

Tribhuvan University
Institute of Science and Technology
2078
☆

Master Level / I Year/ Ist Semester/ Science
Computer Science and Information Technology (CSc. 539)
(Object Orientation Software Engineering)

Full Marks: 45
Pass Marks: 22.5
Time: 2 hours.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Group A

Long answer questions:

Attempt any two questions.

(2×10=20)

1. Discuss different software life cycle models and compare among them with advantages, disadvantages and applicability.
2. Explain object-oriented software engineering with object oriented software development with practical example.
3. Explain object oriented analysis -COAD-Yourdon method and compare with traditional object oriented analysis method.

Group B

Short answer questions:

Attempt all questions.

(5×5=25)

4. Discuss the requirement model from the user requirements prospective.
5. Explain the component base software engineering in brief.
6. Explain function/data oriented method and object- oriented method.
7. Explain the software metrics with example.
8. Compare between hierarchical object-oriented design with responsibility driven design.

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Master Level / I Year/ Ist Semester/ Science

Computer Science and Information Technology (CSc. 544)
(Parallel and Distributed Computing)

Full Marks: 45

Pass Marks: 22.5

Time: 2 hours.

Candidates are required to give their answers in their own words as for as practicable.

The figures in the margin indicate full marks.

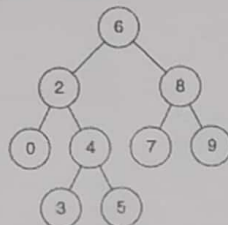
Group A

Long answer questions:

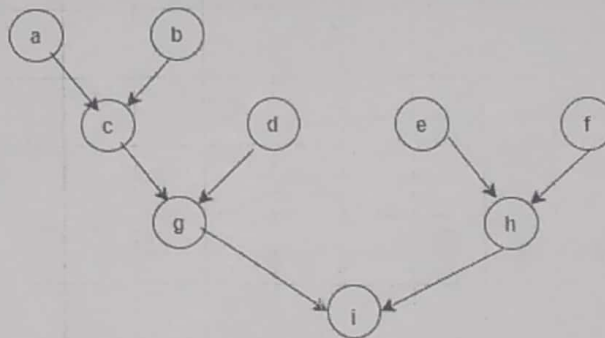
Attempt any two questions.

(2×10=20)

1. Mention the semantic definition for await then rule. Describe about observation bisimilarity with an example. Using the bitonic sort arrange the list {10,20,30,40,4,3,2,1} in increasing order. [3 + 5 + 2]
2. What does dual nature of TM means? State the formal definition of generalized BSR model. Find the Lowest Common Ancestor in following tree graph. [2 + 2 + 6]



3. List any two model for communication. Find the task schedule for the following in-forest / out-forest with communication. [2 + 8]



Group B

Short answer questions:

Attempt all questions

(5 × 5 = 25)

4. What is domino effect? Discuss about open distributed system. [1 + 4]
5. Apply the one criterion BSR model to solve the parenthesis matching problem for the set $((()))()$. [5]
6. List any two basic primitives for data flow model. Describe about LogP model. [2 + 3]
7. How do you perform scheduling in partitioning and scheduling? Using PRAM model find the smallest integer in the array {5, 78, 4, 99, -7, 45, 3, 2}. [2 + 3]
8. Explain the properties of petri nets. [5]

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Master Level / 1 Year/ Ist Semester/ Science

Computer Science and Information Technology (CSc. 543)
(Neural Networks)

Full Marks: 45

Pass Marks: 22.5

Time: 2 hours.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

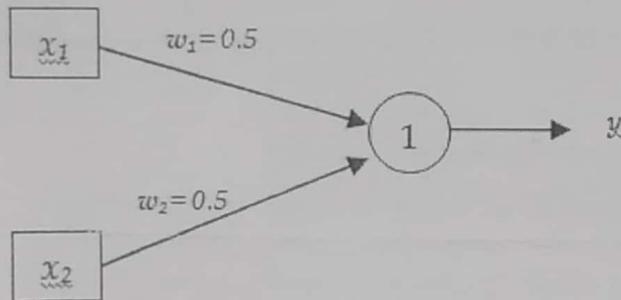
Group A

Long answer questions:

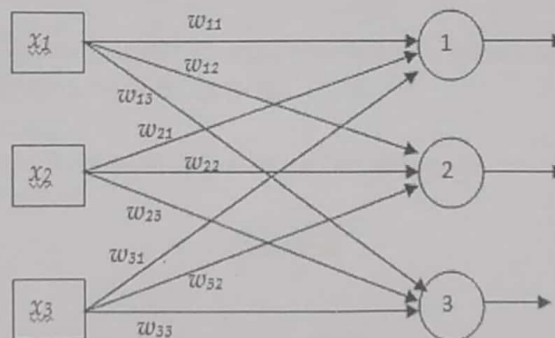
Attempt any two questions.

(2×10=20)

1. Consider following ANN with logistic activation function. Calculate weight updates for the training sample (0.7, 0.3, 0.6) using Momentum. Assume $\alpha = 0.1$ $\beta = 0.8$.



2. Consider following 1-D SOM and initial weight matrix. Show the working of SOM for the input (0.2, 0.1, 0.3).



Initial Weight Matrix

0.1	0.2	0.3
0.2	0.4	0.5
0.3	0.6	0.4

3. Why BPTT is employed in RNNs rather than Backpropagation? Derive weight update rule for BPTT algorithm.

Group BShort answer questions:

Attempt all questions.

(5×5=25)

4. Discuss Non-deterministic model of neuron with example.
5. Fit the quadratic curve through the following data using gradient descent. Show one epoch of training.

x	1	2	3	4
y=f(x)	1	1	4	9

6. Train perceptron up to one epoch using given training set and predict class for the input (20, High).

Hair Length	Sound Pitch	Gender (Class)
18	High	Female
24	High	Female
3	Low	Male
8	Low	Male

7. Derive formula for determining weight vector for RBFNN output layer using LMS estimation method.
8. Discuss working of linear and non-linear support vector machine classifier.

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Master Level / I Year/ Ist Semester/ Science
Computer Science and Information Technology (CSc. 538)
(Advanced Operating System)

Full Marks: 45
Pass Marks: 22.5
Time: 2 hours.

Candidates are required to give their answers in their own words as far as practicable.
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Group A

Long answer questions:

Attempt any two questions.

(2×10=20)

1. Consider the following set of processes with the length of the CPU burst given in millisecond:

Process	Priority	Burst Time
P1	2	2
P2	1	1
P3	8	4
P4	4	2
P5	5	3

The processes are assumed to have arrived in the order of P1, P2, P3, P4, P5, all at time 0.

- Draw the Gantt charts illustrating execution of these processes using scheduling algorithms: SJF, non – preemptive priority (a larger number implies a higher priority) and RR (quantum = 2 ms).
 - Determine TAT and waiting time of each process for each algorithm.
 - Which of the algorithm results in minimum average waiting time (over all processes)?
- What do you mean by encryption? Explain the principle behind its different types. Show an example for asymmetric encryption algorithm.
 - Define RTS (Real Time System). Explain its various characteristics. Describe the approaches for translating addresses in RTS.

Group B

Short answer questions:

Attempt all questions.

(5×5=25)

- What is IPC? Explain message passing and shared memory modes of IPC.
- Explain the sequence of steps involved in handling a page fault in demand paging.
- Define the following terms: Track, Cylinder, Seek time, Transfer Rate and Rotational Latency.
- Explain the implementation of access matrix in the context of protection using Global Table and List of Objects.
- Compare and contrast between stateful file system with stateless file system.

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Master Level / I Year/ Ist Semester/ Science
Computer Science and Information Technology (CSc. 540)
(Algorithms and Complexity)

Full Marks: 45
Pass Marks: 22.5
Time: 2 hours.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Group A

Long answer questions:

Attempt any two questions.

(2×10=20)

1. Explain aggregate method of amortized analysis with reference to Hash Table.
2. Let $X_1 = 3, 6, 9, 17$ and $X_2 = 2, 5, 8, 1$. Perform odd even merge sort in a Butterfly Network.
3. Perform List ranking on the following neighbor array.

5	4	2	3	0	1
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Group B

Short answer questions:

Attempt all questions.

(5×5=25)

4. What do you understand by embedding of networks? Explain embedding of binary tree on Hypercube. Calculate Expansion, Dilation and Congestion.
5. Explain work optimal PRAM algorithm to solve prefix computation problem with an example.
6. Perform shear sort (sorting on Mesh) on the following

5	2	7	13
8	6	9	11
27	23	1	22
17	10	4	3

7. Explain "Reduction" with an example
8. Write Short notes
 - a. Longest Forward Distance
 - b. Las Vegas algorithm

M.Sc. CSc. 545-2078 ☆

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Master Level / I Year/ Ist Semester/ Science

Full N

Computer Science and Information Technology (CSc. 545)

Pass N

(Algorithmic Mathematics)

Time:

Candidates are required to give their answers in their own words as far as practical.
The figures in the margin indicate full marks.

Group A

Long questions:

Attempt any two questions.

[2:

1. Explain "system of linear equations". Write an algorithm to find the roots of equation using Newton Raphson's method and Trace the algorithms with o example.
2. What do you mean by numerical differentiation? Write an algorithm for central quotient formula with example.
3. What is joint probability distribution? Explain Poisson's distribution with suitable example. Write down its algorithm

Group B

Short questions:

Attempt all questions.

[5x

4. What are uses of Newton interpolation? Write down its equation, algorithm and [5]
5. Explain Fast Fourier Transformation with suitable example. [5]
6. What do you mean by Optimization? What are application areas of Integer Programming?

7. What do you mean by Numerical Differentiation? Write an algorithm for Central formula. [5]

8. Write short notes (Any Two)

[2 × 2.]

- a) Everett's Formula
- b) Baye's Theorem
- c) Joint Probability Distribution

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