Reading 5 -- Class Descriptions x Requirements Description

Goal: To verify that the concepts and services that are described by the functional requirements are captured appropriately by the class descriptions.

Inputs to Process:

1. A set of functional requirements that describes the concepts and services that are necessary in the final system.

2. A set of class descriptions that lists the classes of a system along with their attributes and behaviors.

1) **Read the requirements description to understand the functionality described.**

    INPUTS: Set of functional requirements (FR).

    OUTPUTS: Candidate classes/objects/attributes (marked in blue in FRs);
                         Candidate services (marked in green in FRs);
                         Constraints or conditions on services (marked in yellow in FRs).

☞ Read over the each functional requirement to understand the functionality that it describes.

☞ Find the nouns in the requirement; they are candidates to become classes, objects, or attributes in the system design. Underline the nouns with a blue pen.

☞ Find the verbs, or descriptions of actions, which are candidates to be services or behaviors in the system. Underline the verbs or action descriptions with a green pen.

☞ Look for descriptions of constraints or conditions on the nouns and verbs you identified in the preceding two steps. Especially pay attention to non-functional requirements, which typically contain restrictions and conditions on system functionality. For example, examine whether relationships between the concepts have been identified. Ask whether there are explicit constraints or limitations on the way actions are performed. Try to notice if definite quantities have been specified at any point in the requirement (see Example 4). Underline these conditions and constraints with a yellow pen.

2) **Compare the class descriptions to the requirements to verify if the requirements were captured appropriately.**

    INPUTS: Set of functional requirements (FR);
                         Class description (CD).

    OUTPUTS: Corresponding concepts have been marked on the FR and CD;
                         Discrepancy reports.

☞ For each green-underlined action description in the functional requirements, try to find an associated behavior or combination of behaviors in the class description. Use syntactic clues (e.g. a behavior name that is similar or synonymous to an action description) to help your search, but make sure the *semantic* meaning of the function in the requirements and high-level design is the

same. When found, mark both the name of the behavior(s) in the class description and the description of the activity in the requirements with a green symbol (*).

Do the classes receive the right information for accomplishing the required behaviors? Are *feasible* results produced? If not, you have found an incorrect fact. The classes as defined cannot achieve an appropriate service. Fill out a discrepancy report describing the problem.

☞ For each blue-underlined noun in the functional requirements, try to find an associated class in the class description. An associated class may be named after a concept from the requirements, may describe a general class of which the concept is a particular instance (i.e. an object), or may contain the concept as an attribute. Use syntactic clues (e.g. a class name that is similar to the name of a concept) to help your search, but make sure the *semantic* meaning of the concepts in the requirements and design is the same.

☞ If the concept in the functional requirements corresponds to a class name in the class description, mark both the name of the class in the class description and the concept in the requirements description with a blue symbol (*).

Do the class descriptions contain sufficient information regarding the concepts that play some role in this functionality? Do the class names have some connection to the nouns you had marked? Are the classes using unambiguous and clear information to describe the concepts? If not, you have detected an ambiguity. Fill out a discrepancy report describing the problem.

Do these classes encapsulate (blue-marked) attributes concerned with the nouns you had marked? Do these classes encapsulate (green-marked) behaviors concerned with the verbs or actions descriptions you had marked? Were all identified constraints and conditions for these classes regarding this requirement described? If not, you have found an omission; important information from the requirements has been left out. Fill out a discrepancy report describing the problem.

☞ If the concept in the functional requirements corresponds to an attribute in the class description, mark both the name of the attribute in the class description and the concept in the requirements description with a blue symbol (*).

Is the class description using *feasible* types to represent information, given the requirements description? Were the (yellow-underlined) constraints and conditions on these attributes observed in their definition? If not, you have found an incorrect fact. Fill out a discrepancy report describing the problem.

3) **Review the class description and functional requirements to make sure that all appropriate concepts correspond between the documents.**

INPUTS: Set of functional requirements (FR);
                               Class description (CD).

OUTPUTS: Discrepancy reports.

☞ Look for descriptions of functionality in the requirements that have been omitted from the design.

Is there some underlined concept (in blue) or activity (in green) in the requirements, which is unstarred? If yes, it may mean that some concept was not captured in the design. However, it may also mean that some concept in the requirements was simply used for explanation or example, and need not be made a part of the system. Decide whether this omission should be identified as a defect. Describe what is missing, filling in a defect record for each unstarred noun.