Some questions to have an insight of exam

Chapters in the text-book that are less relevant to the exam

- Chapter 3 – Project organization and Communication
- Chapter 12 – Rational Management
- Chapter 13 – Configuration Management
- Chapter 14 – Project Management

E –questions (must get 75% points from them)

General questions

--What are basic ways to deal with complexity?

(3p)

-- Which of the following are models?

a) a UML class diagram

b) a set of UML class diagrams describing the classes in a software system

c) a 1:100 scale clay replica of a new sports car that will be used to test its aerodynamics in a wind tunnel

d) a full-scale, working prototype of a new sports car

(3p)

UML and OOP

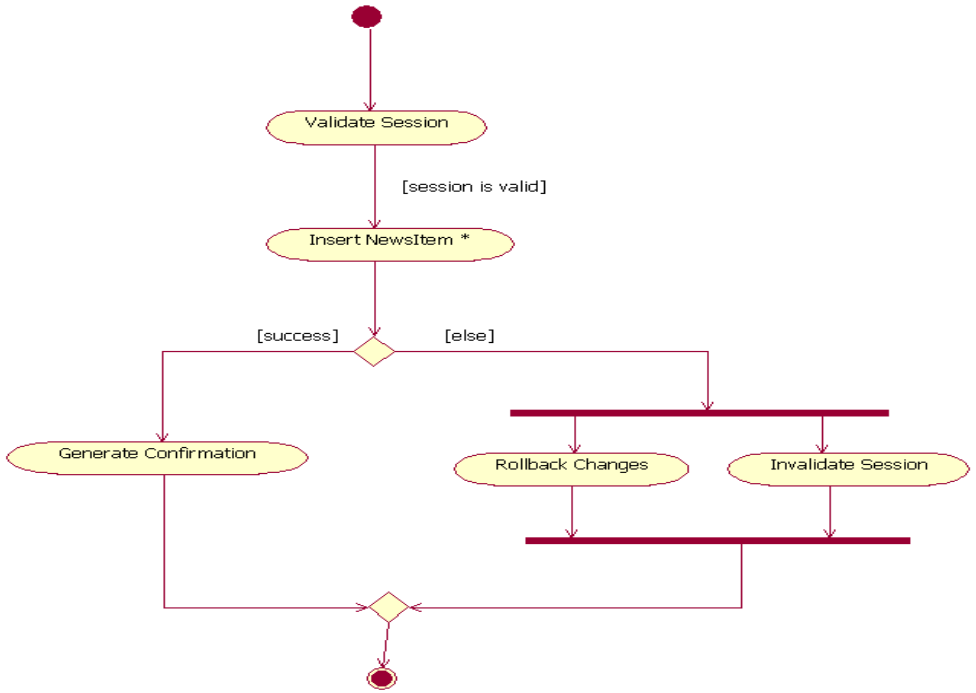
-- What is/are difference(s) between Sequence diagrams and Communication diagrams? When each of them is more appropriate to use?

(2p)

E –questions (must get 75% points from them)

--Based on Activity Diagram in Figure 2, which of the following statements are true?

a) The 'Insert NewsItem' activity is executed many times
b) The 'Rollback Changes' and 'Invalidate Session, activities are taken in parallel.
c) The 'Rollback Changes' and 'Invalidate Session, activities are executed many times.
d) The 'Rollback Changes' and 'Generate Confirmation, activities are taken in parallel
e) If session is valid then confirmation is generated. **(3p.)**



E –questions (must get 75% points from them)

System Design

--Assume that we classified design goals into five categories: performance, dependability, cost, maintenance, and end user. Assign one or more categories to each of the following goals:

a) Users must be given a feedback within 1 second after they issue any command.

b) The TicketDistributor must be able to issue train tickets, even in the event of a network failure.

c) The housing of the TicketDistributor must allow for new buttons to be installed in the event the number of different fares increases.

The AutomatedTellerMachine must withstand dictionary attacks (i.e., users attempting to discover an identification number by systematic trial).

e) The user interface of the system should prevent users from issuing commands in the wrong order.

(3p)

E –questions (must get 75% points from them)

Moving to Code

-- **Explain the following mapping concepts: model transformation, forward engineering, reverse engineering and refactoring. Draw a figure showing their relations to model space and source code space.**

(3p)

Agile Software Development.

-- What are main ideas of the Manifesto of Agile Software Development?

(3p)

More difficult questions

-- Why do we apply principle of Falsification in software engineering? (4p)

-- Give an explanation of V-Model? What are/is its main difference(s) compare to Waterfall model? (4p)

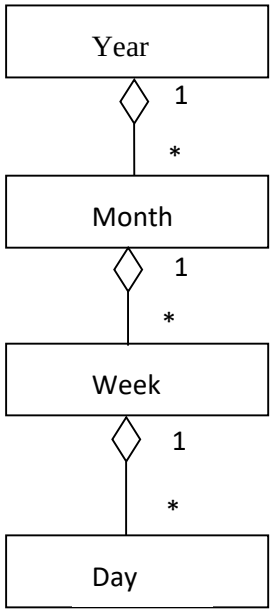
-- Consider an application that must select dynamically an encryption algorithm based on security requirements and computing time constraints. Which design pattern would you select? Draw a UML class diagram depicting the classes in the pattern and justify your choice. (4p)

Most difficult questions

-- Explain what is common and what is different between transformational and deductive synthesis.

(5p)

-- Consider the object model in the Figure. Given your knowledge of the Gregorian calendar, modify the model such that a developer unfamiliar with the Gregorian calendar could deduce the number of days in each month, the number of weeks in each month, the number of months in a year and the number of days in a week? Identify additional classes and associations if necessary. **(5p)**



Most difficult questions

-- Consider a sorted binary tree data structure for storing integers. Write invariants in OCL denoting that

- **All nodes in the left subtree of any node contain integers that are less than or equal to the current node, or the subtree is empty.**
- **All nodes in the right subtree of any node contain integers that are greater than the current tree, or the subtree is empty.**

(5p)