



VIT[®]

Vellore Institute of Technology
(Deemed to be University under section 3 of the UGC Act, 1956)

Final Assessment Test - Jan/Feb 2023

Course: ITA5001 - Software Project Management

Class NBR(s): 5083 / 5090

Slot: A1

Time: Three Hours

Max. Marks: 100

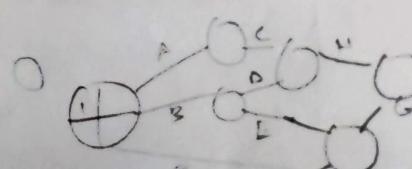
KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE

Answer All Questions

(10 X 10 = 100 Marks)

1. Ramesh is the manager of a software development section. On Tuesday at 10.00 am he and his fellow section heads have a meeting with their group manager about the staffing requirements for the coming year. Paul has already drafted document 'bidding' for staff. This is based on the work planned for his section for the next year. The document is discussed in the meeting. At 2.00 pm Ramesh has a meeting with his senior staff about the important project his section is undertaking. One of the software development staff has just had a road accident and will be in hospital for some time. It is decided that the project can be kept on schedule by transferring another team member from less urgent work to his project. A temporary replacement is to be brought in to do the less urgent work but this might take a week or so to arrange. Ramesh has to phone both the personnel manager about getting the replacement and the user for whom the less urgent work is being done explaining why it is likely to be delayed. Identify essential management responsibilities Ramesh was responding to at different points during his day.
2. John decides and specified four modules for an online academic project development. Draw an activity network for the same. Further, four specifications need to be carefully checked to see that they are consistent and compatible. Redraw the activity network to reflect this.
3. Consider the table given below for designing an activity network considering activity-on-node and identify the critical path to estimate the project duration. Perform forward pass and backward pass to calculate Earliest Start, Earliest Finish, Latest Start, Latest Finish and Float value for each activity in the network.

Activity Name	Duration (Weeks)	Precedence
A	6	-
B	4	-
C	3	A
D	4	B
E	3	B
F	10	-
G	3	E,F
H	2	C,D



4. Consider a project which has following time(in weeks) estimates for different activities:

Activity Name	Optimistic(a)	Most Likely(m)	Pessimistic(b)
A	5	6	8
B	3	4	5
C	2	3	3
D	3.5	4	5
E	1	3	4
F	8	10	15
G	2	3	4
H	2	2	2.5

Compute the expected time (T_e) and standard deviation (s) of each activity. Design the PERT network after calculating the event's standard deviation. Assume the target date for the event number 4, 5 and 6 as 10, 10 and 15 weeks respectively. Compute the z values for each node that has target date.

5. Describe Bohem's top ten development risks associated to a software project and identify risk reduction techniques associated with those risks.
6. A software developer working on Lopez's project has written the first 500 lines of a Java program that is estimated to require 1000 lines of code. Explain why it would be unreasonable to assume that the programming task is 50% complete. How might you make a reasonable estimate of how near completion it might be?
7. How would you evaluate the following aspects of a project proposal?
- The usability of an existing software application.
 - The usability of a software application that is yet to be designed and constructed.
 - The maintenance costs of hardware to be supplied.
 - The time taken to respond to requests for software support.
 - Training.
8. A new analyst/programmer is to be recruited to work in John's team. The intention is to recruit someone who already has some experience. Make a list of the types of activities that the analyst/programmer should be capable out that can be used as the basis for a job specification.
9. Consider yourself a project manager for developing an online patient's portal system for a reputed hospital in Vellore district. Identify the possible stakeholders and their potential roles and responsibilities involved in the development of the project.
10. Describe the different development phases of Agile model with its advantages. Also, illustrate the reasons to use Agile model in most of the software industries nowadays.





VIT®

Vellore Institute of Technology
(Approved by Government under section 2(f) of the UGC Act 1956)

Final Assessment Test- Jan/Feb 2023

Course: ITA5005 - Object Oriented Software Engineering

Class NBR(s):6225

Slot: B1+TB1

Time: Three Hours

Max. Marks: 100

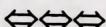
KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE

Answer ALL Questions

(10 X 10 = 100 Marks)

1. You are a newly appointed project manager in SB Infotech. The upcoming project is quite complex and you are in a dilemma in choosing between XP and DSDM. In this regard, perform a comparative analysis between XP and DSDM focusing on their strengths and weakness.
2. SB Infotech is presently developing a crop disease detection system that would enable farmers diagnose crop diseases. The farmers need to register to the portal providing their demographic and identity proof related information. Once registered, the farmers can avail options for taking suggestions on crop cultivation, detection of crop disease, purchase fertilizers and resources for cultivation and also talk to agricultural experts. The farmers can upload images of plant parts and predictive diagnosis will be generated by the app on the potential plant disease. Also the remedial measures will be suggested. Identify the functional and non-functional requirements for the above mentioned system.
3. For the scenario in Question 2, Draw a detailed activity diagram.
4. Consider the process of ordering a pizza over the phone and representing each step of the process from the moment you pick the phone to the point where you start eating pizza. Include activities that others need to perform. Add exception handling to the activity diagram you developed. Consider at least two exceptions (e.g delivery person wrote down the wrong address, delivery person brings wrong pizza) Sketch the DFD Level 0 and DFD Level 1 for the scenario.
5. Consider the scenario of an Online Conference Registration system. The application would allow Students, Research scholars and Faculty members to register for the conference. They can upload their abstract and when accepted, the final paper can be uploaded. The registrants need to pay fees for registration and also avail accommodation facility.
For the above mentioned system, develop a detailed class diagram. You can make assumptions and add any relevant features as well.
6. As a software developer it is extremely important to pay special attention towards impact of quality attribute on software design. "Software design and usability are empirically related" – Justify the statement by highlighting the usability principles.

7. Elucidate the phrase "A Low coupling combined with High cohesion supports the mission of high readability and maintainability". Also justify the fact that data coupling is the best portraying a comparative analysis with other forms of coupling with example. [3+7]
8. You are working in "SJ" systems which develops generic software components. [5+5] What are the essential characteristics of software design that leads to successful reuse of components. Why is it required to opt for reuse and not develop the product from scratch?
9. Compare and contrast between the different types of architectural patterns highlighting each of its characteristics and applicability.
10. It is often seen that scrum is referred as "an agile project management framework". Why is it so and how does it focus on the use of empirical process that allows teams to respond rapidly, efficiently and effectively to change?



**VIT®**Vellore Institute of Technology
Approved by University under section 2 of the UGC Act, 1956**Final Assessment Test – Jan/Feb 2023**

Course: MAT5007 - Applied Statistical Methods

Class NBR(s): 5824 / 5838 / 5923

Slot: D1

Time: Three Hours

Max. Marks: 100

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE**General Instructions:** Use of statistical table is permitted.**Answer any TEN Questions**

(10 X 10 = 100 Marks)

1. Calculate mean, Median and mode of the following data

x	0-10	10-20	20-30	30-40	40-50	50-60	60-70
f	10	20	35	40	25	25	15

2. Calculate the mean deviation and its coefficient from the following data

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
frequency	5	8	12	15	20	14	12	6

3. Calculate Karl-Pearson's coefficient of correlation from the advertisement cost and sales for the following data:

Advertisement Cost	39	65	62	90	82	75	25	98	36	78
Sales(in rupees)	47	53	58	86	62	68	60	91	51	84

4. From the following data, find

- (i) The two regression equations
- (ii) The coefficient of correlation between the marks in Economics and Statistics
- (iii) The most likely marks in statistics when marks in Economics are 30

Marks in Economics	25	28	35	32	31	36	29	38	34	32
Marks in Statistics	43	46	49	41	36	32	31	30	33	39

5. The number of monthly breakdowns of a computer is a Random Variable having a Poisson distribution with mean equal to 1.8. Find the probability that this computer will function for a month

- (i) without a breakdown
- (ii) with only one breakdown and
- (iii) with at least one breakdown.

6. The weekly wages of 1000 workmen are normally distributed around a mean of Rs.70 with a S.D. of Rs.5. Estimate the number of workers whose weekly wages will be

- (i) between Rs.69 and Rs.72.
- (ii) less than Rs.69
- (iii) more than Rs.72

7. Before an increase in excise duty on tea, 800 persons out of a sample of 1000 persons were found to be tea drinkers. After an increase in duty, 800 people were tea drinkers in a sample of 1200 people. Using standard error of proportion, state whether there is a significant decrease in the consumption of tea after the increase in excise duty.

8. The mean yield of wheat from a district A was 210 pounds with S.D. 10 pounds per acre from a sample of 100 plots. In another district the mean yield was 220 pounds with S.D. 12 pounds from a sample of 150 plots. Assuming that the S.D. of yield in the entire state was 11 pounds, test whether there is any significant difference between the mean yield of crops in the two districts.
9. The average number of articles produced by two machines per day are 200 and 250 with standard deviations 20 and 25 respectively on the basis of records of 25 days production. Can you regard both the machines equally efficient at 1% level of significance.
10. In a certain sample of 2000 families, 1400 families are consumers of tea. Out of 1800 Hindu families, 1236 families consume tea. Use Chi-square test and state whether there is any significant difference between consumption of tea among Hindu and Non-Hindu families.
11. Out of 800 families with four children each, how many families would be expected to have (i) two boys and two girls (ii) atleast one boy (iii) atmost two girls. Assume equal probabilities for boys and girls.
12. Four doctors each test four treatments for a certain disease and observe the number of days each patient takes to recover. The results are follows (recovery time in days)

Treatment				
Doctor	1	2	3	4
A	10	14	19	20
B	11	15	17	21
C	9	12	16	19
D	8	13	17	20

Discuss the difference between (i) doctors and (ii) treatments.

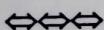


KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE

Answer ALL Questions

(10 X 10 = 100 Marks)

1. Demonstrate with suitable example mathematical analysis of recursive and non-recursive algorithms.
2. Demonstrate various operations performed in Circular Linked Lists with an example.
3. Compare the working principle of splay tree with binary search tree and AVL tree.
4. Discuss pros and cons of merge sort with suitable example.
5. Explain in detail various Graph traversals methods.
6. Calculate the efficiency of Compression by compressing the sentence "i love Problem Solving with Data Structures and Algorithms" using Huffman coding method.
7. Explain the concept of memoization in dynamic programming approach using simple example.
8. In a theme park, the Roller-Coaster ride is started only when a good number of riders line up in the counter (say 20 members). When the ride proceeds with these 20 members, a new set of riders will line up in the counter. This keeps continuing. Implement the above scenario of lining up and processing using suitable data structure learned in class.
9. Assume in the Regional Passport Office, a multitude of applicants arrive each day for passport renewal. A list is maintained in the database to store the renewed passports arranged in the increased order of passport ID. The list already would contain their cords renewed till the previous day. Apply Insertion sorting technique to place the current day's records in the list. Later the office personnel wish to sorting the records based on the date of renewal so as to know the count of renewals done each day. Taking into consideration the fact that each record has several fields (around 25 fields), follow Selection sorting logic to implement the same.
10. Design an algorithm to implement queue operations using stack with an example.



Final Assessment Test - Jan / Feb 2023

Course: ITA5003 - Data Communication and Networking

Class NBR(s): 5114 / 5115 / 5119

Slot: E1+TE1

Time: Three Hours

Max. Marks: 100

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE

Answer ALL Questions

(10 X 10 = 100 Marks)

1. Discuss the functionalities of the protocols used in each layer of the OSI model and illustrate the communication between two end systems with a neat sketch.
2. We need to use synchronous TDM and combine 20 digital sources each of 100 Kbps. Each output slot carries 1 bit from each digital source but one extra bit is added to each frame for synchronization.
 - a) What is the size of an output frame in bit?
 - b) What is output frame rate?
 - c) What is duration of the output frame?
 - d) What is output data rate?
 - e) What is efficiency of the system?
3. a) If the baud rate of the signal is 600 baud/sec and each signal unit carries 6 bits. Find the bit rate of the signal. [5]

 b) A network bandwidth of 10Mbps can pass only an average of 12000 frames per minute with each frame carrying average of 10,000 bits what is throughput of this network? [5]
4. A path in a digital circuit-switched network has a data rate of 1 Mbps. The exchange of 1000 bits is required for the setup and teardown phases. The distance between two parties is 5000 km.

Answer the following questions if the propagation speed is 2×10^8 m:

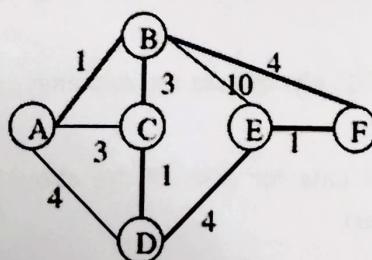
- i. What is the total delay if 1000 bits of data are exchanged during the data-transfer phase?
- ii. What is the total delay if 100,000 bits of data are exchanged during the data-transfer phase?
- iii. What is the total delay if 1,000,000 bits of data are exchanged during the data-transfer phase?
- iv. Find the delay per 1000 bits of data for each of the above cases and compare them. What can you infer?

5. Five equal-size diagrams belong to the same message leave for the destination one after another. However, they travel through different path as shown in the following table.

Datagram	Path Length	Visited Switches
1	3200 km	1,3,5
2	11,700 km	1,2,5
3	12,200 km	1,2,3,5
4	10,200 km	1,4,5
5	10,700 km	1,4,3,5

We assume that the delay for each switch (including waiting and processing) is 3,10,20,7 and 20 ms respectively. Assuming that the propagation speed is 2×10^8 M/S. Find the order the datagram arrive at the destination and the delay for each ignore any other delays in transmission.

6. a) A slotted aloha network transmits 200-bit frame on a shared channel of 200 Mbps. What is the throughput if the system (all station together) produces 3000 frames/sec. [5]
- b) A network has data transmission bandwidth 20 Mbps. It uses CSMA/CD in the MAC layer. The max signal propagation time from one node to another node is 40 microsecond. What is minimum size of a frame in the network represent in bytes. [5]
7. a) One of the addresses in a block is 110.23.120.14/20. Find the number of addresses, the first address, and the last address in the block. [5]
- b) A datagram is carrying 2000 bytes of data. If there is no option information, what is the value of the header length field and what is the value of total length field? [5]
8. Consider the network shown below. Show the operation of Distance vector routing algorithm for computing the least cost path from F (the rightmost node in the figure below) to all destinations. Also explicitly list all the shortest path routes from F to all destinations that are the result of the algorithm's computation. Depict all the steps through diagram.



9. a) Elaborate in detail about the UDP datagram format. [5]
- b) TCP opens a connection using an initial sequence number (ISN) of 14,534. The other party opens the connection with an ISN of 21,732. Show the three TCP segments during the connection establishment. [5]
10. Explain the following:
- a) Remote login protocols [5]
- b) SNMP [5]



**KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE****Answer any TEN Questions****(10 X 10 = 100 Marks)**

1. From the description given below, identify the entities and the relationships that exist between them. Use this information to create an Entity-Relationship (ER) diagram.

Company has several departments.

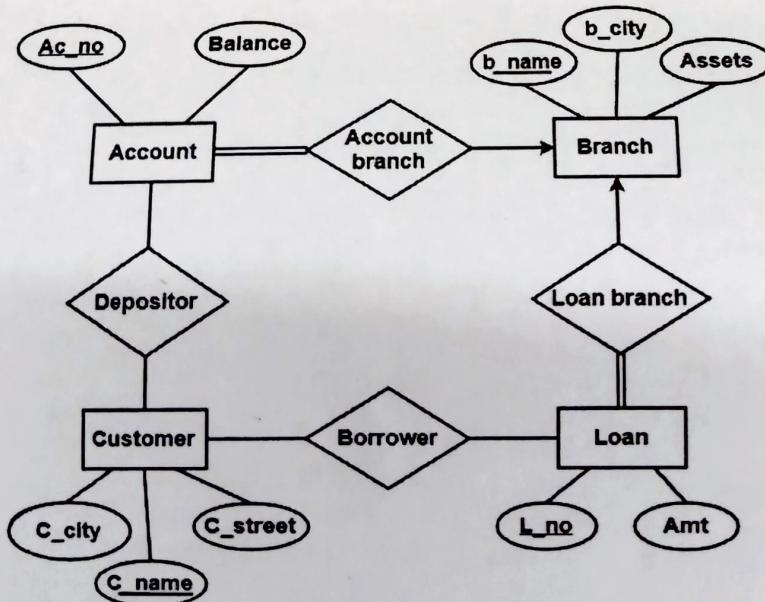
Each department may have several Location. Departments are identified by a name, D_no, Location.

A Manager controls a particular department. Each department is associated with number of projects. Employees are identified by name, id, address, dob, date_of_joining.

An employee works in only one department but can work on several project.

We also keep track of number of hours worked by an employee on a single project. Each employee has dependent. Dependent has D_name, Gender and relationship.

2. a) Reduce the following ER diagram to relational schema

[5]

- b) Explain the concept of specialization and generalization in extended entity- [5]

relationship model with the help of suitable example

3. Explain the difference between external, internal, and conceptual schemas. How are these different schema layers related to the concepts of logical and physical data independence?

4. Consider the following schema

Employee (SSN, FName, LName, Address, Dno, Mgrssn, Sal)

Department(Dnumber, Dname, Location, Dmgrssn)

SELECT Fname, Lname, Address FROM Employee, Department WHERE

Dname='Research' AND Dnumber=Dno;

Consider the above query.

Find out the best evaluation plan for the query using heuristic optimization.

Show the initial query tree, all intermediate query trees and the optimal query tree.

5. Why normalisation for a database is required? Hence explain 1NF, 2NF and 3NF with an example.

6. When does deadlock occur? Explain two-phase commit protocol with example.

7. Write down the pairs of conflicting operations present in the following schedule and draw the precedence graph.

Determine whether the schedule is conflict serializable. If the schedule is conflict serializable then write down an equivalent serial schedule.

r1 (X); r2 (Z); r1 (Z); r3 (X); r3 (Y); w1 (X); w3 (Y); r2 (Y); w2 (Z); w2 (Y)

8. Explain how I/O parallelism is attained in a parallel database environment.

9. Briefly explain about Intra-operation parallelism and Inter-operation parallelism.

10. a) Compare ODBMS and ORDBMS. [5]

- b) Explain the concept of inheritance in SQL [5]

11. What is the difference between XML Schema and XML DTD?

12. Explain the role and use of multimedia database for current technologies.

