

UNIVERSITY OF MAURITIUS

FACULTY OF ENGINEERING



SECOND SEMESTER EXAMINATIONS

MAY 2015

PROGRAMME	BSc (Hons) Software Engineering Year 1		
MODULE NAME	Software Engineering & Computing		
DATE	Tuesday 12 May 2015	MODULE CODE	CSE1009Y(1)
TIME	09.30 – 12.30	DURATION	3 hours
NO. OF QUESTIONS SET	5	NO. OF QUESTIONS TO BE ATTEMPTED	5

INSTRUCTIONS TO CANDIDATES

There are TWO Sections in this paper: Section A and Section B.

Answer ALL questions in both Sections (TWO from section A and THREE from section B).

Use SEPARATE answer books for each Section.

SECTION A

Answer ALL questions

Question 1

- (a) (i) Write down two goals of modern biomedical chip research.
(ii) Provide three elementary examples of the application/use of such types of chips.
- [2+3 marks]**
- (b) Suggest two applications of simulation software.
- [1+1 marks]**
- (c) Explain the following extract from an article: "Microsoft Office 2013 is backward compatible"?
- [2 marks]**
- (d) Explain the meaning of an Application Programming Interface (API).
- [2 marks]**
- (e) Assume that you are the administrator of a wireless network. Write down a check list of four precautions that must be enforced in the wireless network to ensure an acceptable level of security.
- [4x1 marks]**
- (f) Figure 1 illustrates five nodes (computers) connected in a full mesh topology.

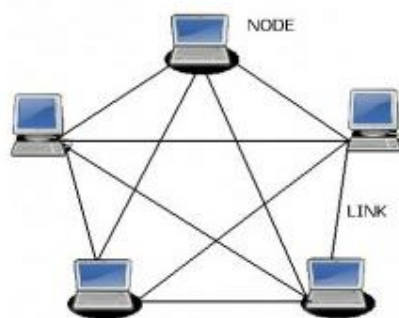


Figure 1: full mesh topology

- (i) State three advantages that this topology offers over a bus topology.
(ii) State three disadvantages that this topology offers over a bus topology.

[3+3 marks]

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(Question 1 continued)

- (g) Provide two examples of features considered to be part of Web 2.0.

[2+2 marks]

[Total 25 marks]

Question 2

- (a) (i) What is a cloud based Operating System?

[1 mark]

- (ii) Write down two major limitations (weaknesses) of cloud computing.

[2x1 marks]

- (b) What is the primary benefit of using web page-authoring software?

[1 mark]

- (c) Write down four ways by which the **disk cleanup** system maintenance utility program can free up disk space on computer's hard drive.

[4x1 marks]

- (d) (i) State the four main steps of the boot (booting) process which is accomplished when a computer is turned on.

[4x1 marks]

- (ii) Assume that some errors have been observed during the boot process. Propose two approaches that might resolve these errors and hence, give a clean boot process.

[2x1 marks]

- (e) Explain the following terms, as they apply to virtual memory.

- (i) Swap file
- (ii) Paging
- (iii) Thrashing

[2+1+1 marks]

- (f) Describe a tool that can be used to increase efficiency in Microsoft Office (Productivity) Software.

[2 marks]

(Continue next page)

(Question 2 continued)

- (g) Provide an example of each of the following.
- (i) A hardware that can be used to counteract computer crime.
 - (ii) A software that can be used to counteract computer crime.
- [1+1 marks]**
- (h) State, giving two reasons, the problems associated with the usage of lists and which makes a database a better choice.
- [2x1 marks]**
- (i) Write down the complete URL, given that you wish to view a file "presentation.pptx", located in a subfolder "assignment" which has a parent folder named "sec" on a web site whose domain name is se.org. The server that hosts this file has name "mrjs". Assume that the website has a *secured connection*.
- [1 mark]**
- [Total 25 marks]**

SECTION B

Answer ALL questions

Question 3

The Executive Sports Club (ESC) is a rapidly growing social club with fitness centre facilities, swimming pool , tennis court and a reception hall that allow members to practice sports and anyone to organize events such as birthday, wedding etc. They want to introduce a computerized system that is web-based and using an open source dbms such as sql in order to reduce the cost.

The Executive sports club has been in operation since 1990 and the personnel knows the loopholes of the current system. However they don't know how to solve these problems with the proposed system and would appreciate having intermediate working software that will help formulate better requirements.

Prospective (new) members wishing to join ESC must be first be nominated by two actual (existing) members of the club. Nominees are either accepted or rejected at a monthly membership committee meeting. The membership clerk records nominations and membership decisions and informs the nominating members about the outcome of membership decisions. The membership clerk enters details such as the name and address of the nominated person. The membership secretary records the reasons for decisions on behalf of the committee. The system also needs to keep track of members who quit. Membership are payable at the start of the month and any members that did not pay for free months should be sent a reminder.

The club needs a system to keep record of social events that will be organized during a particular year. The system will record the event fees paid and **dues (owing)**. A report will be generated every month to keep track of money paid for events and amount due. The time-frame for the development project is six months.

- (a) List four stakeholders that might be a source of requirements for the ECS system.

[2 marks]

- (b) Identify from the case study three functional and three non-functional requirements (*Rewrite the requirements so that they are in line with guidelines for writing good requirements*).

[6 marks]

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(Question 3 continued)

- (c) Rewrite the following (vague) requirements so that they may be objectively validated.

The software should be easy to use.

The software should be highly portable.

The software should be reliable.

[3 marks]

- (d) Prepare a traceability matrix showing stakeholder and requirements traceability information using part (a) and part (b) answers.

[2 marks]

- (e) Suggest with reasons the Design Architecture that will be appropriate for the ECS.

[2 marks]

- (f) With the help of a diagram briefly describe a development life-cycle model that will be more appropriate for the ECS. Give reasons for your choice.

[5 marks]

[Total 20 marks]

Question 4

- (a) The project manager of a web development company has to decide which estimation techniques to choose; estimation by analogy or estimation by experts. The company has a long experience in web development with a good records of each project. However, it has not been successful in retention of his employees. Which technique should the project manager opt for? Give justifications for your choice.

[1+2 marks]

- (b) Consider the incomplete network diagram shown in Figure 2 for a complex software project whose duration is in months.

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(Question 4 continued)

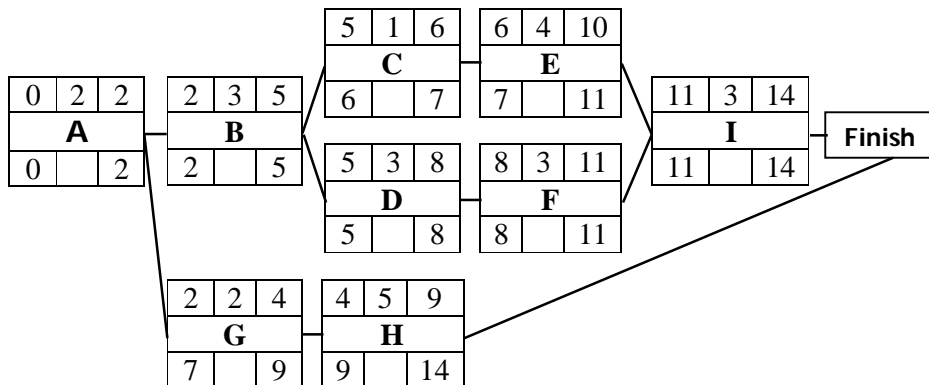


Figure 2

- (i) What is the critical path? **[2 marks]**
- (ii) What is the minimum time to complete the project? **[1 mark]**
- (iii) What is the impact on the project if the duration of E is increased by 2 months? **[2 marks]**
- (iv) How many staff do we need to work on the project? Assume that the software will consist of 1,000,000 LOC and the parameters for Algorithmic modelling are $a=3$, $b = 0.25$, $M=1.1$. **[2 marks]**
- (c) (i) Identify two software project risks for a web development project by the software company mentioned in part(a). For each risk identify possible risk categories (project/product/business). Give justifications. **[2+1 marks]**
- (ii) For the risks identified above, suggest strategies to mitigate the risk. **[2 marks]**
- [Total 15 marks]**

Question 5

- (a) (i) Companies that want to implement a software quality assurance framework needs to implement a quality culture within the company. List four characteristics of a quality culture.

[2 marks]

- (ii) Explain each of the following SQA processes, putting emphasis on how these help in developing a software of quality.

- Enforcement of standards
- Control change.

[1+1 marks]

- (b) A Flight reservation application allows user to make bookings for tickets by entering firstname (3-15 chars inclusive), surname (3-15 chars inclusive) and number of tickets (minimum of 1). You have been asked to test that simple application.

- (i) Why is it important to be able to partition the test scenario into equivalence classes?

[1 mark]

- (ii) Identify the different equivalence classes.

[4 marks]

- (iii) Suggest four additional partitions using Boundary value techniques which are not already covered by equivalence partitioning.

[2 marks]

- (c) (i) Discuss whether a quality software should have high cohesion or low cohesion and whether loose coupling or tight coupling is advisable when designing software.

[2 marks]

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(Question 5 continued)

- (ii) According to you, what type of coupling does the following method exhibit? Support your answer with appropriate justifications.

```
void Calculate_age(student stud){  
    age=date.now()-stud.dob;//date.now() returns the current date  
    if (age>0)  
        cout<<"Age of student"<<age;  
}
```

[2 marks]

[Total 15 marks]

END OF QUESTION PAPER