Midterm-
COMP 354 Software Engineering (B)

Date: October 26th, 2017
Time: 11.45 – 13.00
Close book and close notes exam
No calculator required.

Student – id: _____

Student name: _____

Please use the provided space on the question sheet for your answers.
If you need extra space, please continue on the back of the page (**indicate clearly**)

Total number of pages (including cover): 7
Total number of questions: 6
Total number of points: 75

Question #1 (12 points)
Please note that for each of the questions below it is possible to have **0..4 correct/false answers** => You have to indicate for **each** answer (a-d) if they are correct or not. Wrong or no answers = -1, but no negative overall points

The objective of requirements analysis is	False	True
a. to develop an abbreviated solution of a problem		
b. Identify all the functionality a customer wants		
c. Eliminate the need for non-functional requirements		
d. Maximize cohesion and minimize system coupling		

Domain models…	False	True
a. Focus on assigning responsibilities to classes		
b. Are part of the 4+1 view and provide a view of the software structure		
c. Focus on non-functional requirements		
d. Are based on system sequence diagrams		

Batch oriented architectures…	False	True
a. Best suited for non GUI applications		
b. Have components that are fully independent from a global context		
c. Are easy to parallelize		
d. Is an architectural style from the past which is no longer being used by companies		

The actors described in use-cases are…	False	True
a. the people who develop the software product		
b. the people who are the intended software product users		
c. the people who are maintaining the software system		
d. who are responsible for the software design		

Pipes and Filter architecture in its purest form…	False	True
a. Requires the use of shared variables and global states		
b. Is best suited for GUI and interactive applications		
c. Requires independence of the filters		
d. Provides high coupling among the filters		

Cost estimation …	False	True
a. ensures that a project will not overrun its cost		
b. is used to predict the cost of a software project		
c. should only be performed using one cost estimation method to avoid ambiguity		
d. is typically independent of the size of a project.		

Question #2 (28 pts)

Given is an elevator system for an office building. The office building has three elevators that move between floors in the building. There are two system computers with touch screens, which control all elevators. The computers control the opening/closing of doors, moving the elevator from one floor to another one. Furthermore, this system computer reads various sensors to make sure that the elevator is working correctly. Users can open, close the elevator door, and select the floor destination of the elevator.
A technician is on duty and has the same privileges as the user while using/maintaining an elevator. In addition, he has also ability to remotely access each elevator, through the system computer. During remote access, he can perform all operations such as open, close door, stop elevator. In addition, the technician can perform an operation "check system status", which checks the status of *all elevators in the system* and can optionally print the results to a laser printer.

Given is also the following success scenario for the technician "check_system_status".

Pre-condition
Technician is in his office.
System computer is working properly.

Main (success) scenario
1. Technician enters user-id in system computer.
2. Technician enters password in system computer.
3. Technician initiates the check system status by pressing the screen.
4. The system computer will then check the status of all 3 elevators one after each other.
5. After all elevators are checked, the system computer displays the report on screen
6. User can optionally print the report on the laser printer
7. Technician logs out of the system.

Post-condition
All elevators have reported their status.
Technician is logged out of the system.

Based on the above problem description, please provide the following:
a. A domain model for the elevator system (7 pts).

b. A use case diagram for the elevator problem. (7 pts)

c. Create a sequence diagram for the provided technician scenario *"check system status"*. Indicate all patterns being used + justify briefly their use – you can use the opposite page (10 pts)

d. Which Architectural Style would you suggest for the elevator system? Please justify briefly your solution (4 pts)

Question#3 (4 points)
What is the main purpose of architectural views such as the 4+1 views?

Question# 4 (15 pts)

Given are the following descriptions of different application contexts. Please choose for each an:
1. An appropriate architectural style, 2. justify your decision briefly. (1-2 sentences).
3. Highlight some **disadvantages** of this architecture style.

a. A large financial institution has scheduled to run automatically every month an end-of-month accounting processing. This processing involves the execution of several automated processing steps, requiring no user interaction. To reduce the processing time, these processing steps are being developed to be independent from each other to support incremental processing. (6 pts)

Style to be used: _____

Justification:

Disadvantages of this architectural style:

b.). You are developing software for a mission critical control software to be used in an airplane. One of your responsibilities is to provide sufficient documentation to ensure that the software product meets all the requirements provided by the client/law maker. (9 pts)

Important: Also, which software life cycle model should be used and why –justify briefly (1-2 sentences)

Style to be used: _____

Justification:

Disadvantages of this architectural style:

Software Life cycle model: _____

Justification

Question #5 (8 points) each answer - 4 pts
Given are the following statements, clear indicate if you agree/disagree with the statements and justify briefly your decision (1-2 sentences) –

a. There is no relationship between domain model and a sequence diagram. Agree / Disagree

b. There is no relationship in UML between scenarios, sequence diagrams and class models – all of these models should be seen in isolation. Agree / Disagree

Question# 6 (8 points)

a.) Why is there a need for cost estimation (keep your answer brief) – (3 pts)

b.) explain briefly 1-2 sentences. What are some of the challenges when estimating the cost of software projects (List 3 major challenges and explain them briefly (5 pts)