1. Explain why testing can only detect the presence of errors, not their absence.
Answer: Look at on the Soft Eng Class Presentation

7. Explain why interface testing is necessary even when individual components have been extensively validated through component testing and program inspections.

Answer:
The interface to the module may have been incorrectly specified. The validation process is based on this specification rather than actual usage of the module or sub-system.
• The assumptions made by other modules about the behaviour of a given module (A say) in response to particular interface stimuli may be incorrect. That is, these modules expect A to behave in a way in which it was never designed to operate.
• Interface testing can reveal omissions in the interface design. It may be discovered, when integrated with other modules, that the interface must be augmented in some way.

1. Explain the differences between verification and validation, and explain why validation is a particularly difficult process.
Answer: Look at on the Soft Eng Class Presentation

2. Do you think is it necessary for a program to be completely free of defects before it is delivered to its customer? To what extent can testing be used to validate that the program is fit for its purpose?

Answer:
A program need not be completely free of defects before delivery if:
1. Remaining defects are minor defects that do not cause system corruption and which are transient i.e. which can be cleared when new data is input.
2. Remaining defects are such that they are recoverable and a recovery function that causes minimum user disruption is available.
3. The benefits to the customer's business from the system exceed the problems that might be caused by remaining system defects.

Testing cannot completely validate that a system is fit for its intended purpose as this requires a detailed knowledge of what that purpose will be and exactly how the system will be used. As these details inevitably change between deciding to procure a system and deploying that system, the testing will be necessarily incomplete. In addition, it is practically impossible for all except trivial system to have a complete test set that covers all possible ways that the system is likely to be used.
4 Explain why program inspections are an effective technique for discovering errors in a program. What types of error are unlikely to be discovered through inspections?

Answer:
Program inspections are effective for the following reasons:
1. They can find several faults in one pass without being concerned about interference between program faults.
2. They bring a number of people with different experience of different types of errors. Hence, the team approach offers greater coverage than any individual can bring.
3. They force the program author to re-examine the program in detail - this often reveals errors or misunderstandings.
The types of errors that inspections are unlikely to find are specification errors or errors that are based on a misunderstanding of the application domain (unless there are domain experts in the team).

8. Explain why it may be cost-effective to use formal methods in the development of safety-critical software system. Why do you think that some developers of this type of system are against the use of formal methods?

Answer: Hint: the costs of system failure are very high and so additional cost in the development process is justified. (explain this more)

1. Suggest why the savings in cost from reusing existing software is not simply proportional to the size of the components that are reused.
Answer: Hint: Do to think reusing 2000 lines of code would save twice as much as reusing 1000 lines of code???

2. Give at least two circumstances where you might recommend against software reuse.
   Answer: Anyone can give me the answer, please???
Hint: business status of the code provider is dubious, critical applications, small systems where the costs of reuse systems where performance is a critical requirement

1. Explain in detail why a software system that is used in a real-world environment must change or become progressively less useful.
Answer: Hint: environment, system requirements, system declines, Business expansion, legal, political

7. What are essential conditions for software re-engineering to be successful?

Answer: Hint: staff available who are familiar with the technology, automated tools
8. What are the strategic options for legacy system evolution? When would you normally replace all or part of a system rather than continue maintenance of the software (with or without re-engineering)?

Answer: Hint
a. Abandon maintenance of the system and replace it with a new system.
b. Continue maintaining the system as it is.
c. Perform some re-engineering (system improvement) that makes the system easier to maintain and continue maintenance.
d. Encapsulate the existing functionality of the system in a wrapper and add new functionality by writing new code which calls on the existing system as a component.
e. Decompose the system into separate units and wrap them as components. This is similar to the solution above but gives more flexibility in how the system is used.

You would normally choose the replacement option in situations where the hardware platform for the system is being replaced, where the company wishes to standardize on some approach to development that is not consistent with the current system, where some major sub-system is being replaced (e.g. a database system) or where the technical quality of the existing system is low and there are no current tools for re-engineering.

3. Your customer wants to develop a system for stock information where dealers can access information about companies and can evaluate various investment scenarios using a simulation system. Each dealer uses the simulation in a different way, according to his/her experience and the type of stocks in question. Suggest a client-server architecture for this system that shows where functionality is located. Justify the client-server system model that you have chosen.

Answer: Hint Fat client model (but why???)

4. By making reference to the application model shown below, list and explain at least two problems that might arise when converting a 1980’s mainframe legacy system for insurance policy processing to a client-server architecture.
Answer: Hint: no clear separation between data management, application processing and information
Presentation (Explanations are needed... 😊)

9. Modify below to show the generic architecture of a presentation system. Base your design on the
features of any spreadsheet system that you have used.

Answer: Look at our take home quiz

4. Using UML graphical notation for object classes, design the following object classes identifying
attributes and operations. User your own experience to decide on the attributes and operations that should
be associated with these objects:
- A telephone
- A printer for a personal computer
- A bank account
- A library catalogue

Answer: Easy ya 😊 ....I give one answer

<table>
<thead>
<tr>
<th>Bank account</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account number</td>
</tr>
<tr>
<td>Type of account</td>
</tr>
<tr>
<td>Balance</td>
</tr>
<tr>
<td>Transaction list</td>
</tr>
</tbody>
</table>

| Open |
| Close |
| List balance |
| List statement |
| Credit |
| Debit |
7. Identify the possible objects in the following systems and develop an object-oriented design for them. You may make any reasonable assumptions about the system when deriving the design.

- A group diary and time management system is intended to support the timetabling of meetings and appointments across a group of coworkers. When an appointment is to be made that involves a number of people, the system finds a common slot in each of their diaries and arranges the appointment for that time. If no common slots are available, it interacts with the user to rearrange his/her personal diary to make room for the appointment.

- A petrol/gas station is to be set up for fully automated operation. During swipe their credit card through a reader connected to the pump, the card is verified by communication with a credit company computer; and a fuel is limit is established. The driver may then take the fuel required. When fuel is delivery is complete and the pump hose is returned to its holster, the driver’s credit card account is debited with the cost of the fuel taken. The credit card is returned after debiting. If the card is invalid, the pump returns it before fuel is dispensed.

Answer: Though question

Hints:

<table>
<thead>
<tr>
<th>Object</th>
<th>Attributes</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump</td>
<td>Fuel Dispensed</td>
<td>Activate, Deactivate</td>
</tr>
<tr>
<td></td>
<td>Price</td>
<td>Deliver Fuel</td>
</tr>
<tr>
<td></td>
<td>Hose Status</td>
<td>Stock Update</td>
</tr>
<tr>
<td>Card Reader</td>
<td>Card Number</td>
<td>Read Card</td>
</tr>
<tr>
<td></td>
<td>Card Type</td>
<td>Check Status</td>
</tr>
<tr>
<td></td>
<td>Card Status</td>
<td>Print Receipt</td>
</tr>
<tr>
<td></td>
<td>Credit Limit</td>
<td></td>
</tr>
<tr>
<td>Fuel Tank</td>
<td>Current Fuel Level</td>
<td>Add Fuel, Remove Fuel</td>
</tr>
<tr>
<td>Communication System</td>
<td>Number dialed Credit limit</td>
<td>Send card number Return card status</td>
</tr>
<tr>
<td>System controller</td>
<td>Card number Credit type Max delivery Price table Fuel delivered</td>
<td>Send card number</td>
</tr>
<tr>
<td>Price Table</td>
<td>Fuel Prices</td>
<td>Lookup Amount Price</td>
</tr>
</tbody>
</table>

3. What factors to be taken into account in the design of a menu-based interface for “walk-up” systems such as bank ATMs? Write your comments on the interface of an ATM that you use.

Answer: Hint: System users may be infirm, users may be completely unfamiliar, Different people may understand the meaning of icons (still remember about Human Computer Interaction 😊), need for the system for very simple functions

11. Discuss whether it is ethical to instrument software to monitor its use without telling end users that their work is being monitored.

Answer: Need scientific answer (duh…I don’t have any idea about this since I’ve monitor by my “boss” 😊)

Hint: Depending on the users, it is arguable whether monitoring is ethical at all in that individuals have a write to privacy and this includes how they use systems.
3. Explain why the rapid delivery and development of new system is often more important to business than the detailed functionality of theses systems
Answer: Hint: difficult to coordinate their work with other teams, avoided for critical systems (why ya... 😊)

4. Extreme programming express user requirements as stories, with each story written on a card. List and explain at least two respectively, advantages and disadvantages of this approach to requirements description.
Answer: Hint: support the most common user operations, easy to understand (adv....but why 😊)
liable to be incomplete and their informal nature (why ya this disadv...😊)
focus on functional requirements (why ya this disadv...😊)
cross-cutting system requirements (why ya this disadv...😊)
relationship between the system architecture and the user stories is unclear (why ya this disadv...😊)

6. Suggest at least two reasons why the productivity rate of programmers working as a pair is roughly the same as two programmers working individually.
Answer: Hint: continuous informal reviewing, Information sharing is implicit (what does it mean?), encourages refactoring (what does “refactoring” mean?), spend less time in fine-grain optimization (what does fine grain optimization mean?)

10. A charity has asked you to prototype a system that keeps track of all donations they have received. This system has to maintain the names and addresses of donors, their particularly interest, the amount donated and when the donations was made, If the donation is over a certain amount, the donor may attach conditions to the donation (e.g. It must be spent on a particular project), and the system must keep track of these and how the donation was spent. Explain in details how you would prototype this system, nearing in mind that the charity has a mixture of paid workers and volunteers. Many if the volunteers are retirees who have has little computer experience.
Answer: Read the passage carefully. Hint: less or no computer experience, how about the technology?, how about for remote area, how d you manage the data?

10. To help counter terrorism, many countries are planning the development of computer systems that track large numbers of their citizens and their actions. Clearly this has privacy implications. Discuss the ethics of developing this type of system.
Hint: present your answer in systematic form

9. Apart from the challenge of heterogeneity, rapid delivery and trust, identify at least three problems and challenges that Software Engineering is likely to face in the 21st century.
Answer: look at our Class Presentation answer
8. List at least two advantages and two disadvantages professional software engineer should be certified in the same way as doctors or lawyers.
Answer: look at our Class Presentation answer

8. Explain why legacy systems may be critical to the operation of a business.
Answer look at our Class Presentation answer

7. A multimedia virtual museum system offering virtual experiences of ancient Greece is to be developed for a consortium of European museum. The system should provide users with the facility to view 3-D models of ancient Greece through a standard web browser and should also support an immersive virtual reality experience. What political and organizational difficulties might arise when the system is installed in the museum that make up the consortium?
Answer look at our Class Presentation answer

6. A flood warning system is to be procured which will give early warning of possible flood dangers to sites that are threatened by floods. The system will include a set of sensors to monitor the rate of change of river levels, links to a meteorological system giving weather forecast, links to the communication systems of emergency services (police, coastguard, etc), video monitors installed at selected locations, and a control room equipped with operator consoles and video monitors. Controllers can access database information and switch video displays. The system database includes information about the sensors, the location of sites at risk and the threat conditions for these sites (e.g. high tide, southwesterly winds, etc) tide tables for coastal sites, the inventory and location of flood control equipment, contact details for emergency services, local radio stations, and so on.

Draw a block diagram of possible architecture for such a system. You should identify the principal sub-system and their links between them.
Answer: look at our Class Presentation answer

8. In a medical system that is designed to deliver radiation to treat tumors, suggest one hazard that may arise AND propose one software feature that may be used to ensure that the identifies hazard does not result in an accident.
Answer: look at our Class Presentation answer

Possible hazard is delivery of too much radiation to a patient. This can arise because of a system failure where a dose greater than the specified dose is delivered or an operator failure where the dose to be delivered is wrongly input.
Possible software features to guard against system failure are the delivery of radiation in
increments with a operator display showing the dose delivered and the requirement that the operator confirm the delivery of the next increment. To reduce the probability of operator error, there could be a feature that requires confirmation of the dose to be delivered and that compares this to previous doses delivered to that patient. Alternatively, two different operators could be required to independently input the dose before the machine could operate.

5. Giving reasons for your answers, suggest which dependability attributes are likely to be more critical for the following systems:
   - An internet service provider by an ISP with thousands of customers.
   - A computer controlled scalped used in keyhole surgery
   - A directional control system used in a satellite launch vehicle.
   - An Internet-based personal finance management system.

Answer:
look at our Class Presentation answer

7. Reliability and safety are related but distinct dependability attributes. Describe the most important distinction between these attributes and explain why it is possible for a reliable system to be used and vice versa.

Answer: Hint: Ensuring system reliability does not necessarily lead to system safety as reliability is concerned with meeting the system specification (the system 'shall') whereas safety is concerned with excluding the possibility of dangerous behavior (the system 'shall not'). If the specification does not explicitly exclude dangerous behavior then a system can be reliable but unsafe.

10. In computer security terms, explain the differences between an attack and a threat.
Answer: Hint: An attack can lead to a threat if the exploitation of the vulnerability leads to a threat. However, some attacks can be successful but do not lead to threats as other system features protect the system.

1. Giving reasons for your answer based in the type of system being developed, suggest the most appropriate generic software process model that might be used as basis for managing the development of the following system:
   - A system to control anti-locking in a car.
   - A virtual reality system to support software maintenance.
   - A university accounting system that replaces an existing system.
   - An interactive system that allows railway passengers to find train times from terminals installed in stations.

Answer: look at our Class Presentation answer

9. Explain why a software system that is used in a real-world environment must change or become progressively less useful.
Answer: Hint: why ya??? :)}
1. In the context of CMM prediction of performance, explain in details in the following areas:
   A. Process
   B. People
   C. Technology measurement

2. Explain the role of Joint Application Development (JAD) in Software Requirements and one illustration to all participations who involved in JAD.

3. A. Classic mistakes
   B. Why do classic mistakes in projects happen.

6. The table below sets out a number of activities, duration, and dependencies. Draw an activity chart showing the project schedule.

<table>
<thead>
<tr>
<th>Task</th>
<th>Duration (days)</th>
<th>Dependencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>15</td>
<td>T1</td>
</tr>
<tr>
<td>T3</td>
<td>10</td>
<td>T1, T2</td>
</tr>
<tr>
<td>T4</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>T5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>T6</td>
<td>15</td>
<td>T3, T4</td>
</tr>
<tr>
<td>T7</td>
<td>20</td>
<td>T3</td>
</tr>
<tr>
<td>T8</td>
<td>35</td>
<td>T7</td>
</tr>
<tr>
<td>T9</td>
<td>15</td>
<td>T6</td>
</tr>
<tr>
<td>T10</td>
<td>5</td>
<td>T5, T9</td>
</tr>
<tr>
<td>T11</td>
<td>10</td>
<td>T9</td>
</tr>
<tr>
<td>T12</td>
<td>20</td>
<td>T10</td>
</tr>
<tr>
<td>T13</td>
<td>35</td>
<td>T3, T4</td>
</tr>
<tr>
<td>T14</td>
<td>10</td>
<td>T8, T9</td>
</tr>
<tr>
<td>T15</td>
<td>20</td>
<td>T12, T14</td>
</tr>
<tr>
<td>T16</td>
<td>10</td>
<td>T15</td>
</tr>
</tbody>
</table>

Answer: Please look at Lolo Answer 😊

10. Fixed-price contracts, where the contractor bids a fixed price to complete a system development, may be used to move project risk from client to contractor. If anything goes wrong, the contractor has to pay. Suggest how the use of such contacts may increase the likelihood that product risks will arise.

Answer: Hint Look at our tutorial

2. Explain why the process of project planning is iterative and why a plan must be continually reviewed during a software project.

Answer: Hint: Project planning can only be based on available information.
3. Discover ambiguities or omissions in the following statement of the requirements for part of a ticket-issuing system.

An automated ticket-issuing system sells rail tickets. Users select their destination and input a credit card and a personnel identification number. The rail ticket is issued and their credit card account charged. When the user presses the start button, a menu display of potential destination is activated, along with a message to the user to select a destination. Once a destination has been selected, users are requested to input their credit card. Its validity is checked and the user is then requested to input a personal identifier. When the credit transaction has been validated, the ticket is issued.

ANSWER: Look at our quiz Answer

1. Suggest who might be stakeholders in a university student records system. Explain why it is almost inevitable that the requirements of different stakeholders will conflict in some way.

Answer: Hint: I bet you know the answer 😊

3. The LONTAR system has to include support for cataloging new documents where the system catalog may be distributed across several machines. What are likely to be the most important types of non-functional requirements associated with the cataloguing facilities?

Answer: look at the Final Exam

4. Using your knowledge of how an ATM is used, develop a set of use-cases that could server as a basis for understanding the requirements for an ATM system.

Answer: look at the Final Exam answer

9. When emergency changes have to be made to system, the system software may have to be modified before changes to the requirements have been approved. Suggest a process model for making these modifications that ensures that the requirements document and the system implementation do not become inconsistent.

Answer:

![Diagram of process model](image)

How do you explain the above figure?
10. Your company uses a standard analysis method that is normally applied in all requirements analyses. In your work, you find that this method can not represent social factors that are significant in the system you are analyzing. You point this out to your manager, who makes it clear that the standard should be followed. Discuss what you should do in such situation.

Answer: Hint: *The best way to tackle this problem is to demonstrate by example that the analysis method is inadequate. (You have to explain these)*

2. Draw a context model for a patient information system in a hospital. You may make any reasonable assumptions about the other hospital systems that are available, but your model must include a patient admission and an image storage system for X-ray, as well as other diagnostic records.
   Answer: look at our Class Presentation answer

3. Draw a data-flow diagram modeling the data processing with a bank ATM involved when a customer withdraw cash from the machine.
   Answer: Anyone can give me the answer?? Just let me know yours by e-mail

9. Develop a sequence diagram showing the interaction involved when a student registers for a course in a university. Course may have limited enrollment, so the registration process must include checks that places are available. Assume that the student accesses an electronic course catalogue to find out about available courses.
   Answer: Anyone can give me the answer?? Just let me know yours by e-mail

4. In the insulin pump system, the user has to change the needle and insulin supply at regular intervals and may also change the maximum single dose and the maximum daily dose that may be administrated. Suggested three user errors that might occur and propose safety requirements that would avoid these errors resulting in an accident.

Answer: Hint:
Maximum daily dose set wrongly
Maximum single dose set wrongly
Failure to replace empty insulin reservoir
Insulin reservoir improperly fitted
Needle improperly fitted

*So please put the example of safety requirements to avoid these errors to my e-mail.*
5. A safety-critical software system for treating cancer patients has two principal components:
   - A radiation therapy machine that delivers controlled doses of radiation to tumor sites. This machine is controlled by an embedded software system.
   - A treatment database that includes details of the treatment given to each patient. Treatment requirements are entered in this database and are automatically downloaded to the radiation therapy machine.

Identify three hazards that may arise in this system. For each hazard, suggest a defensive requirement that will reduce the probability that these hazards will result in an accident. Explain why your suggested defense is likely to reduce the risk associated with the hazard.

Answer:

*Hazards*: I give one: Incorrect dosage of radiation computed (others please added ya...☺)

*Software protection*: I give one: (others please added ya...☺)

1. Comparison with previous doses delivered. Establishment of a maximum monthly dose which may never be exceeded. Feasibility checks (e.g. for negative dosages). Confirmation of dose to be delivered by operator. Continuous visual display of dose being delivered.

1 I explain why it may be necessary to design the system architecture before the specifications are written. Answer: Hint: means of structuring the specification and developing different sub-system specifications concurrently.

4. Giving reasons for your answer, suggest an appropriate structural model for the following system:
   - An automated ticket-issuing system used by passenger at a railway station.
   - A computer-controlled video conferencing system that allows video audio, and computer data to be visible to several participants at the same time.
   - A robot floor-cleaner that is intended to clean relatively clear spaces such as corridors. The cleaner must be able to sense walls and other obstructions.

Answer: look at our Class Presentation answer

7. Giving reasons for your answer, suggest an appropriate control model for the following systems:
   - A batch processing that takes information about hours worked and pay rates and prints salary slips and bank credit transfer information.
   - A set of software tools that are produced by different vendors, but which must work together.
   - A television controller that responds to signals from a remote control unit.

Answer: Answer this and let me know by e-mail ya...☺

Good luck and God bless you all