King Saud University

College of Computer and Information Sciences
Computer Science Department

Course Code:	**CSC 342**	
Course Title:	**Software Engineering**	
Semester:	**2nd 2016**	
Exercises Cover Sheet:	**MID1 Exam**	**90 Minutes**

Student Name:	.....
Student ID:	.....
Department Name:	.....

Tick the Relevant	Computer Science B.Sc. Program ABET Student Outcomes	NCAAA Outcomes	Question No. Relevant Is Hyperlinked	Covering %
	a) Apply knowledge of computing and mathematics appropriate to the discipline;	**1.1**		
√	**b) Analyze a problem, and identify and define the computing requirements appropriate to its solution**	**2.1**		
√	**c) Design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;**	**2.2**		
√	**d) Function effectively on teams to accomplish a common goal;**	**3.1**		
√	**e) Understanding of professional, ethical, legal, security, and social issues and responsibilities;**	**1.2**		
	f) Communicate effectively with a range of audiences;	**4.1**		
	g) Analyze the local and global impact of computing on individuals, organizations and society;	**2.3**		
	h) Recognition of the need for, and an ability to engage in, continuing professional development;	**2.4**		
√	**i) Use current techniques, skills, and tools necessary for computing practices.**	**1.3**		
	j) Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;	**1.4**		
√	**k) Apply design and development principles in the construction of software systems of varying complexity;**	**1.5**		
√	**General Question**	**-----**		

Question #1:

Indicate whether each of the following statement is "true" or "false". Justifying any "false" choice [/ 10 Points]

Statement	Answer [T / F]
1. Software engineering is concerned with all aspects of computer-based systems development including hardware, software and process engineering. Software engineering is an engineering discipline that is concerned with all aspects of software production.	**F**
2. Computer programs and associated documentation are what we refer to as software engineering. Computer programs and associated documentation are what we refer to as software	**F**
3. Embedded software products are usually developed for specific customers according to their specification. Embedded software products are built into hardware	**F**
4. Web services is an example of the software components that can be reused.	**T**
5. Agile model focus on rapid delivery of working software.	**T**
6. In incremental model, control over system evolution is lost.	**F**
7. Generic software products are written to support a particular business process Generic software products are written to be sold on open market	**F**
8. Batch software must react immediately based on the context Real time software must react immediately based on the context	**F**
9. Computer science focuses on theory and fundamentals of computer systems	**T**
10. UML (Unified Modeling Language) is a modeling language for OOS.	**T**

Question #2:

Match each of the following software feature with its description

[/ 5 Points]

Software Feature	Matching	Description
Maintainability		1. Software can evolve to meet the changing needs of customers
Reliability		2. Software consistently performs according to its specifications
Security		3. Malicious users should not be able to access or damage the system
Efficiency		4. Software should not make wasteful use of system resources such as memory and processor cycles
Acceptability		5. Software must be understandable, usable and compatible with other systems that they use.

Question #3:

Identify the type of the following software requirements; Functional (F), Non-functional (N).

[/ 6 Points]

Requirements	Type [F / N]
1. The system should allow the nurse to produce a daily report about each patient.	**F**
2. The database should be able to store at least 100000 record.	**N**
3. The system database should not allow accessing patients' data from outside the hospital.	**N**
4. The system should allow the doctor to search for a patient given his national ID.	**F**
5. The system should allow the nurse to view all patients admitted in a certain date.	**F**
6. The system should be easy to use for an average computer users	**N**

Question #4:

Circle the most appropriate answer(s)
[/ 4 Points]

1. "Software engineers should not use their technical skills to **misuse** other people's computers." Here the term **misuse** refers to:
   a) Unauthorized access to computer material
   b) Modification of project implementation
   c) Dissemination of viruses or other malware
   d) All of the mentioned

2. Identify an ethical dilemma from the situations mentioned below:
   a) Your team started the design a safety-critical system, although requirements are still incomplete.
   b) Your employer releases a safety-critical system without finishing the testing of the system.
   c) Refusing to undertake a project.
   d) Agreement in principle with the policies of senior management.

3. What is the most expensive phase in a custom software development life cycle?
   a) Design and implementation
   b) Maintenance
   c) Analysis
   d) Testing

4. Which of these are the 4 generic software engineering framework activities?
   a) Specification, modeling, deployment, testing
   b) Risk management, measurement, production, reviewing
   c) Specification, designing, evaluation, evolution
   d) Analysis, designing, programming, evolution

Question #5:

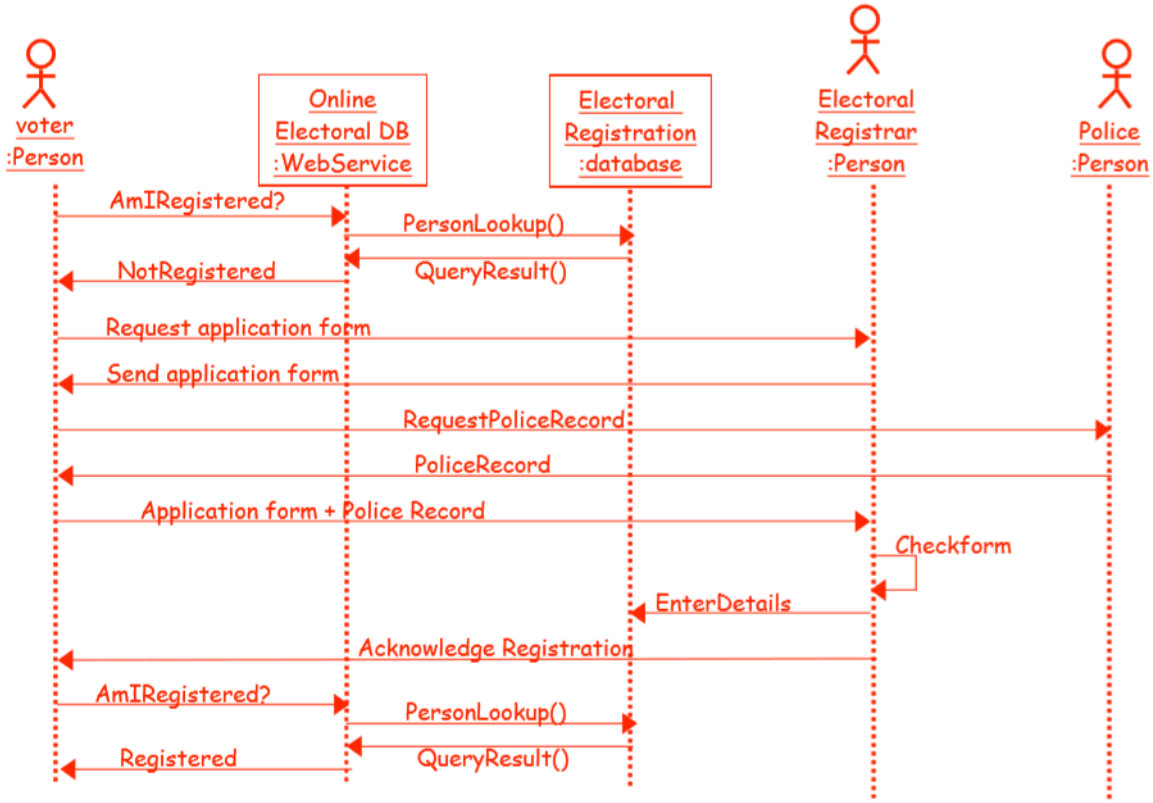
Draw a Sequence Diagram for the following process

[/ 10 Points]

The registering process starts when a new voter checks the online electoral registration database, to see if she is listed. When she finds that she is not listed, she contacts the electoral registrar, who sends her an application form. As part of the application, she needs to contact the police, to request a copy of her police record, as persons with recent

criminal convictions cannot vote. She then sends the police record along with the application form to the registrar. The registrar checks the form is filled out correctly, and then enters her details in the registration database. The registrar then sends an acknowledgement to the voter, who finally checks the online registration database again to confirm that her application was processed.

Notes: This solution assumes that the voter accesses the registration database through a separate web service front end, even though this isn't stated explicitly in the question. It also assumes the police record is obtained by contacting a person in the police department, rather than say through a form or a web service. There are many different ways of labeling the messages, and arranging the diagram. Credit is given for any solution that captures all the important steps described in the question.



Question #6:

A. Draw a Use Case Diagram for the following system

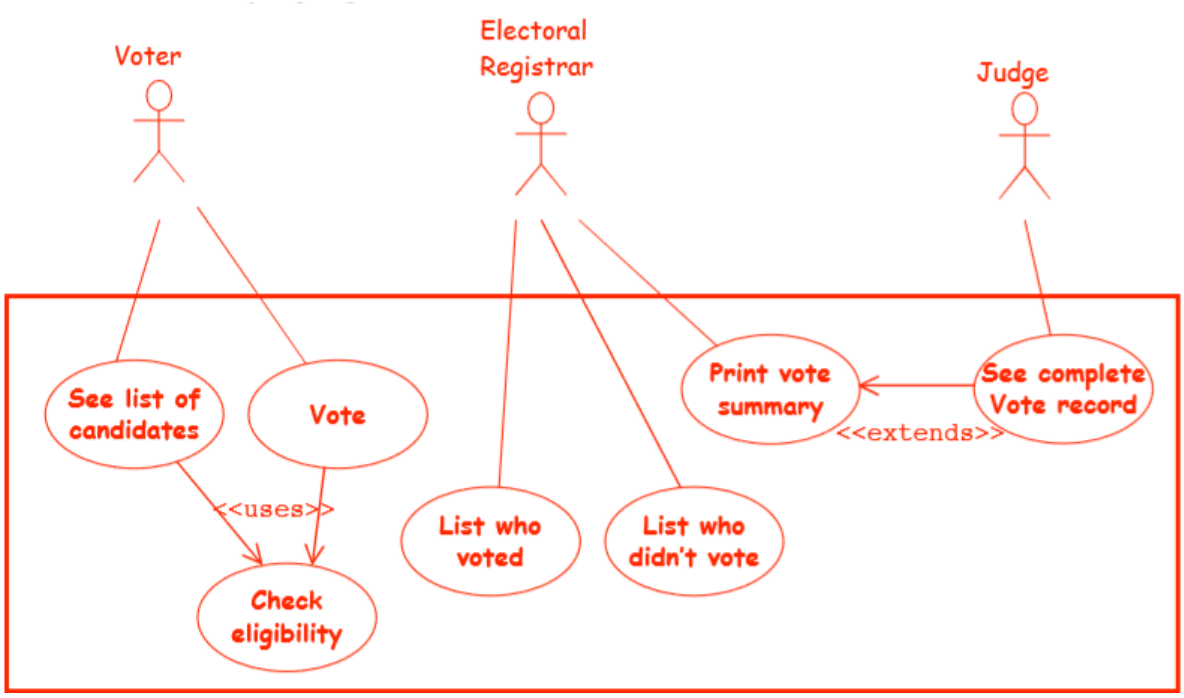
[/ 10 Points]

A voting machine that allows voters to see a list of candidates and select one to vote for. The machine should check that each voter is eligible to vote. The electoral registrar will also want to print a summary of the total votes for each candidate, and (separately) a list of the voters who have voted, and a list of those who haven't. In case of a dispute, the

machine should also list a complete record of who voted for whom, but only a judge can use this function which carried out with very high confidentiality.

B. Fill in the information for "Vote for a candidate" use case.
[/ 10 Points]

Actors:	voter
Description:	
Stakeholders and Interests:	Voter, candidate, registrar
Trigger:	Voter hits the vote button
Pre-conditions:	The voter is registered in the voters database
Post-conditions:	The voter vote is saved in the DB
Normal Flow:	1. Voter requests to vote for a candidate 2. The system checks her eligibility 3. The voters enters (or chooses) the name of her candidate 4. The system confirms saving the vote to the DB
Alternative Flows (if any):	3a. The system displays "not eligible to vote" and end use case
Special Requirements (if any):	User choice should be handled with high confidentiality



Notes: The “extends” link from the judge’s use case isn’t obvious, so don’t penalize if they missed it.

	Result					
Question No.	**Relevant ABET Student Outcome**	**Relevant NCAAA Student Outcome**	**SO is Covered by %**	**Full Mark**	**Student Mark**	**Assessor's Feedback**
Ex. 1						
Ex. 2						
Ex. 3						
Ex. 4						
Ex. 5						
Ex. 6						
Totals			**100%**	**15**		
	I certify that the work contained within this assignment is all my own work and referenced where required. **Student Signature:** **Date:**					**Feedback Received:** **Student Signature:** **Date:**