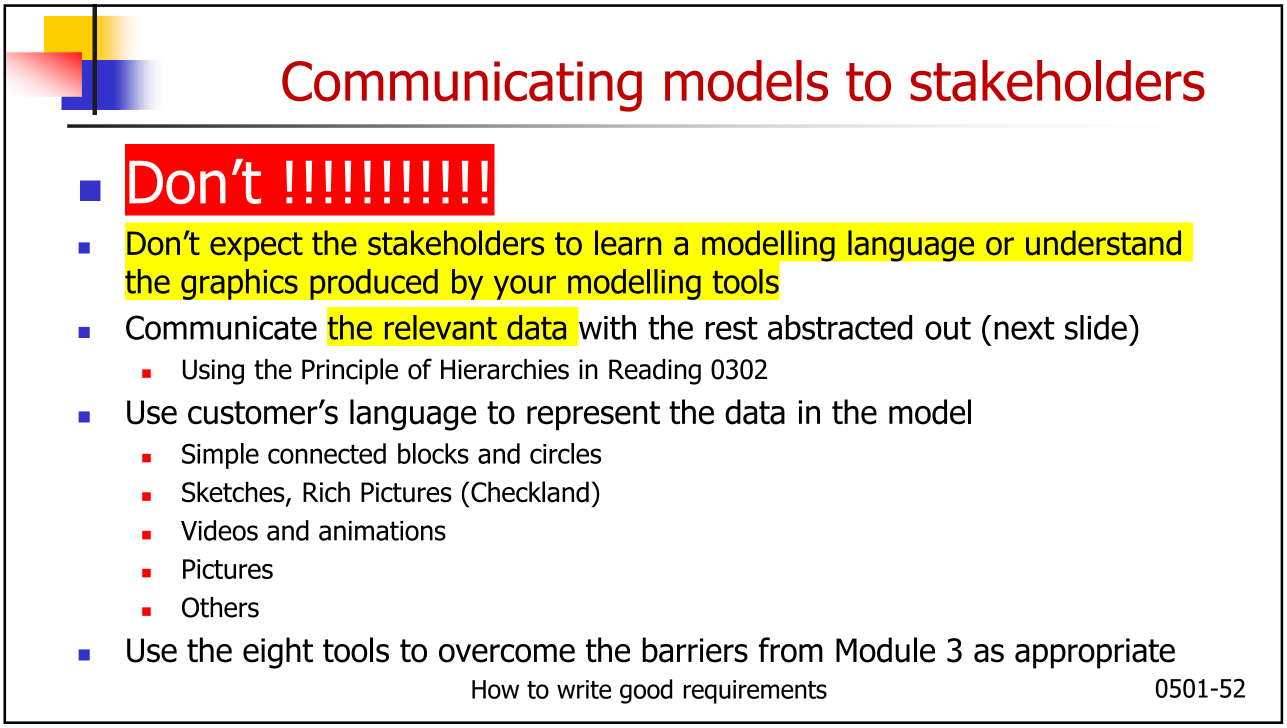

Communicating models to stakeholders

- Don't !!!!!!!!!!!
- Don't expect the stakeholders to learn a modelling language or understand the graphics produced by your modelling tools
- Communicate the relevant data with the rest abstracted out (next slide)
  - Using the Principle of Hierarchies in Reading 0302
- Use customer's language to represent the data in the model
  - Simple connected blocks and circles
  - Sketches, Rich Pictures (Checkland)
  - Videos and animations
  - Pictures
  - Others
- Use the eight tools to overcome the barriers from Module 3 as appropriate

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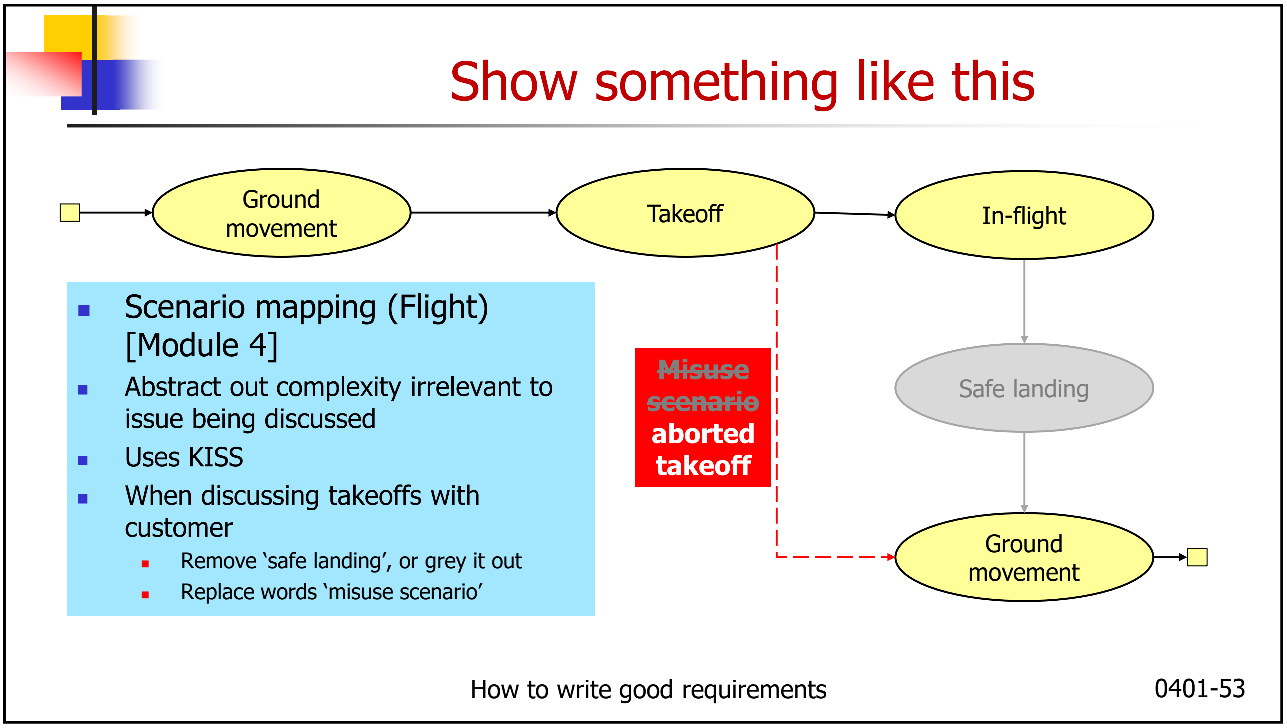

Show something like this

- Scenario mapping (Flight) [Module 4]
- Abstract out complexity irrelevant to issue being discussed
- Uses KISS
- When discussing takeoffs with customer
  - Remove 'safe landing', or grey it out
  - Replace words 'misuse scenario'

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Exercise 5-21 Creating scenarios

1. Convert any 10 of the responses from the stakeholder in Exercise 3-1 to a set of linked scenarios
2. Identify the mission, support and risk prevention/mitigation functions (as appropriate)
3. Prepare a <5 minute presentation containing
   1. This slide and the version number of the Module
   2. The scenarios
   3. A higher level drawing (or N^2 chart) showing the links (interfaces) between the scenarios
   4. The exercise problem formulated per COPS problem formulation template
   5. A compliance matrix for the exercise
   6. Lessons learned from exercise
4. Save as a PowerPoint file in format Exercise5.21-abcd.pptx
5. Post/email presentation as and where instructed

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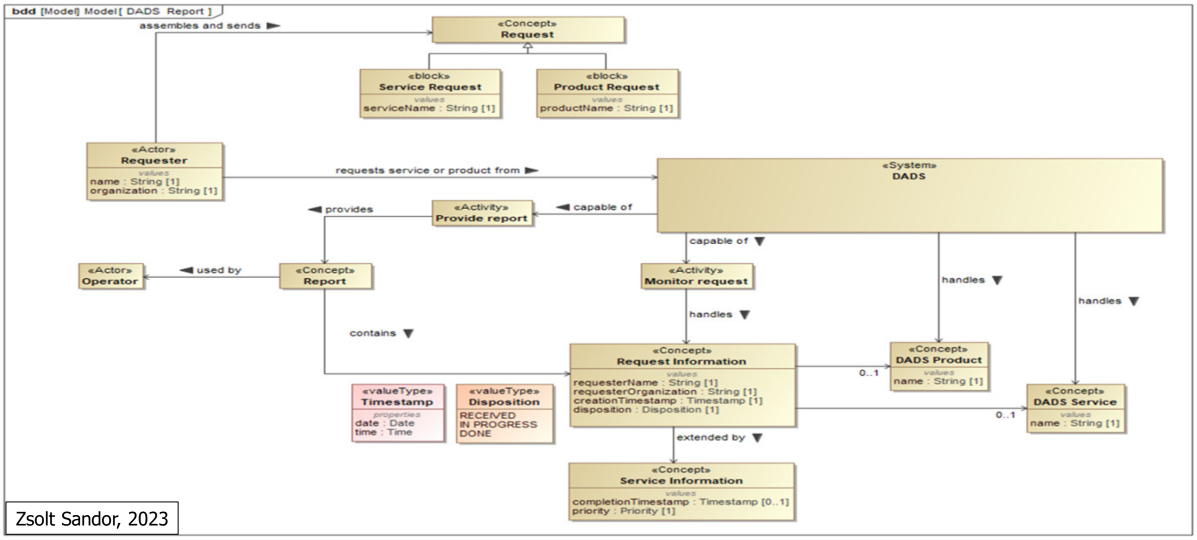
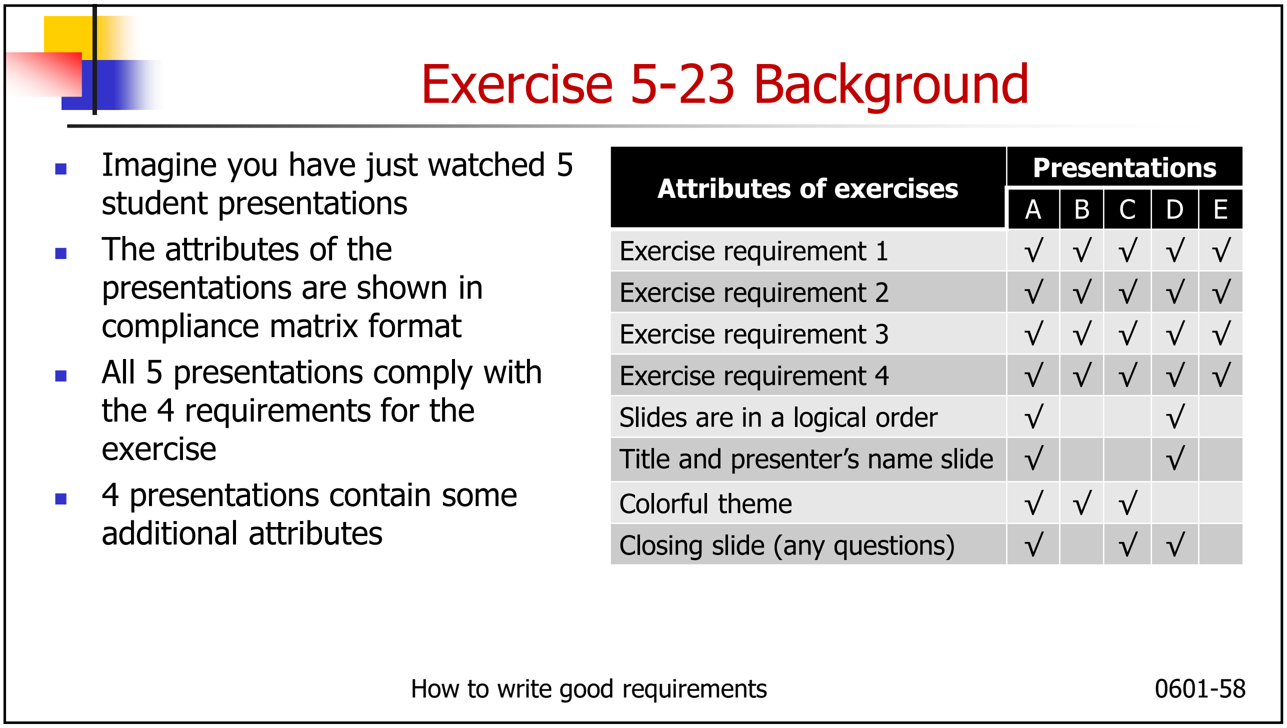
Exercise 5-22 Deriving requirements from scenarios

1. Write a complete set of well-written requirements traceable to the scenario in the next slide (as complete as you can, within a 60 minutes time limit)
2. Prepare a <5 minute presentation containing
   1. The well-written requirements
   2. Identify the mission, support and risk prevention/mitigation requirements (if any)
   3. If there is anything in the scenario that does not generate a requirement, discuss the reason(s) (maximum of two)
   4. The exercise problem formulated per COPS problem formulation template
   5. A compliance matrix for the exercise
   6. Lessons learned from exercise (<3 min)
   7. Why you think this exercise was included in the lesson
   8. This slide and the version number of the Module
3. Save as a PowerPoint file in format Exercise5.22-abcd.pptx
4. Post/email presentation as and where instructed

Exercise 5-22 Scenario



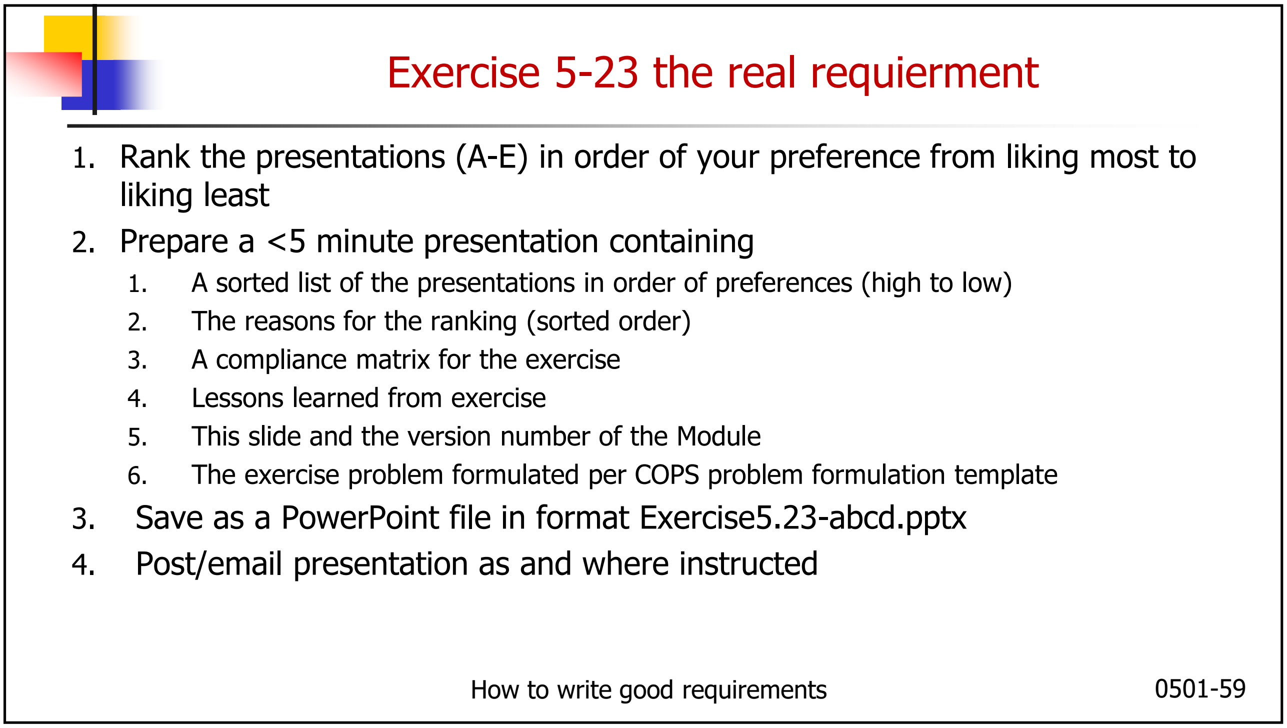
Zsolt Sandor, 2023



Exercise 5-23 Background

- Imagine you have just watched 5 student presentations
- The attributes of the presentations are shown in compliance matrix format
- All 5 presentations comply with the 4 requirements for the exercise
- 4 presentations contain some additional attributes

Attributes of exercises	Presentations				
	A	B	C	D	E
Exercise requirement 1	√	√	√	√	√
Exercise requirement 2	√	√	√	√	√
Exercise requirement 3	√	√	√	√	√
Exercise requirement 4	√	√	√	√	√
Slides are in a logical order	√			√	
Title and presenter's name slide	√			√	
Colorful theme	√	√	√		
Closing slide (any questions)	√		√	√	



Exercise 5-23 the real requirment

1. Rank the presentations (A-E) in order of your preference from liking most to liking least
2. Prepare a <5 minute presentation containing
    1. A sorted list of the presentations in order of preferences (high to low)
    2. The reasons for the ranking (sorted order)
    3. A compliance matrix for the exercise
    4. Lessons learned from exercise
    5. This slide and the version number of the Module
    6. The exercise problem formulated per COPS problem formulation template
3. Save as a PowerPoint file in format Exercise5.23-abcd.pptx
4. Post/email presentation as and where instructed

Meeting the objectives

#	Objectives	Met
1	To explain how to document and store the stakeholder needs	16-17
2	To provide reasons for documenting needs	15
3	To explain some things you should be aware of about models and modelling	19-22
4	To discuss some things you should be aware of about modeling tools in general	24-26
5	To explain some of the different types of models	28-46
6	To explain uses, advantages and limitations of models	48-49
7	To explain how to create functional models	51-54
8	To explain how to communicate functional and operational models to stakeholders	56
9	To practice creating parts of a model	58
10	To practice writing requirements traceable to scenarios	59
11	To provide the opportunity to exercise the 5 levels of knowledge in the updated Blooms taxonomy	58-62

Any questions ?

1. Best
2. Worst
3. Missing

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Subject: <class title> BWM Module #