TUTORIALS

Question 1

(a) Give any two reasons of why you would employ a software engineering approach in software development.

To better manage development process and thus deliver software within schedule
To abide by the cost constraints
To produce better quality software and that includes the requirements given by customers.

[2 Marks]

(b) A development team needs to develop a new software system for a customer who has a vague understanding of the system requirements and is unable to assess how the new system affect work practices. Explain why waterfall model is not an appropriate model to be used in this case. Suggest a model that will suit this context.

Waterfall model is used when the requirements are well-understood. In this case the user has a vague understanding of the requirements.

Recommended: Prototype

A prototype is a simplified subset of the proposed system that simulates the actual processing that will be done by the real system. In this way, the customer will be able to use the prototype to define their requirements.

Typically prototype consists of a few screen designs and reports that provide just sufficient
functionality to allow users to experience how the proposed system might look and feel. The user
will be able to use the system and clear any misunderstanding.

[4 marks]

Question 2

A hospital ward management system automatically collects and displays nursing information on each of the patients in a ward. The system maintains a set of medical notes for each patient. Each

patient's notes keep a record of pulse, temperature and blood pressure measurements. Blood pressure, pulse and temperature are measured at set time intervals, pulse should be measured every 15 minutes with temperature measured every 30 minutes. The system automatically takes all measurements at the specified intervals and updates the patient's notes accordingly. The patient's measurements are displayed by the system on a bedside monitor. The medical notes for the patient can be examined and measurement intervals altered from this bedside display during ward rounds.

(a) Why should a number of system stakeholders be consulted during the requirements engineering process for a computer-based system?

Every stakeholder has a different view of the system and involving several stakeholders will enable the requirements engineer to have different viewpoints of the system
Each stakeholder contributes in terms of additional information related to the system which other stakeholders might have missed
Not all stakeholders know everything about how the system should operate
Stakeholders' involvement in all stages of development ensures higher rates of product acceptance

[2 Marks]

(b) Briefly explain the difference between functional and non-functional requirements?

Functional Requirements are the statements of services the system should provide, how the system should react to particular inputs and how the system should behave in particular situations
[1 Mark]

Non-Functional Requirements are the constraints on the services or functions offered by the system. Categories may be in terms of user interface, performance, safety and quality among others
[1 Mark]
[2 Marks]

(c) For any interactor viewpoint identified in (c) suggest two functional and two non-functional requirements that could be suggested by the stakeholders associated with that viewpoint.

Functional requirement

The software shall provide a repository of patient information, so that nursing information about new patients can be added.

The software shall allow the modification of the measurement taken by the ward manager.

The software shall capture the temperature and pressure of patients through the use of digitized readers.

Non-functional requirement
Blood pressure, pulse and temperature shall be measured at set time intervals, pulse shall be measured every 15 minutes with temperature measured every 30 minutes

The system will provide a menu driven touch screen interface for ward manager to interact with the patient information.

The software shall access level control so that only ward managers are allowed to make modification to the measurements.

[4 Marks]

Question 3

(a) A Web browser is a complicated program. It must deal with many types of data (images, sound, etc.), support various network services and handle the many constructs of HTML (the language in which Web pages are written). As a Project manager, you have to lead a small group of programmers in implementing a Web browser.

I. Briefly state two issues that could make Software Project Management difficult?
[2 Marks]

Any 2 issues

The product is intangible.
The product is uniquely flexible.
Software engineering is not recognized as an engineering discipline with the same status as
mechanical, electrical engineering, etc.
The software development process is not standardised.
Many software projects are 'one-off' projects.

Question 1

Please read carefully the case study which is about an Airline Reservation system and answer the questions that follows.

"Little Paradise Flights" will like to implement an Airline Reservation system (ARS) for its customers that will provide easy-to-use, interactive, and intuitive graphical web interface.

The following functionalities shall be provided to the users - access to the ARS to check the flight schedule, availability of seats, ticket price and to block, reserve, cancel, and reschedule tickets. There are three databases internal to the system DB-user is the database containing all the personal information of the registered users of the ARS. This can be updated by the user by logging in to the system. Information from this database is used during transactions like charging the credit card etc. DB-schedule is a copy of the flight schedule database. The latter exists independently and is updated by a flight scheduler system which is out of scope of the ARS. DB-schedule is updated with the latest status of the flight schedule database whenever there is any change in the latter. For example, if a flight has been added to the schedule between two cities on Tuesdays, DB-schedule gets updated with this change through a process with which we are not concerned. It is external to the system and is out of the scope of this SRS. DB-schedule also contains the base prices of tickets for various flight numbers. DB-reservations are a database containing information regarding the number of seats available on each class on different flights. It has provision for marking how many of the reserved seats have been blocked but not yet bought. DB-reservations should update itself using DB-schedule, for example, if a new flight is added. DB-geography is a database, which contains information about the cities and towns serviced by the airline. The distance between all cities and towns is contained in a matrix form. There are two interfaces, one for the administrator and one for the customer via web. The administrator can update DB-schedule with any changes in the base prices of flight tickets. The system uses a pricing algorithm and dynamically determines the actual price from this base price depending on the date of reservation vis-à-vis date of departure. The system will give notification of booking confirmation through e-mail and sms.

(d) Identify the principal viewpoints which might be taken into account in the specification of this system and organize these using a viewpoint hierarchy diagram.

Interactor: customers of the airline company, Administrator
Indirect: Management of the airline company, finance department, flight scheduler system
Domain: Regulations of the airline industry, coding standards, Mobile phone companies

[6 Marks]

(e) For any interactor viewpoint identified in (a) suggest three functional and three non-functional requirements that could be suggested by the stakeholders associated with that viewpoint.

Requirement proposed by students must follow guidelines for writing good requirements.

For example FR1: Users shall use the online interface to check flight schedules

NFR 1: All customers will be provided with a login and password to be allowed to do bookings of seats.

[6 marks]

(f) There are a number of checks that should be performed during the requirement analysis phase, briefly describe three of them.

Validity checks : Does the requirement meet the objectives of the system.
Consistency checks : Requirements in the document should not conflict.
Completeness checks : The requirements document should include requirements which define all functions and constraints intended by the system user.
*Realism checks : U*sing knowledge of existing technology, the requirements should be checked to ensure that they can actually be implemented.
Verifiability : requirements should be written such that a set of checks can be designed to demonstrate that the delivered system meets that requirement.

[3 marks]

(g) Give two reasons why it is almost inevitable that the requirements of different stakeholders will conflict in some way.

The requirements that stakeholders have will conflict in various ways, as different people have different priorities.

Some of the stakeholders who influence the design of a system more than others may not know exactly what they really want and need.

[4 Marks]

(h) Identify some of the problems that are encountered during the requirements elicitation process.

Problems of scope: boundary of system is ill-defined, unnecessary design information may be given

Problems of articulation: users are aware of their needs but are unable to articulate them or afraid to articulate it, users may not be aware of their needs
Communication barriers: user and analyst speak different languages, limitations of the communication language
Cognitive limitations: analysts have poor knowledge of problem domain, users have poor understanding of computer capabilities and limitations
Technical issues: requirements evolve over time, rapid software & hardware technology changes

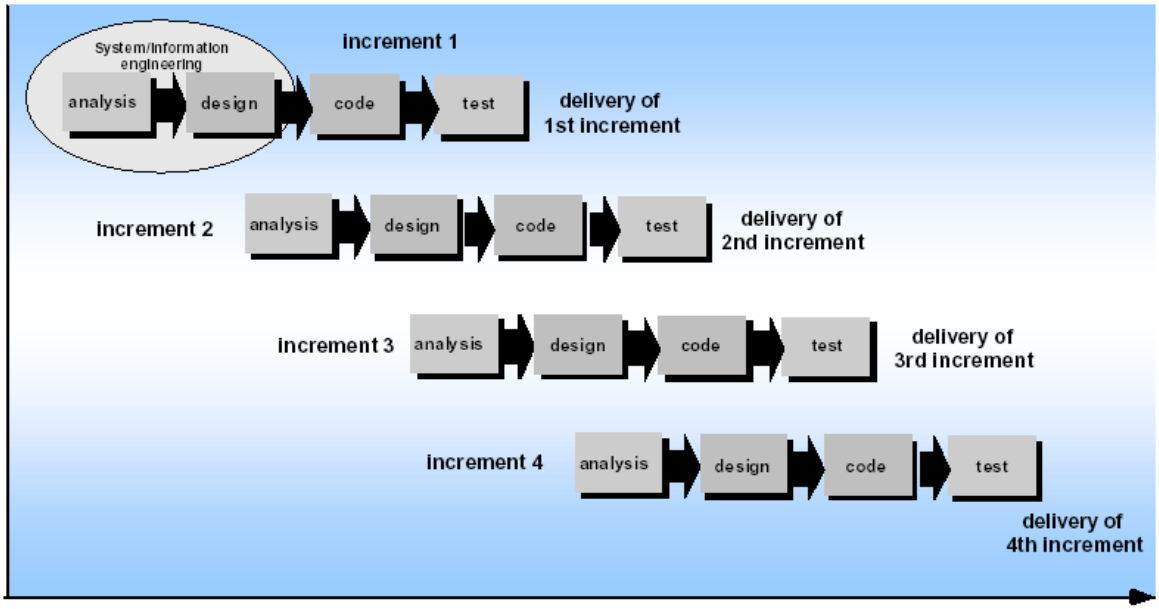
[5 Marks]

Question 2

(a) SOFTDEV is an outsourcing software development company which develops a wide range of application for many enterprises. For one of its project, it has decided to use Incremental model.

(i) With the help of a diagram, explain the Incremental model development life cycle .

Combines elements of the Waterfall Model with the iterative feature of the Prototyping Model
Allows reduction of rework (due to changing requirements) in the development process and gives customers opportunity to delay decisions on their detailed requirements until they have some experience with the system
Rather than deliver the system as a single delivery, the development and delivery is broken down into increments with each increment delivering part of the required functionality



The plan addresses the modification of the core product to better satisfy customer needs and the delivery of additional features and functionality
Once the development of an increment is started, the requirements are frozen though requirements analysis for later increments can continue
Once an increment is completed and delivered, customer can out it into service – i.e. customer takes early delivery of part of the system functionality, they may experiment with it and clarify requirements for later requirements.
New increments are integrated with existing increments so that system functionality improves with each delivered increment.

[5 marks]

(ii) Describe two benefits derived from using this software process model.

Customer value can be delivered with each increment so system functionality is available earlier
No need to wait until the entire system is delivered.
First increment satisfy their most critical requirements so the s/w can be immediately used
Early increments act as a prototype to help elicit requirements for later increments
Lower risk of overall project failure
The highest priority system services tend to receive the most testing

[4 marks]