Seat Number

ELECTIVE - I
Software Project Management
(1054)

P. Pages : 2

Time : Three Hours   Max. Marks : 100

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Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with black ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Answer **any five** questions.
5. Figures to the right indicates full marks.
6. Draw suitable diagram wherever necessary.

1. a) Discuss problems with software project from team member's view.   10

    b) Explain planning process for selecting information technology projects.   10

2. a) What is a product? Explain product description.   10

    b) What is project time management process? What are main process for it?   10

3. a) Discuss cost estimation tools & techniques.   10

    b) What are main outputs of quality control? Also discuss some tools, & techniques for quality control.   10

4. a) Discuss in detail 'earned value management'.   10

    b) Explain Maslow's hierarchy of needs with suitable diagram.   10

5. a) What is mean by 'Managing The Project Team'? Explain tools & techniques for managing project teams.   10

    b) What are conflict handling modes? Discuss in detail.   10

6. a) Explain risk breakdown structure with suitable example.   **10**

   b) What is contract? Discuss types of contracts.   **10**

7. a) What is risk identification? Explain risk identification tools & techniques.   **10**

   b) Discuss 'project - initiation' & 'project closing'.   **10**

8. a) Discuss various project success factors.   **10**

   b) What are goals of scope control? Also discuss variance.   **10**

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Applied Algorithms
(1040)

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :
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4. Solve **any five** questions out of eight.
5. Figure to the right indicate full marks.
6. Assume suitable data if necessary and state it clearly.

1. a) Prove that the worst case behavior of Kruskal's algorithm is O $(E|\log|E|)$.   **10**

   b) What is the major drawback of quick sort algorithm? What are the possible ways in which we can address this issue? Briefly discuss.   **10**

2. a) A binary tree is rooted tree in which each node has at most two children. Show by induction that in any binary tree the number of nodes with two children is exactly one less than the number of leaves.   **10**

   b) Give an algorithm to detect whether a given undirected graph contains a cycle, if the graph contains a cycle, then your algorithm should output one. The running complexity of your algorithm should be (m+n) for the graph with n nodes and m edges.   **10**

3. The input is set of jobs j_1, j_2, ..., j_N each of which takes one time unit to complete. Each job j_i earns d_i Rs if it is completed by time limit t_i, but no money if completed after the time limit.   **20**

   i) Give an O(N^2) greedy algorithm to solve the problem.

   ii) Modify your algorithm to obtain and O (N log N) time bound.

4. a) Explain the Mege sort using divide and conquer approach with an example. **10**

   b) Write an algorithm for Quick sort using divide and conquer approach. What is the best case, average case and worst case complexity? On what input data does Quick sort exhibit its worst case behavior? Sow with example for each best, average and worst case. **10**

5. a) Explain the matrix - chain - multiplication in detail. **10**

   b) Prove that : "A red black with in internal nodes has height almost $2\log(n+1)$" **10**

6. a) Analyze the increment operation on a binary counter using aggregate analysis. **10**

   b) Explain the Accounting method of amortized analysis with stack operation. **10**

7. a) Explain the representation of binomial heap. **10**

   b) By considering the complete graph with n vertices, show that the number of spanning trees in an v vertex graph can be greater than $2^{n-1}-2$. **10**

8. a) Explain the working of Floyd-Warshall algorithm. **10**

   b) The longest common subsequence problem is as follows: **10**
   Give two sequences
   $A = a_1, a_2, \ldots\ldots, a_M$ and
   $B = b_1, b_2, \ldots\ldots, b_N$.
   Find the length k of the longest sequence
   $C = c_1, c_2, \ldots\ldots, c_K$
   Such that C is a subsequence to both A and B an example.
   A = dynamic and B = Programming.
   Then longest common subsequence "am" and has length 2.
   Write an algorithm using dynamic programming for the same above given problem and algorithm should have the complexity O (MN).

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चालक - 010

2629

Soft Computing
(1090)

P. Pages : 2

Time : Three Hours   **Max. Marks : 100**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with black ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Answer **any five** questions.
5. Neat diagrams must be drawn wherever necessary.

1. a) Explain following terminologies of ANN's.   **10**
        i) Weights   ii) Bias
        iii) Threshold   iv) Learning rate
        v) Momentum factor

    b) What is activation function? Explain identity binary step,   **10**
        bipolar step and sigmoidal activation functions.

2. a) What is learning? Explain supervised, unsupervised and   **10**
        reinforcement learning methods with neat diagrams.

    b) Explain the architecture of a perceptron network. Also explain   **10**
        the perceptron learning rule.

3. a) Explain the architecture of a back propagation network.   **10**

    b) Explain the structure of a biological neuron in detail.   **10**

4. a) Explain the architecture of a bidirectional associative memory   **10**
        (BAM) network and activation functions for BAM.

    b) Explain the fundamental architecture of ART network and   **10**
        working of a ART network.

5.   a) Write a short note on self-organized map.   **10**

      b) Explain with examples the following operations on fuzzy sets.   **10**

        i)   Union   ii)   Intersection
        iii) Complement   iv)   Algebraic sum
        v)   Algebraic product

6.   a) Explain the structure of a fuzzy inference system and mamdani FIS in detail.   **10**

      b) Explain the four modes of fuzzy approximate reasoning.   **10**

7.   a) What are genetic Algorithms? Explain basic operators in genetic Algorithms.   **10**

      b) Explain application of neural networks in image processing.   **10**

8.   a) Explain application of genetic algorithm in natural language processing.   **10**

      b) Explain application of fuzzy logic in pattern recognition.   **10**

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Seat Number

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2630

Net Centric Computing
(1030)

P. Pages : 2

Time : Three Hours   **Max. Marks : 100**

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Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with black ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Assume suitable data if necessary.
5. Neat diagram must be drawn whenever necessary.
6. Use of non programmable pocket calculator is allowed.
7. Attempt **any five** question.

1. a) An Image is 1024 x 768 pixels with 3 bytes/ pixel. Assume the image is uncompressed. How long does it take to transmit it over a 56 kbps modem channel? Over a 1-mbps cable modem? Over a 10- mbps Ethernet? Over 100-mbps Ethernet.   **10**

    b) What are the widely used data link protocols? Explain how they uses bit stuffing and/or byte stuffing.   **10**

2. a) A communication channel is operating at a transmission rate 10,00,000 bps. To the channel arrive packets according to a Poisson with rate lambda = 100 packets per sec. The packets have an exponentially distributed length with a mean 5000 bits. We assume that the channel can be modeled as M/M/1 system with queuing discipline FCFS. Find.   **10**

    i)   Service rate   ii)   Average service rate.
    iii) Utilization of server.   iv)   Average number of packets.
    v)   Average time   vi)   Average waiting time

    b) Discuss the factor that affect on the network performance.   **10**

3. a) Discuss the responsibilities of the network administrator. **10**

   b) Does CMST algorithm always yield an optimal solution? **10**
   Explain how to improve the quality of the solution.

4. a) Write short note on. **10**

       i) DSL   ii) ISDN

   b) Why does ATM use small, fixed length cells? Explain. **10**

5. a) Suppose an organization uses Kerberos for authentication. In **10**
   terms of security and service availability, what is the effect if
   AS or TGS goes down?

   b) Explain how packet filters are used inside firewall for **10**
   maintaining security.

6. a) What are the advantages of VOIP? Explain. **10**

   b) Explain how VOIP in different from PSTN in detail. **10**

7. a) Describe wavelet compression with suitable example. **10**

   b) What are different lossless compression? Explain any one in **10**
   detail.

8. a) Explain backup and mirroring in detail. **10**

   b) What are the principles behind compression? Why do we need **10**
   compression?

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Parallel Computing

(1080)

P. Pages : 2

Time : Three Hours   **Max. Marks : 100**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with black ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any five** question out of eight.
5. Assume suitable data wherever necessary.
6. Figure to the right indicate full marks.

1. a) Explain the factor that limit speed up by parallel algorithm on an MIMD model.   **10**

    b) Explain Parallelism possible under SISD, SIMD, & MIMD models. **10**

2. a) Compare MIMD with other type of parallel computing architecture. **10**

    b) Explain the following terms in connection with parallel computation.   **10**

        i)   Measurement of Cost & runtime of Computation.

        ii) Period & length of parallel algo.

3. a) Explain the components of parallel computers using its general structure. Discuss the general principal of parallel Computing. **10**

    b) Explain Odd-even transport sort.   **10**

4. a) Explain parallel Computation of quick sort. How the parallel architecture is formulated for this sorting?   **10**

    b) Explain the working of Bitonic sort using perfect shuffel.   **10**

5. a) How message passing & pivot selection is done for PRAM model? Explain using suitable data set? **10**

    b) Explain parallel quick sort for CRCW PRAM model. **10**

6. a) State and explain Amdahl's law. Whether superlinear speedup is possible in case of parallel algorithm. **10**

    b) Why is message passing inferior to the shared variable model with respect to allocation issue. **10**

7. a) Explain how searching is done in parallel using tree & mesh algo. **10**

    b) Write parallel algorithm for FFT. How parallelism is achieved to perform the transform. **10**

8. a) Explain network for merging. How merging is done on ERFW model? **10**

    b) Explain the parallel bubble sort. Compare its performance with other parallel sorting algorithms. **10**

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Seat Number

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2632

Distributed Systems
(1020)

P. Pages : 2

Time : Three Hours   **Max. Marks : 100**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with black ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any five** questions out of eight.
5. Assume suitable data if necessary & state it clearly.
6. All questions carries equal marks.

1. a) What is distributed system? Explain in detail the different goals of distributed system.   **10**

   b) Discuss self management in distributed system.   **10**

2. a) Describe in detail the general organization of message broker in message queuing system with the help of diagram.   **10**

   b) Discuss advantages & disadvantages of various system architecture of distributed system.   **10**

3. a) How does mounting of remote file system take place in NFS? Describe functionality of autocounter in NFS?   **10**

   b) Explain concept of logical clocks and its importance in distributed system.   **10**

4. a) Explain the Bully & Ring election algorithm. Discuss time complexity for both algorithms.   **10**

   b) Discuss the need of naming sub system in distributed system? What are the major job performed by naming subsystem?   **10**

5. a) Write short note on   **10**

    i) Consistency models

    ii) Diffie Hellman Key Exchange Protocol.

  b) Describe the Token Ring algorithm for implementing mutual   **10**
exclusion in distributed environment. Discuss how this algorithm
satisfies the critical section requirements. State the two types of
failures this algorithm needs to handle.

6. a) Explain in detail four types of multicast in reliable group   **10**
communication.

  b) Write short note   **10**

    i) Process resilience

    ii) Replica management

7. a) Explain why transient synchronous communication has inherent   **10**
scalability problem & how these could be solved.

  b) Write short note on   **10**

    i) Local Transparency

    ii) Use of stub to make RPC mechanism transparent.

8. a) Describe Byzantine's general problem with the help of neat   **10**
diagram. What is lampart's solution to solve this problem?

  b) Discuss the term consistency & replication related to distributed   **10**
co-ordination based system.

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Seat Number

2633

Web Engineering
(1070)

P. Pages : 2

Time : Three Hours   Max. Marks : 100

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with black ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any five** out of eight questions.
5. Figures to right indicate full marks.

1.	a)	Explain N-Tire architecture of web application.	10
	b)	What is WebE process frameworks ?	10
2.	a)	What is Hypertext modelling? How it affect the navigation model of web requirement activities.	10
	b)	What are the development trends in RE for web application.	10
3.	a)	Define and describe web engineering	10
	b)	Explain the distributed cross co-operate web application.	10
4.	a)	Explain presentation design in detail.	10
	b)	What is client side scripting technology? List and compare various client side technologies.	10
5.	a)	Explain the functional web application design in detail.	10
	b)	Explain Agile Test approaches.	10

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6.   a)   Explain search engine approach of marketing.   **10**

     b)   Explain characterization of work load in web application.   **10**

7.   a)   List the objective of content modeling & discuss the approach   **10**
           for content modeling.

     b)   Explain the web usability methods.   **10**

8.   a)   How to reduce transmission time of web applications.   **10**

     b)   Why & how to use public key cryptography algorithms in web   **10**
           security?

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Advanced Software Engineering
(1010)

P. Pages : 2

Time : Three Hours   **Max. Marks : 100**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with black ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Answer **any five** questions.
5. All questions carry equal marks.

1.	a)	Explain technical metrics of software quality.	**10**
	b)	What type of relations exists among objects?	**10**
2.	a)	Explain clean room software engineering.	**10**
	b)	Explain verification & validation.	**10**
3.	a)	Explain cohesion and coupling.	**10**
	b)	Explain black box testing with suitable example.	**10**
4.	a)	What role does the cardinality play in the development of an object oriented relationship model?	**10**
	b)	Compare reactive and proactive risk strategies.	**10**

5. a) What are strengths and weakness of analysis phase in software development?   10

    b) Explain technical metrics for software testing.   10

6. a) Explain software metrics.   10

    b) Explain web engineering.   10

7. a) Explain corrective, adaptive and perfective maintenance.   10

    b) Compare black box and white box testing with suitable example.   10

8. a) Describe and differentiate between process metrics and project metrics.   10

    b) Explain cause effect graph analysis.   10

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2635

Advanced Database Management Systems
(1060)

P. Pages : 2

Time : Three Hours   **Max. Marks : 100**

Instructions to Candidates :
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3. Students should note, no supplement will be provided.
4. Answer **any FIVE** questions
5. All questions carry equal marks
6. Black diagrams to the right indicates full marks

1. a) The company you work for wants to digitize their time cards. You have been asked to design the database for submitting and approving time cards. Draw the database ER diagram with the following information: **14**

   • A timecard should have hours worked and date submitted.
   • Each timecard is associated with exactly one employee.
   • Each timecard should have a unique id.
   • Each timecard has a status: it is either approved, not approved, or pending.
   • Each employee has a unique id.
   • Each employee has a name and address.
   • Each employee submits a time card every pay period. i.e. In 1 year, they will submit multiple time cards.
   • Each employee either has direct deposit or physical check as their method of payment.
   • Each employee is associated with exactly one manager.
   • Each manager has a unique id and a name.
   • Each manager is in charge of multiple employees.
   • Each manager approves time cards for multiple employees.

   If you feel that you must make some assumptions, please state them clearly so that they are easily understood by the graders. Remember to indicate the key for each entity, as well as the multiplicity of each relationship (e.g. one-to-many) using the appropriate notation.

b) Explain Specialisation and generalisation with example. **6**

2. a) What is the difference between persistent and transient objects. How is persistence handled in OO Database systems. **10**

b) What are the rules associated with inheritance and overloading of function implementation. Explain how inheritance and overloading is achieved in SQL. **10**

3. a) Explain how two dimensional data types are stored and managed in Informix server. **10**

b) What are the enhanced features related to the version of the Oracle DBMS product that supports OO concepts. **10**

4. a) Describe the similarity between rules used in deductive database and views in the relational model. **10**

b) What are predicates in deductive databases? Explain Prolog notation in deductive databases with example. **10**

5. a) Consider the following rule defined predicates: **10**

ROUND-TRIP-REACHABLE (X, Y) :-
    REACHABLE (X, Y), REACHABLE (Y, X)
DURATION (X , Y , Z)

Draw a predicate dependency graph for the above predicates.
(Note: DURATION (X, Y, Z) means that you can take flight from X to Y in Z hours.)

b) What are active databases. Explain the issues in design and implementation of active databases. **10**

6. a) What are distributed databases? Explain its advantages and disadvantages. **10**

b) What are different database system architectures. Explain each with neat diagram. **10**

7. a) What are federated databases. Explain its architecture. **10**

b) What is data concurrency. Explain the process of data recovery in DDBMS. **10**

8. a) Explain the transparency features of a DDBMS. Define and explain the different types of distribution transparency. **10**

b) Explain the different techniques used for executing an equijoin of two files located at different sites what main factors affect the cost of data transfer. **10**

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