UNIVERSITY OF PUNE

[4364]-764

B. E. (Computer Engg)

Image Processing

(Elective-1)

(2008 Pattern)

[Total No. of Questions : 12] **[Total No. of Printed Pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer any 3 question from each section.

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Neat diagram must be drawn wherever necessary.

(4) Black figures to the right indicate full marks.

(5) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(6) Assume suitable data, if necessary.

Section-I

Q.1

a) Explain the main Component of typical Image Processing with block diagrams. [8]

b) Write a note on Human Visual System. [8]

OR

Q.2

a) Describe Elements of matrix theory required any image processing application. [8]

b) Write short note on Digital imaging Hardware and Software. [8]

Q.3

a) Explain the method of contrast stretching using histogram equalization. [8]

b) Explain two dimensional sampling and Nyquist rate, aliasing effect and fold over frequencies in case of two dimensional sampling. [8]

Q.4

a) What is salt pepper noise? How we can remove it. [8]

b) Explain Hadamard and Walsh transformation. [8]

Q.5

a) With the help of appropriate mask explain the following [10]
   1) Point detection
   2) Line detection
   3) Edge detection

b) What is Hough transformation? How it can be used for boundary representation. [8]

OR

Q.6

a) State different methods of edge detection and explain one in details [8]

b) What is image segmentation? Discuss various approaches for image segmentation. [10]

Q.7

a) What is image restoration? How it differs from image enhancement. [8]

b) Write short note on [10]
   1) Lucy Richardson Filtering
   2) Blind Deconvolution

OR

Q.8

a) Explain methods of image degradation function for image restoration. [8]

b) Explain inverse filtering and Wiener filtering. State its difference [10]

Q.9

a) Explain the methods used for lossless image compression. [8]

b) With suitable example, explain how chain code can be used for boundary representation. How we can make this code rotation invariant? [8]

OR

Q.10

a) Describe the type of redundancies observed in an image. How we can remove these redundancies to achieve compression. [8]

b) Explain need and classification of object representation method. [8]

Q.11

a) Write a short note on [10]
   1) Medical Image Processing
   2) JPEG 2000

b) Explain Image Pyramids. [6]

OR

Q.12

a) Write short note [10]
   1) Principal Component Analysis
   2) Character Recognition application

b) Define WAVELET with properties. [6]

UNIVERSITY OF PUNE

[4364]-711

B. E. (Computer Engineering)

Software Testing and Quality Assurance

(2008 Course) Elective -II

Total No. of Questions : 12 **[Total No. of Printed Pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answers to the **two sections** should be written in **separate answer-books**.*

(2) From section I answer (Q1 or Q2) and (Q3 or Q4) and (Q5 or Q6)

(3) From section II answer (Q7 or Q8) and (Q9 or Q10) and (Q11 or Q12)

(4) Assume suitable data, if necessary.

(5) Figures to the right indicate full marks.

SECTION-I

Q1.

a) Explain the steps involved in testing life cycle [12]

b) What are the origins of the defects in the software system [6]

OR

Q2.

a) Explain defect life cycle for removing defects in the software system [10]

b) What is an importance of testing in software productions cycle [6]

Q3.

a) What is the requirement based testing? explain with suitable example [10]

b) What is system testing? Explain with example [6]

OR

Q4.

a) Explain test case design criteria for black box testing [8]

b) Explain following types of Testing

1) Security testing 2) Integration testing [8]

Q5.

a) What is mutation Testing? Explain the problems with mutation testing [10]

b) What is test adequacy criteria for white box testing [6]

OR

Q6.

a) Explain graph based testing for identifier naming [8]

b) What is data flow testing and path testing [8]

SECTION-II

Q7.

a) What are parameters for Object Oriented Testing [8]

b) Explain the following types of Testing [8]

1) Validation Testing 2) Random Testing

OR

Q8.

a) Explain the goal question metric for testing [8]

b) Explain the following types of testing [8]

1) Accepting Testing 2) Sanity Testing

Q9.

a) Explain software quality metrics with suitable example [8]

b) Explain system testing with the help of winrunner [8]

OR

Q10.

a) Define six sigma principles? Explain how six sigma principles improves quality of the software system [10]

b) Explain functional testing with the help of rational robot [6]

Q11.

a) Explain the effect of ISO quality model on software quality [8]

b) Explain load runner testing tool [8]

OR

Q12.

a) Explain black box testing with help of suitable testing tool [10]

b) Explain GUI testing for web application [8]

[Total No. of Questions: *12*] **[Total No. of Printed Pages:** *4*]

UNIVERSITY OF PUNE

[4364]-777

B. E. (*Computer Engg*)(SEM-II) Examination - 2013

Advanced Databases (2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 *Answer any three questions from each section.*

2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*

3 *Neat diagrams must be drawn wherever necessary.*

4 *Black figures to the right indicate full marks.*

5 *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

6 *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	For each of the three partitioning techniques, namely round-robin, hash partitioning, and range partitioning, give an example of a query for which that partitioning technique would provide the fastest response.	6
	B	Write a short note on Parallel query optimization.	5
	C	What is interquery parallelism? Explain cache coherency problem and protocol available to guarantee cache coherency.	6

OR

Q.2	A	Explain parallel External sort-Merge with example.	6
	B	Explain interoperation parallelism suitable example.	6
	C	What factor could result in skew when a relation is partitioned on one of its attributes by Hash partitioning and Range partitioning. In each case, what can be done to reduce the skew?	5
Q. 3	A	If we are to ensure atomicity, all the sites in which a transaction T executed must agree on the final outcome of the execution T must either commit at all sites, or it must abort at all sites. Describe the techniques or protocol used to ensure this property in detail.	7
	B	Explain semijoin strategy along with example.	6
	C	Write short note on LDAP.	4

OR

Q. 4	A	Explain deadlock handling with respect to distributed database.	6
	B	Explain the difference between data replication in a distributed system and the maintenance of a remote backup site.	2
	C	What are the different approaches to store a relation in the distributed database. Explain them in brief.	6
	D	Write short note on multidatabase system.	3
Q. 5	A	Write short notes on: i) SOAP. ii) XML DTD.	8
	B	Explain the structure of XML data with example.	8

OR

Q. 6	A	Explain the following with respect to web architecture i) Web server. ii) Common gateway interface. iii) Cookie. iv) Uniform Resource Locator.	8
	B	Which are different parsers for XML? Explain them in detail.	8

SECTION II

Q. 7 A What are different data cleaning methods? 8

B Explain architecture of data warehouse with a neat diagram. 6

C A data warehouse can be modeled by either a star schema or a snowflake schema. Briefly describe the similarities and the differences of the two models, and then analyze their advantages and disadvantages with regard to one another. Give your opinion of which might be more empirically useful and state the reasons behind your answer. 4

OR

Q. 8 A Explain indexing OLAP data with example 6

B Explain the following operation on the multidimensional data with example. 6

i) Roll up and drill down. ii) Slicing & dicing

C Explain three different data warehouse models. 6

Q. 9 A Consider following training set. 8

Class Label	A	B	C
C1	S	Y	X
C1	B	Y	X
C1	B	R	X
C1	S	R	X
C2	S	B	X
C2	B	B	Z
C2	B	Y	Z
C2	B	B	X
C2	S	Y	Z

Construct decision tree based on above training set using ID3.

B Explain K mean algorithm with example. Also state it weakness 8

OR

Q. 10 A A database has 5 transactions. Let $min\ sup$ = 0.6 and $min\ conf$ = 0.8. 8

Customer	Date	Items bought
100	10/15	{I,P,A,D,B,C}
200	10/15	{D,A,E,F}
300	10/16	{C,D,B,E}
400	10/18	{B,A,C,K,D}
500	10/19	{A,G,T,C}

i) List the frequent k-itemset for the largest k,

ii) List all the strong association rules (with support and confidence)

B Explain in detail classification and prediction. What is the difference between them. 8

Q. 11 A What do you mean by relevance ranking? Explain TF/IDF methods of ranking. 8

B Explain the following: 8

i) Inverted Index
ii) Ontology
iii) Stop Words.
iv) Random walk

OR

Q. 12 A What is page ranking and popularity ranking? Explain in brief. 8

B Explain the following terms 8

i) Web crawlers.
ii) Homonyms
iii) Vector space model
iv) Synonyms

[Total No. of Questions: *12*] **[Total No. of Printed Pages:** *2*]

UNIVERSITY OF PUNE

[4364]- 778

B. E. (*Computer Engineering*) (SEM-II) Examination - 2013

VLSI & DIGITAL SYSTEM DESIGN (Elective-IV) (2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions: *Answer any from each section.*

1. ***Answer*** *three questions* ***from Section I and*** *three questions* ***from Section II***
2. *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*
3. *Neat diagrams must be drawn wherever necessary.*
4. *Figures to the right indicate full marks.*
5. *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	Explain the VLSI design process in detail	8
	B	Explain in detail LDD formation	8
		OR	
Q.2	A	Explain in detail process of Active region formation	8
	B	What is N and P well information? Explain detail steps involved in it	8
Q. 3	A	What is wafer preparation of crystals? Explain measurement methods of silicon wafers	9
	B	Explain Czochrlski and flat zone crystal growth methods	8
		OR	
Q. 4	A	Describe the activity flow of digital system design	8
	B	Explain the approach of discrete event simulation using half adder circuit	9
Q. 5		Write short notes on following	
		a) Electronic aspects of digital design	4
		b) Software aspect of digital design	4
		c) Analog Vs Digital Systems	4
		d) Programming logic devices	5
		OR	
Q. 6	A	What is diminished radix-complement representation? Give representation of following numbers- I. 0 II. 100 III. 8151 IV. 1849	8
	B	What are different error correcting codes? Explain in detail	9

SECTION II

Q. 7	A	Explain architecture of FPGA. What is selection criterion of FPGA in application?	8
	B	What are different digital design levels? Explain multiplexer design and write VHDL code for it	8
		OR	
Q. 8	A	Explain simulation behavior and Synthesis behavior of VHDL	8
	B	Explain n-variable theorems with suitable example.	8

Q. 9	A	Discuss logic levels and noise margins with respect to CMOS circuits	9
	B	What is emitter coupled logic? Explain with suitable diagram	8
		OR	
Q. 10	A	What is race-free state assignment? Explain with suitable example	9
	B	Define the following terms with respect to CMOS circuits: i) Fan Out ii) Transition time iii) Propagation delay iv) Power consumption	8
Q. 11	A	Design a clocked synchronous state machine with two inputs, A and B and single output Z. The value of Z is 1 if- - A had the same value at each of the previous clock ticks or - B has been 1 since the last time that the first condition was true. Else, Z=0	8
	B	What the VHDL code for the above example	9
		OR	
Q. 12	A	Explain applications of parity checking	8
	B	Draw a neat diagram and explain briefly internal structures of synchronous SRAM	9

UNIVERSITY OF PUNE
[4364]-761
B.E. (Computer Engineering)
(Semester - I) Examination - 2013
DESIGN ANALYSIS OF ALGORITHMS
(2008 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :4]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three** questions from section 1 and questions from section 2.*
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary.
(5) Assume suitable data, if necessary.

SECTION -1

Q. 1. a) Prove if $f(n) = a_m n^m + \ldots\ldots\ldots\ldots\ldots\ldots + a_1 + a_0$ Then f(n)=O(n^m) (8)

b) Write control abstraction for divide and conquer strategy. Give the reason why the quick sort is faster than merge sort. (6)

c) Explain the Greedy Kruskal's minimum spanning tree. (4)

OR

Q. 2. a) Prove by contradiction that "there are infinitely many prime numbers". (6)

b)Write and explain Dijkstra's algorithm for a directed graph. (6)

c) Write an algorithm for merge sort. State its time complexity. (6)

Q. 3. a) Solve the instance of 0/1 knapsack problem using dynamic Programming: $n = 4, m = 25$ (8)

$(P_1, P_2, P_3 P_4) = (10,12,14,16)$

$(W_1, W_2, W_3, W_4) = (9,8,12,14,)$

B) State multistage graphs problem and explain how it can be solved using forward approach. (8)

OR

Q. 4. a) For a directed graph the edge length matrix is given below. Solve the Travelling Salesperson problem using dynamic programming method. Specify its complexity. (8)

0	10	15	20
5	0	9	10
6	13	0	12
8	8	9	0

b) What is the optimal binary search tree problem? Explain how it is solved using dynamic programming. (8)

Q. 5. a) Explain backtracking strategy and write general recursive and iterative backtracking algorithms. (8)

b) Write the control abstractions for LC-search. (6)

c) Differentiate between "backtracking" and "branch and bound" strategies. (2)

OR

Q. 6. a) Write recursive backtracking schema for m coloring of the graph. Determine the time complexity of the same. (8)

b) Write an upper bound function for 0/1 knapsack problem. (6)

c) What are implicit and explicit constrains with respect to backtracking. (2)

SECTION-2

Q. 7.a) Explain how directed Hamiltonian Cycle (DHC) reduces to travelling salesperson decision problems (TSP). (6)

b) Prove that vertex cover problem is NP-complete. (8)

c) Differentiate between deterministic and non deterministic algorithms. (4)

OR

Q. 8. a) Prove that CNF- satisfiability reduces to clique decision problem. (6)

b) Explain AND/OR graph decision problem. (6)

c) State and Explain Cook's Theorem. (6)

Q. 9. a) Write an algorithm for prefix computation. Determine its time complexity (8)

b) Prove that "the maximum of n keys can be found in O (log log n) time using n common CRCW PRAM processors". (8)

OR

Q. 10. a) Explain parallel computational models. (8)

b) Write the odd-even merge sort algorithm and explain it with an example. (8)

Q. 11. a) What is convex Hull? Explain Quick Hull and Graham's Scan algorithm. (8)

b) What is deadlock? What are the necessary condition for deadlock to occur? Explain how resource allocation can be done to avoid deadlock. (8)

OR

Q. 12. a) What is meant by heuristic algorithms? Discuss any one heuristic search algorithm. (8)

b) Explain in brief any two image edge detection algorithm. (8)

[4364]-763

B. E. (Computer Engineering)

(Semester - I) Examination - 2013

Object Oriented Modeling and Design

(2008 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **three** questions from section I and **three** questions from section II*

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Neat diagrams must be drawn wherever necessary.

(4) Black figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

SECTION-I

Q1) a) What is the need of modeling software system? What are object oriented concepts used in software modeling and how? [8]

b) What do you mean by MDA? Give the metamodel of UML. [8]

OR

Q2) a) How the 4+1 view architecture of the system models all the view of the system? [8]

b) Explain the behavioural things in UML [8]

Q3) a) How UML supports requirements modeling? [8]

b) Give the activity diagram for computation of percentage of marks and report card generation in an assessment system. State you assumptions. [8]

OR

Q4) a) Give the usecase diagram for sports event management system with descriptions of usecase and actors identified. [8]

b) What are entity classes? Identify and model in UML the entity classes in a bus ticket reservation system. [8]

Q5) a) Explain the element of a class diagram with an example. [8]

b) Explain the application of composite structure diagram. [6]

c) What do you mean by an active class? [4]

OR

Q6) a) Give the class diagram for online store management system. [8]

b) Explain the concept of realization and collaboration. [6]

c) How class and object diagrams are related? [4]

SECTION-II

Q7) a) Explain the behavioural modeling with any two UML diagram. [8]

b) How timing diagram can be used in real time systems? [6]

c) Give any two operators used in sequence diagram. [4]

OR

Q8) a) Explain the sequence diagram elements with a sequence diagram for transaction on a bank account. [8]

b) Explain following

1) Composite State

2) Self transition

3) Orthogonal State [6]

c) How interaction overview diagram is related to activity diagram? [4]

Q9) a) Explain elements and purpose of a component diagram. [8]

b) How do you model the deployment view in UML? [8]

OR

Q10) a) What are types of interfaces of a component? How it is modeled in UML? [8]

b) Give the deployment diagram for client server 2 tier, event registration system. [8]

Q11) a) Explain the forward engineering and reverse engineering. [8]

b) Give the solution for observer design pattern. [8]

Or

Q12) a) Explain the design pattern template with an example. [8]

b) How do you forward engineer a class diagram? [8]

UNIVERSITY OF PUNE

[4364]-767

B. E. Computer Engineering

Examination – May 2013

SOFTWARE ARCHITRCTURE

(2008 Pattern)

Total No. Of Questions: 12 **[Total No. Of Printed Pages: 4]**

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

(1) Figures to the right indicate full marks.

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) From Section I, Answer (Q1 or Q2) and (Q3 or Q4) and (Q5 or Q6

(4) From Section II, Answer (Q7 or Q8) and (Q9 or Q10) and (Q11 and Q 12)

(5) Make suitable assumptions wherever appropriate and relevant.

SECTION-1

Q. 1. Write short notes on any three (18)

a) Software design

b) Synchronous and asynchronous messaging

c) Software architect and his/her role in IT industry

d) Software architecture and functional /nonfunctional requirements

e) Software architecture and 4+1 views

OR

Q. 2. A) When and why will a software architect choose following choices for (6)

Any system, Justify with example

i) ODBC ii) C language iii) ORACLE

B) How can the architect use component diagram to show components And interfaces, explain components/ interfaces with an example diagram. (6)

C) Write short notes on software design and its impact on application. (6)

Q. 3. A) Consider a hypothetical PAYROLL (employee salary) system. State The likely functional requirements for the system. Assuming a role of an software architect, discuss importance of accuracy, performance, data Confidentiality for your system. (8)

B) What do you understand by quality of software. State what do Understand by modifiability of software system?. What are the Challenges in making changes to software? Draw a diagram for modifiability tactics. And discuss in brief on Modifiability tactic : localize changes (8)

OR

Q. 4. Explain and illustrate the following concepts (in context of quality Attribute) with examples, in brief (16)

a) Importance and challenges of security for a university online Exam website

b) Quality attribute scenarios

c) Define any two software quality attributes

d) Tactics for recovery from database failures

Q. 5. a) Explain in brief, terms: architectural patterns and architecture (4)

b) Write on history and the need of design patterns (6)

c) Write short notes on MEDIATOR pattern (6)

OR

Q. 6. a) Explain what are design patterns. Further illustrate design patterns (4)
Using examples from specifically a NON-SOFTWARE context

b) Which design pattern will you choose you in following (6)
CONTEXT and why? Explain how the pattern will work with UML diagrams, CONTEXT is that you wish to create objects in your application Dynamically?

c) Write and Illustrate with relevant examples the relation of UML and (6)
documentation of design patterns

SECTION-2

Q. 7. a) What is the role of following technologies: JAVA SE, JAVA EE (6)

b) What kind of application can be developed in RPC, and how is RPC (6)
of benefit for such application

C) Write short notes on application servers (6)

OR

Q. 8. a) Write short notes on EJB components and interfaces (6)

b) Drew a neat labeled diagram for three tier use of J2EE (6)

c) Explain working of RPC with sample code (6)

Q. 9. a) What kind of responsibilities does a web client have in a web (4)
Application

b) Explain following web client side concepts through simple examples (6)
i) plug-ins ii) browser configuration

c) Explain following web client side concepts through simple examples (6)
i) Client side validation ii) HTML 5

OR

Q. 10. a) Discuss the importance of IT in any enterprise (4)

b) Discuss the concept of N tires in web application (6)

c) Discuss what different technologies are available to develop client side in web based systems. (6)

Q. 11. In context of JAVA struts, write on (16)

a) Advantages of java

b) Concept of ACTIONS

c) What is JSP and what is the role of JSP in STRUTS

d) Advantage of STRUTS

OR

Q. 12. a) How is role of server side different from client side in a typical Website. (4)

b) What is UDDI (4)

c) Define terms : service oriented architecture, web services (4)

d) What is the role of middle tier in 3 Tier application, Illustrate (4)

UNIVERSITY OF PUNE

[4364]-762

B. E. (Computer Engineering)

Examination - 2013

PRINCIPLES OF COMPILER DESIGN (2008 Pattern)

[Total No. of Questions:] **[Total No. of Printed Pages :5]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answers to the **two sections** should be written in **separate answer-books**.*

(2) Neat diagrams must be drawn wherever necessary.

(3) Assume suitable data, if necessary.

SECTION-I

Q1 a) Discuss the action taken by every phase of compiler on following string: A =B*C+D/E [6]

b) Construct Predictive Parser for following grammar. [8]

S → a B D h

B → B b | c

D → E F

E → g | ϵ

F → f | ϵ

c) What are the advantages and disadvantages of operator Precedence parser? [4]

OR

Q2 a) Explain in detail the Front end – Back end arrangement of compiler design. [6]

b) Construct SLR parser for following grammar: [8]

S→ a SS b

S→ a SSS

S→c

Show moves of above parser on one valid input string and one invalid input string.

c) How YACC handles different types of conflits in parser? [4]

Q3 a) Differentiate between S-attributed and L-attributed definitions. [4]

b) What is need for semantic analysis? Explain type checker in detail. [6]

c) Generate annotated parse tree for following expression: [6]

a*b-c/e + f

OR

Q4 a) What is attributed grammar? Explain with example. [4]

b) Explain bottom-up evaluation of L-attributed grammar [6]

c) What is typecasting? What changes should be made in the semantic analyzer to add typecasting? [6]

Q5 a) Generate three address code for following code fragment. [8]

```
sum=0
for (j=1; j<=10; j++)
sum= sum + a[j] + b[j]
```

b) Write syntax directed translation scheme for simple assignment statement. [8]

OR

Q6 a) Write syntax directed translation scheme for boolean expression and explain the need of backpatching. [8]

b) Generate quadruples and indirect triples for following statement. [8]

a= b ^ (c + d) *f/g

SECTION-II

Q7 a) Discuss: Static and Dynamic Scope [6]

b) Which are different data structures used for symbol table? Discuss. [6]

c) Discuss various issues associated with source language. [6]

OR

Q8 a) Write short note: Activation record [4]

b) Explain various parameter passing techniques with suitable examples. [8]

c) Differentiate between block structured and non block structured languages [5]

Q9 a) Explain Dynamic Programming code generation algorithm [8]

b) Write short note: DAG [4]

c) Discuss various issues in code generation. [4]

OR

Q10 a) Construct DAG for following [4]

D = B*C

E= A+B

B= B*C

A= E-D

Which optimization is achieved using this DAG?

b) What is "next use" information? Explain its use in code generation. [6]

c) Explain the tree labeling algorithm with example. [6]

Q11 a) Read following piece of code: [4]

B1: j = j-1

t_4 = 4*j

t_5 = a[t_4]

if t_5>j go to B1

which optimization technique can be applied to this code? Explain it in detail.

b) Explain how loops in flow graph are identified? [4]

c) Explain fundamental data flow properties. [8]

OR

Q12 a) Write short note: Global optimization [4]

b) Explain following optimization techniques: compile time evaluation, dead code elimination, code movement [6]

c) What is "ud chain"? Explain Gen set and Kill set for ud chain. [6]

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UNIVERSITY OF PUNE

[4364-765]

B.E. (Computer Engineering) Examination-2013

Design and Analysis of Computer Networks

(2008 pattern)

Time-Three hours **Maximum Marks-100**

[Total No. of Question=12] **[Total no. of printed pages= 4]**

Instructions:

(1)Answer 3 questions from Section-I. Answer question 3 from Section-II,

(2)Answers to the two sections should be written in separate answer books.

(3)Neat diagrams must be drawn whenever necessary.

(4)Use of electronic pocket calculator is allowed.

(5)Assume suitable data wherever necessary.

SECTION-I

Q.1 (a)Explain the characteristics of queuing system and the six parameters associated with Kendall Notations. (8)

(b)Measurement of a network gateway: (10)

mean arrival rate :125 Packets/s

mean response time: 2 ms

Assuming exponential arrivals;

1.What is the gateway's utilization?

2.What is the probability of n packets in the gateway?

3.Mean number of buffers so P (overflow) is < 10^{-6} ?

OR

Q.2 (a)Explain significance and applications of Little's theorem in queuing theory. (8)

(b)Explain in short M/M/1 Queuing Model. A drive -in banking serivce is modeled as an M/M/1 queuing system with customer arrival rate of 2 per minute. It is desired to have fewer than 5 customers line up 99 percent of the time. How fast should the service rate be? (10)

Q.3 (a)Describe any four System Design techniques specifying their associated advantages. (8)

(b)What is Space-division switching?Draw multistate crossbar switch architecture and define the formula for number of cross points. (8)

OR

Q.4 (a)Explain Hierarchical and Collapsible Backbone Network Architecture. (8)

(b)Differentiate between second generation and third generation switch. Justify why does third generation switch provide more bandwidth than second generation switch. (8)

Q.5 (a)Explain Weighted Round Robin scheduling techniques. Connections A,B and C have mean packet sizes of 50,000 and 1500 bytes and weights 0.5 ,0.75 ans 1.0. How many packets from each connection should a round robin server in each round? (8)

(b)Differentiate between open loop and closed loop flow control techniques .Explain how TCP supports flow control. (8)

OR

Q.6 (a)Describe the functioning of Deficit Round Robin scheduling discipline with suitable example. (8)

(b)Explain Weighted Fair Queuing (WFQ).What is the advantage of Worst case Fair weighted Fair Queuing (WF^2Q) over Weighted Fair Queuing? (8)

SECTION-II

Q.7 (a)Describe the significance of Traffic subclasses in traffic engineering. Explain any two Traffic classes related to ATM networks. (8)

(b)Explain the Quality-of-service (QoS) parameters used in ATM Forum and IFTF approaches. (8)

OR

Q.8 (a)What is Traffic management?Explain Telephone and Internet traffic models in short. (8)

(b)What is signaling?Which are the types of Signaling?Explain Signaling System No.7 in telephone networks. (8)

Q.9 (a)Explain different types of routers with neat diagram. (8)

(b)Explain how router performance is calculated. Derive expression for router throughput in terms of packet size and packet per second. (8)

OR

Q.10 (a)Explain the architecture of router along with the fields in the routing table.(8)

(b)Explain with diagram components of Router along with their functionalities. (8)

Q.11 (a)an organization uses a class C network decided to sub net into four different subnets the appropriate sub net mask for the same. How many hosts will be supported in each subnet? (6)

(b)Explain any five network management related tools/commands used by the Network Administrator. (6)

(c)Describe any two tools used for Network traffic management. (6)

OR

Q.12 Write a short note on. (18)

(a)CIDR

(b)Bandwidth Management

(c)Securing Enterprise Network using firewall

UNIVERSITY OF PUNE

[4364]-766

B. E. (Semester - I) Examination –2013

B.E(Computer) Engineering

Elective I-Artificial Intelligence

(Course 2008)

[Time : 3 Hours] **[Max. Marks:100]**

SECTION I

Q.1 a) Explain in detail what do you understand by task environment. [10]

Develop a PEAS description of task environment for each of the following agents

i) Satellite Image Analysis System

ii) Interactive English Tutor

b) What are intelligent agents? Describe in brief typical agent architecture. [8]

OR

Q.2 a) What is the role of Table driven Agent program in simple reflex agent? Write the architecture and function of model based reflex action [10]

b) What is Logic Programming? Explain forward and backward reasoning with and example. [8]

Q.3 a) How to evaluate the performance of an algorithm? How does uniform cost search use algorithm's performance? [8]

b) Explain the A* search algorithm with the help of a suitable example. [8]

How is it possible to avoid loops in A*.

OR

Q.4 a) Explain memory bounded heuristic search methods [8]

b) Give the initial state, goal state, successor function and cost function for the following and solve the problem using hill climbing : [8]

" You are given 3 jugs measuring 12 liters, 8 liters, 3liters and water tap. You can fill the jugs of empty them from one to another or on the ground. The goal is to measure exactly 1 liter water."

Q.5 a) Using CSP, explore the search space to solve the following cryptarithmatic problem. [8]

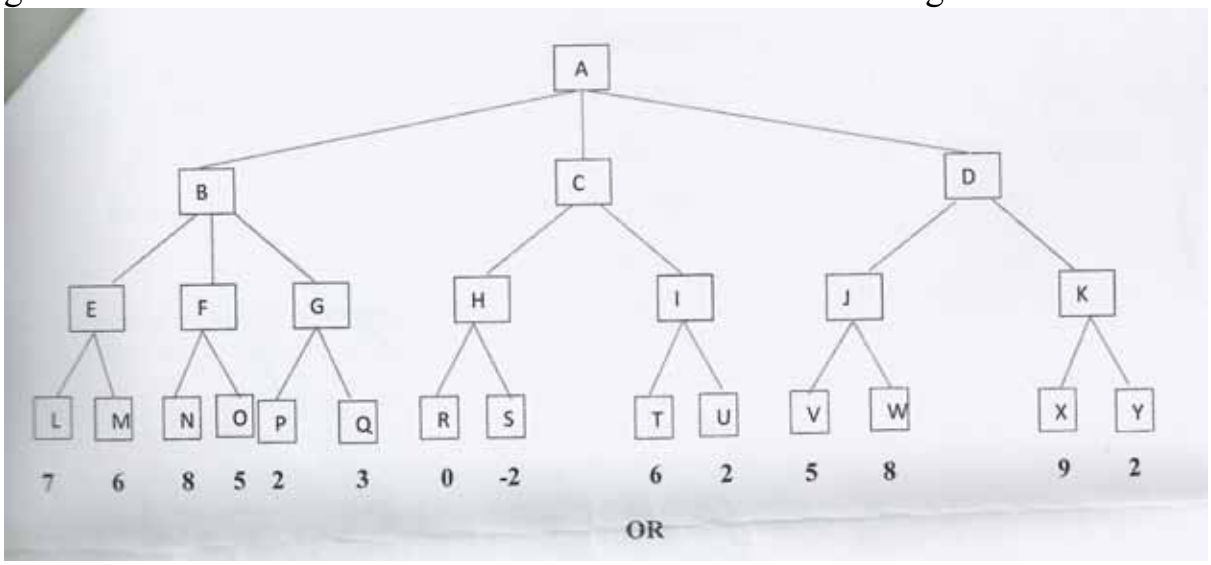
T A K E

\+ A

\+ C A K E

K A T E

b) What is alpha beta cut-off? Explain the concept with the help of the given game tree. What nodes would not need to be examined in the given tree? [8]



OR

Q.6 a) Explain the minimax algorithm to determine the optimal strategy for MAX to decided the best first move. [8]

b) Using CSP, explor the search space to solve the following cryptarithmatic problem [8]

N O

\+ N O

Y E S

SECTION- II

Q.7 a) what is semantic net? Explain how it is used to represent Inheritance. [8]

b) Explain how planning problem is expressed in STRIPS. [10]

(use Air Cargo transport problem as an example)

OR

Q.8 a) How can knowledge expressed in predicate logic be converted into clause from? Convert the following statements to clause form. [10]

i) Every child loves candy

ii) Anyone who loves candy is not a nutrition fanatic

iii) Anyone who eats any pumpkin is a nutrition fanatic

iv) Anyone who buys any pumpkin either carves it or eats it

v) John bys pumpkin

b) Explain planning with State Space Search using suitable example [8]

Q.9 a) Explain fuzzy set and crisp set. Mention applications of fuzzy logic. [8]

b) What are the basic axioms of probability? Why are they reasonable? [8]

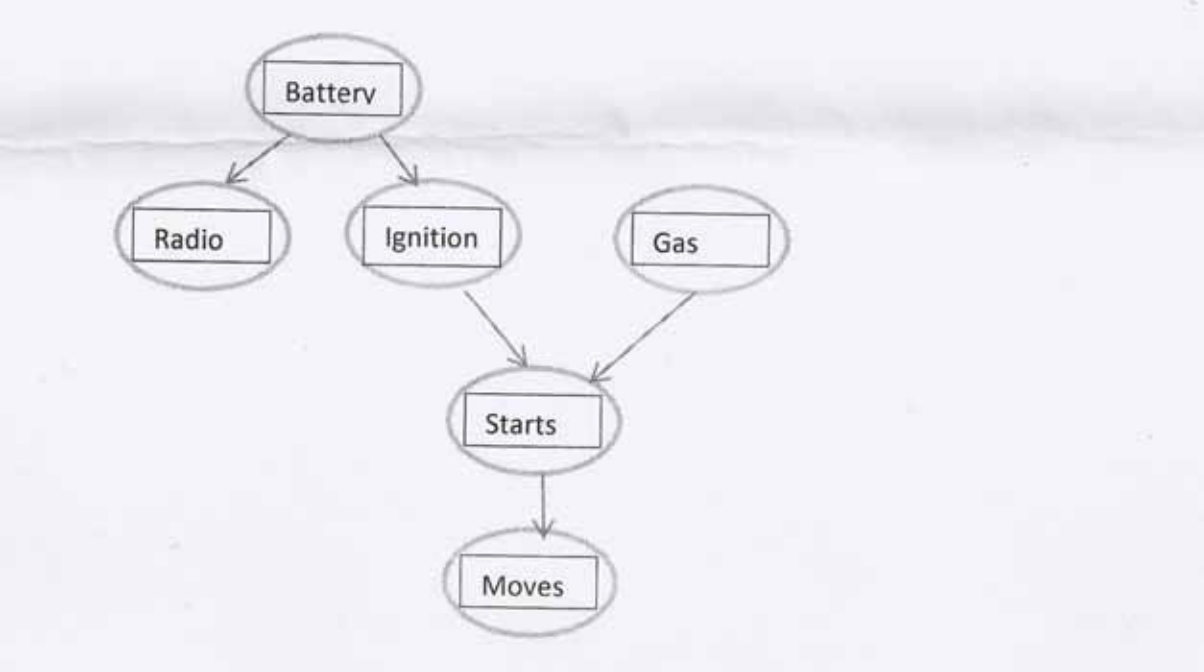
OR

Q.10 a) What are the basic inference tasks that must be solved in a generic [8]

Temporal model.

b) Consider the network for car diagnosis. Each variable(radio, Battery etc) [8]

is a boolean where true value indicates that the corresponding aspect of the vehicle is in working order.



1. Extend the network with Boolean variables Icy weather and Starter Moteor.
2. Give reasonable conditional probability tables for all nodes.
3. How many independent values are contained in the joint probability distribution for eight Boolean nodes, assuming that no conditional independence relations are known to hold them.
4. How many independent probability values does your network table cotain?

Q.11 a) Explain the basic characteristics of an expert system. [8]

b) Show syntactic parse for the following English statements : [8]

i) The big boy hit the little boy

ii) John ran.

OR

Q.12 a) What is parsing? Draw the parse tree for the following sentences. [8]

1. A student deleted my file

2. John asked Mary to print the file.

b) Explain all the steps in a NLP with an example. [8]

UNIVERSITY OF PUNE

[4364]-768

B. E. (Computer Engineering)
Examination - 2013
MULTIMEDIA SYSTEMS
(2008 Pattern)

[Time : 3 Hours] **[Max. Marks : 100]**
Total No. of Questions : 12 **[Total No. of Printed Pages :3]**

Instructions :.

*(1) Answers to the **two sections** should be written in **separate answer-books**.*
(2) Black figures to the right indicate full marks.
(3) Neat diagrams must be drawn wherever necessary..
(4) Assume suitable data, if necessary.

SECTION I

Q1) a) Explain characteristics of Multimedia database management system with Applications. [9]

b) What is streaming media and why is it required? Explain in brief any one audio and video streaming technology. [9]

OR

Q2) a) What is Multimedia Authoring tools? Explain different functions of Multimedia authoring software. [9]

b) What is an API? Explain various API for developing Multimedia Applications. [9]

Q3) a) What do you mean by image enhancement? Explain the concept of spatial filtering in image enhancement. [8]

b) Explain GIF file format in detail. [8]

OR

Q4) a) Explain JPEG encoder and decoder with suitable example. [10]

b) Explain Shannon-Fano algorithm used for compression with suitable example. [6]

Q5) a) What are MIDI messages? Explain the different between Channel messages and System messages. [8]

b) Explain VOC file format in detail. [8]

OR

Q6) a) Explain PCM audio compression technique using suitable example. [8]

b) Explain audio compression technique in MPEG. [8]

SECTION II

Q7) a) What is text Compression? Explain LZW Compression and Decompression with suitable example? [9]

b) What do you mean by digital video? Explain the feature of EDTV in detail. [9]

OR

Q8) a) Explain how Huffman coding technique is used foe text compression. [6]

b) Explain the features of H.261 and H.263. [6]

c) What is composite video, component video and S-video signal formats. [6]

Q9) a) Explain various functions in Open GL to create animation. [8]

b) Explain various animation techniques with example. [8]

OR

Q10) a) Explain architecture of Open GL. [8]

b) Explain how atmospheric effects can be introduced in 3D animations. [8]

Q11) a) Explain quality of data transmission w.r.t. Multimedia applications [8]

b) What is mean by Multimedia over IP. [8]

OR

Q12) a) Explain media consumption in detail. [8]

b) Explain any two IP based multimedia protocols. [8]

University of Pune
B.E. (Computers)
4364-769
Examination - 2013
Mobile Computing
(2008 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **03 question from each section.***
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Figures to the right indicate full marks.
(4) Neat diagrams must be drawn whenever necessary.

SECTION I

Q1. A) Enlist and explain the Teleservices and supplementary services provided by GSM. [10]
B) What are the technical requirements of GSM? [6]

OR

Q2. A) Explain channel layout and frequency bands of operation in GSM system. What are the different categories of mobile telephone units specified for the European GSM system? [8]
B) Enlist the requirements in radio subsystem of GSM and explain function of those equipments in detail. [8]

Q3. A) Explain the time and frequency domain layout of a GSM system with the help of a diagram. [8]
B) Find the frame, multiframe and the superframe rates. [8]

OR

Q4. A) Elucidate the time organization of traffic channel(full and half rate). [8]

B) Explain the structure of a TDMA slot with a frame for following bursts: [8]

1. Frequency Correction burst
2. Access burst

Q5. A) Discuss the three handover cases with the help of a diagram. [8]

B) What are the steps in the establishment of MS-PSTN call. Explain the call set-up with suitable signal and response diagram. [10]

OR

Q6. A) Name three distinct states of the mobile. What functions must mobile perform in these states? [8]

B) Explain the concept of "Off-Air call setup". What are the advantages of this scheme compared to call establishment without OACSU? Discuss the process of call establishment with OACUS. [10]

Section II

Q7. A) Describe following terms in the context of Security management in GSM system [8]

1. Challenge
2. Response
3. Anonymity
4. Authentication

B) Describe following terms in the context of Security management in GSM system. [8]

1. Encryption
2. TMSI
3. IMSI
4. LAI

OR

Q8. A) What are four basic security services provided by GSM? Explain any two of them. [8]

B) For what reasons PIN number is used? What is its main purpose? What is PUK number? List important items stored in SIM. [8]

Q9. A) Explain the functioning of FDMA system. [8]

B) Derive the multiple access efficiency of FDMA system. [8]

OR

Q10. A) Explain the functioning of TDMA system. [8]

B) Derive the multiple access efficiency of TDMA system. [8]

Q11. A) Discuss Physical layer of GSM system and the interfaces with the physical layer. [8]

B) What is the basic difference between $LAPD_m$ and LAPD? What is the difference between acknowledged and unacknowledged modes of operation in $LAPD_m$ messages? What is the reason for using fill bits in $LAPD_m$ messages? [10]

OR

Q12. A) Explain in detail the Mobility Management Common procedure. [10]

B) Explain U_m, A and A-bis interface. [8]

UNIVERSITY OF PUNE

[4364]-770
B. E. (Comp Engg) Examination - 2013
Elective II- EMBEDDED SYSTEMS
(2008 Pattern)

[Time : 3 Hours] **[Max. Marks : 100]**
[Total No. of Questions : 12] **[Total No. of Printed Pages :2]**

Instructions :

*(1) Answer **any three** questions from each section.*
(2) Attempt Section I :Q1or Q2, Q3 or Q4, Q5 or Q6 and Section II: Q7 or Q8, Q9 or Q10, Q11 or Q12
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary..
(5) Assume suitable data, if necessary.

SECTION I

Q1) a) Which characteristics of an Embedded system make it different than a General Purpose system? [6]

b) Explain how Digital Signal processor and Media processor are different than a general purpose processor. [6]

c) Discuss various application areas of embedded system. [6]

OR

Q2) a) Draw a layered architecture of Embedded system. Discuss various components in the Embedded System. [6]

b) How embedded system are classified depending on complexity? [6]

c) What challenges are faced while designing an embedded system? [6]

Q3) a) A robotic control system is to designed. For this application, select the appropriate processor based on: [8]

i) Instruction cycle time
ii) Bus width
iii) MIPS
iv) On chip cache
v) On chip RAM/ROM

b) Discuss different structural units in a processor in an embedded system. Mention few advanced units. [8]

OR

Q4) a) Describe different operating modes of ARM7 processor. [6]

b) What are different ways of reducing power consumption in an embedded system? [6]

c) Discuss various read only memories used in Embedded system. [4]

Q5) a) Discuss the topology used by devices to communicate through USB protocol. Mention different types of data transfer. [8]

b) Discuss I^2C protocol w.r.t. following points: [8]

i) Data transfer speed

ii) Arbitration

iii) Data frame Format

OR

Q6) a) Discuss different fields in the data frame of CAN bus protocol. What are the applications of CAN? [8]

b) Which optical devices are commonly used in embedded system? Explain with suitable examples. [8]

SECTION II

Q7) a) What are the advantages and disadvantages of programming in C++ for Embedded system? [8]

b) Explain the usage of stacks and queues in embedded system programming. [10]

OR

Q8) a) What is the use of an emulator in embedded system design? Explain with the help of diagram. [10]

b) Enlist the differences between compiler and cross compiler. Explain with uses of source code engineering tools for embedded C/C++. [8]

Q9) a) Explain the kernel services in an OS. [8]

b) What are the subsystems of an I/O system? Explain. [8]

OR

Q10) a) How RTOS performs the schedule management of multiple tasks. [8]

b) What are the OS units at an RTOS kernel. [8]

Q11) a) Explain three ways in which RTOS handles the ISRs. [8]

b) Enlist the software and hardware requirements of digital camera. [8]

OR

Q12) a) Identify the requirements of s/w mobile phone and show it with the help of class diagram. [4]

b) Write short notes on any three. [12]

i) μCOS-II ii) Vxworks

iii) Special OS features for automotive systems. iv) Embedded Linux

[Total No. of Questions: *12*] **[Total No. of Printed Pages:** *3*]

UNIVERSITY OF PUNE

[4364]-772

B. E. (*Computer Engg.*) Examination - 2013

Advanced Computer Architecture

(2008 Course)(410449)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1. ***Answer*** *three questions from section I and three questions from section II.*
2. *Answers to the* ***two sections*** *should be written in* ***separate answer-books***.
3. *Neat diagrams must be drawn wherever necessary.*
4. *Assume suitable data, if necessary.*

SECTION -I

Q.1 A Explain in brief general classification of parallel computer architecture based on the following techniques. [8]
i) Flynn's classification
ii) Feng's classification

B Explain the following terms with respect to parallel processing [10]
i) Sequential execution time
ii) Parallel execution time
iii) Efficiency
iv) Speedup
v) Scalability

OR

Q.2 A What do you mean by EPIC? State and explain features of EPIC. [8]

B Explain the architecture of Itanium processor in detail. [10]

Q. 3 A Explain following advanced pipelining techniques in details [8]
i) Loop unrolling
ii) Trace Scheduling

B Explain any four features of Ultra SPARC. Explain the concept of register stack exchange(RSE). [8]

OR

Q. 4	A	With the help of the block diagram explain in detail branch prediction logic implementation in Pentium architecture.	[8]
	B	Discuss in detail classification of pipeline processors.	[8]
Q. 5	A	Discuss with suitable example the necessity of data routing and manipulation with respect to SIMD interconnection	[8]
	B	Discuss a problem of parallel sorting with appropriate interconnection network. Obtain the complexity.	[8]
		OR	
Q. 6	A	Discuss any two vector optimization functions implemented in vectorizing compiler.	[8]
	B	Explain in brief the programming model of CRAY-1 vector processor.	[8]
		SECTION II	
Q. 7	A	Explain cache coherence problem. Explain ‘’Write-invalid’’ protocol.	[8]
	B	Explain significance of multiport memory to support Inter-processor Communication Network.	[8]
		OR	
Q. 8	A	What do you mean by Inter-processor communication and synchronization? Discuss the various issues involved in brief.	[8]
	B	Write short notes on time shared bus, crossbar switch and multiport memory model.	[8]
Q. 9	A	Explain with suitable example message passing parallel Programming.	[8]
	B	With suitable example, explain block and simultaneous multithreading.	[8]
		OR	
Q. 10	A	Discuss various context switching policies implemented in multithreaded architecture	[8]
	B	Explain significance of i) Latency hiding techniques ii) And principles of multithreading	[8]
Q. 11	A	Explain in detail the various features of parallel programming language.	[8]
	B	Discuss issues in multiprocessor operating systems in detail.	[10]

OR

Q. 12	A	Explain in short i) Neuro computing ii) Grid computing	[10]
	B	What are features of PVM? How processes are created in PVM? Explain the communication functions defined under PVM.	[8]

UNIVERSITY OF PUNE

[4364]-773

B. E. (Computer Engineering)

Examination - 2013

Distributed Operating System

(2008 Pattern)

[Time : 3 Hours] **[Max. Marks : 100]**

Total No. of Questions : 12 **[Total No. of Printed Pages :3]**

Instructions :

*(1) Answer **any three** questions from each section.*

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Black figures to the right indicate full marks.

(4) Neat diagrams must be drawn wherever necessary.

(5) Assume suitable data, if necessary.

Section I

Q1.	A	Compare between Multicomputer operating system, network operating system and distributed operating system.	06
	B	Explain the following issues with respect to RPC. 1. structure 2. binding 3. parameter and result passing 4. Semantics 5. error handling	10

OR

Q2.	A	What is Distributing Operating System? Explain features of Distributing Operating System in detail.	06
	B	Write a note on CORBA	04
	C	What is Remote Method Invocation? Explain modules in RMI?	06
Q3	A	Explain the following with respect to synchronization in Distributed O.S. 1. Clock Skew 2. Drift Rate 3. Casual ordering 4. Partial ordering	08

	B	Why Lamport logic clock is required? What are the conditions satisfied by logical clocks? Discuss the limitation of Lamport's clock how do overcome those.	08

OR

Q4.	A	Explain the following: 1. Physical clock 2. Logical clock 3. Vector clock In distributed O.S.	10
	B	Why election algorithm is required in distributed operation system? Explain it with any one election algorithm.	06
Q5.	A	Discuss the impact of message loss following deadlock detection algorithms. 1. A path pushing algorithms 2. A edge chasing algorithms	10
	B	What are the different issues in deadlock detection and resolution? How Ho-Ramamoorthy algorithm is used in deadlock detection and resolution?	08

OR

Q6.	A	Distributed deadlock detection algorithms normally have substantial message overhead, even when there is no deadlock. Instead of using a deadlock detection algorithm, we can handle deadlocks in distributed system simply by using "timeouts" i.e. after waiting certain time declares that it is deadlock, what are the risks in using this method? Explain the above scenario by comparing this with any deadlock detection algorithm.	10
	B	Show that Byzantine agreement cannot always be reached among four processor if two processor are faulty.	08

Section II

Q7.	A	What is distributed scheduling? Why it is needed? What are the different issues in load distribution? Explain sender initiated algorithm in detail.	12
	B	Discuss distributed shared memory system with architecture. What is the main motivation behind implementing DSM.	06

OR

Q8.	A	What is distributed scheduling? Why it is needed? What are the different issues in load distribution? Explain receiver initiated algorithm in detail.	12
	B	Explain with examples various consistency models used in distributed shared memory system. Also explain granularity aspect in DSM	06

Q9.	A	How the recovery mechanism achieved in distributed Operating system using rollback and shadow paging? Explain with suitable example	08
	B	What is Rollback? How does it help in recovery mechanism? Explain in details the rollback recovery algorithm	08
		OR	
Q10.	A	Write note on: 1. Recovery in concurrent system. 2. Synchronous and Asynchronous check pointing and recovery	08
	B	How do we achieve the security in the distributed operating system? Explain it with access matrix model for security.	08
Q11	A	What is the cluster? How do you compare cluster with distributed system? How do we classify the clusters? Give any suitable example of the cluster.	10
	B	What are web services? How do you compare it to components? And then Compare between service oriented architecture and component based architecture.	06
		OR	
Q12.	A	Explain the relation of the following system with distribution system 1. Cluster computing 2. Grid computing 3. Cloud computing 4. Service oriented architecture	10
	B	What is the cluster computing? Explain in brief types/ Classification of cluster. Compare cluster computing with Grid Computing.	06

[Total No. of Questions:12] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE
[4364]-774
B. E. (*Computer Engineering*) Examination - 2013
(Pattern Recognition)
(410450)(2008 Course)

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1 *Answer **any three** from each **section.***
2 *Assume suitable data, if necessary.*
3 *Answers to the **two sections** should be written in **separate answer-books**.*
4 *Draw neat diagrams wherever necessary.*
5 *Figures to the right indicate **full marks.***

SECTION -I

Q.1	A	Describe the basic modules in designing a pattern recognition system.	8
	B	Explain the terms feature, feature vector, pattern and classification with example.	8

OR

Q.2	A	Compare supervised and unsupervised pattern recognition.	8
	B	Define Pattern recognition. State various applications of pattern recognition.	8
Q. 3	A	Define Bayes rule. What is probability density function? Define minimum error rate classification.	8
	B	What is discriminant function? Explain how Bayesian can help for multi-classification problem?	8

OR

Q. 4	A	Explain Bayes criterion, and Maximum a Posteriori(MAP) criterion in detail.	8
	B	Define the terms loss, risk, decision rule and bayes risk.	8

Q. 5	A	Explain various parameter estimation method of pattern classification.	8
	B	Write note on i. Expectation maximization method ii. Bayesian estimation	10

OR

Q. 6	A	Discuss Maximum Likelihood approach used for parameter estimation.	8
	B	Explain Gaussian mixture model for density estimation? What are the advantages of Gaussian mixture model over other estimation?	10

SECTION II

Q. 7	A	Define within-class scatter matrix & between-class scatter matrix. Discuss the discriminate analysis for 2-class problem	8
	B	What is the role of Dimension reduction in pattern recognition? State and explain different methods for Dimension reduction	10

OR

Q. 8	A	What is mean by Context-dependent classification? Explain Discrete Hidden Markov Model and Continues Density Hidden Markov.	10
	B	Explain Principal Component analysis for dimension reduction.	8
Q. 9	A	Explain non-parametric techniques for density estimation. Explain Kernel density estimation.	8
	B	Explain linear Support vector machine in detail.	8

OR

Q. 10	A	In order to select best candidates, school entrance exam on two subjects of English and Mathematics. Suppose	8

that we know the marks and the classification results of 5 applicants as in the table below. If an applicant has been accepted this is denoted as class 1, otherwise class 2. Use the nearest neighbor rule and sum of square distance measure to determine if Ajay should be accepted if his marks of English and Mathematics are 70 and 70 respectively. Using the same example determine if Ajay should be accepted with k-nearest neighbour rule, with k=3

Candidate No.	English	Math	Class
1	80	85	1
2	70	60	2
3	50	70	2
4	90	70	1
5	85	75	1

B Explain linear discriminant function and decision hyper plane in detail. 8

Q. 11 A What is pattern clustering? How it differs from classification? Explain K-mean clustering algorithm 8

B What is Non-metric data? State and explain the technique used for classification of Non-metric data. 8

OR

Q. 12 A What is the difference between classification and clustering? State and explain various techniques used for clustering. 8

B Explain Hierarchical clustering with different linkage metrics. 8

[Total No. of Questions: *12*] **[Total No. of Printed Pages:** *2*]

UNIVERSITY OF PUNE

[4364]-775

B. E. (*Computer Engineering*) Examination - 2013

High Performance Networks(Elective III)

(2008 Course)(410450)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1. *Answer* ***Q1 or Q2, Q3 or Q4, Q5 or Q6*** *from section I and* ***Q7 or Q8, Q9 or Q10, Q11 or Q12*** *from section II.*
2. *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*
3. *Neat diagrams must be drawn wherever necessary.*
4. *Assume suitable data, if necessary.*
5. *Black figures to the right indicate full marks.*

SECTION -I

Q.1	A	Explain the applications of Gigabit Ethernet.	[8]
	B	Explain high level system architecture of Gigabit Ethernet.	[10]
		OR	
Q.2	A	Explain Gigabit Ethernet physical layer in detail	[10]
	B	Explain Carrier extension frame and the need of frame bursting at MAC Layer.	[8]
Q.3	A	Explain physical configurations for ISDN User-Network Interfaces with examples.	[8]
	B	Explain in brief elementary functions for ISDN	[8]
		OR	
Q. 4	A	Describe the SS7 protocol architecture.	[8]
	B	Explain Frame-Mode Control Signaling with example.	[8]
Q. 5	A	Explain HEC operation at receiver and effect of error in Cell Header with diagram.	[8]

	B	Draw and explain ATM Cell Format at User-network interface.	[8]
		OR	
Q. 6	A	Explain traffic management functions of maintain the QoS of ATM connections.	[8]
	B	Explain the causes of cell delay variation in ATM network.	[8]
		SECTION II	
Q. 7	A	Compare different DSL technologies.	[8]
	B	Explain various service characteristics provided by VDSL standards.	[8]
		OR	
Q. 8	A	Explain architecture of VDSL	[8]
	B	Explain what is x DSL and its types?	[8]
Q. 9	A	Explain tunneling in MPLS.	[8]
	B	Explain working of RSVP	[8]
		OR	
Q. 10	A	Explain step-by-step MPLS operations that can occur on data packets in an MPLS domain.	[8]
	B	Explain MPLS Protocol stack architecture.	[8]
Q. 11	A	Explain IP based WiMax Network Architecuture.	[10]
	B	Explain Modulation and Coding supported in WiMax.	[8]
		OR	
Q. 12	A	Comment on any 3 WiMax QoS classes along with suitable Application support.	[8]
	B	Explain the following terms related to WiMax i) Fixed wireless access ii) Nomadic wireless access	[10]

[Total No. of Questions: 12] **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE
[4364]-776
B. E. (Computer) Examination - 2013
Neural Network
(2008 Course)(Sem II)(Elective III)

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1 *Answer* ***Q1 or Q2, Q3 or Q4, Q5 or Q6*** *from section I and* ***Q7 or Q8, Q9 or Q10, Q11 or Q12*** *from section II.*
2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*
3 *Neat diagrams must be drawn wherever necessary.*
4 *Assume suitable data, if necessary.*
5 *Black figures to the right indicate full marks.*

SECTION -I

Q.1 A Draw Schematic diagrams of a typical biological neuron and its artificial neuron model. Explain briefly the operation of a biological neuron and artificial neuron. Explain role of transfer function. [9]

B What is learning? What are the basic learning laws? Describe any one Learning law. [9]

OR

Q.2 A What are the main differences amongst three models of artificial neuron, namely, McCulloch-Pitts, perceptron and adaline? [9]

B Which are various data structure used for Artificial Neural Systems (ANS) implementation? Explain Array-Based Data Structure used for ANS implementation. [9]

Q.3 A Explain supervised learning and unsupervised learning with example of each. Explain any one supervised learning method used in Artificial Neural Network [8]

B Explain Back Propagation Neural Network with example. Include following points: 1>diagram 2>learning method 3>training rule and algorithm 4>classification [8]

OR

Q. 4 A Distinguish between linearly separable and linearly inseparable problems with example. Why a single layer of perceptron cannot be used to solve linearly inseparable problems? [8]

B Explain Adaline and Madaline with diagram. Explain learning rule and transfer function used in Adaline. [8]

Q. 5	A	What is the Hopfield mole of a neural network? What is a state transition diagram for Hopfield Neural Network? Explain how to derive it in Hopfield model.	[8]
	B	What are hard problems in pattern storage task? How to solve the hard pattern storage problems?	[8]

OR

Q. 6	A	Give note on Stochastic Networks and Simulated Annealing.	[8]
	B	Describe the Boltzmann machine and Boltzmann learning law. What are the limitations of the Boltzmann learning?	[8]

SECTION II

Q. 7	A	Draw and explain Competitive Learning Network. Explain training in Competitive Learning Network.	[8]
	B	What is SOFM? Draw and explain its architecture. How training is done in SOFM?	[8]

OR

Q. 8	A	What is ART? What is the significance of 'resonance' in ART network? Explain briefly the operation of an ART.	[8]
	B	Explain unsupervised learning Neural Network.	[8]
Q. 9	A	What is an associate memory? What are the requirements of an associate memory? Distinguish between hetero-associative and auto-associative memories with example.	[9]
	B	What is Stability- Plasticity Dilemma? How the problem is resolved?	[9]

OR

Q. 10	A	Explain any one application of Artificial Neural Network in detail with following: Points: 1>Define application category: (e.g. Image processing/ decision making/ Optimization, etc.) 2>Define on specific application (e.g. character recognition) 3>Input and output for above application 4>Proposed neural network architecture 5>Training and training rule 6>Classification	[18]
Q. 11	A	Explain and draw any one model of fuzzy neural system.	[8]
	B	Give advantages of neuro-fuzzy combination. Explain any one application fuzzy neural system.	[8]

OR

Q. 12	A	Define 1>Fuzzy Logic 2> Crisp Logic 3>Membership Function 4>Neuro-Fuzzy Combination	[8]
	B	Give advantages and disadvantages of Artificial Neural Network	[8]

[Total No. of Questions: *12*] **[Total No. of Printed Pages: 4]**

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B. E. (Computer) Examination - 2013

Operation Research (2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 ***Answer any 3 questions from each Section.***
2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books***.
3 *Use of non programmable calculator is allowed.*
4 *Black figures to the right indicate full marks.*
5 *Neat diagrams must be drawn wherever necessary.*
6 *Assume suitable data, if necessary.*

SECTION -I

Q.1 A Formulate the following problem as linear programming problem. 4

A company produces two types of Hats.Each hat of first type requires twice as much labour time as the second type.If all hats are of second type only,the company can produces a total of 500 hats of day.The market limits daily sales of first and second type to 150 and 200 hats. Assume that profits per hat are Rs.8 for first type and Rs.5 for second type.

B Solve the following LP Problem graphically. 8

Maximize $Z=3x1+5x2$ subject to restrictions

$x1+2x2 \leq 2000$, $x1+x2 \leq 1500$, $x2 \leq 600$ and $x1, x2 \geq 0$

C Define Slack and surplus variables. 4

OR

Q.2 A Solve following LP Problem using Simplex Method 8

Maximize $Z=x1+2x2+x3$ subject to constraints

$2x1+x2-x3 \leq 2$, $-2x1+x2-5x3 \geq -6$,$4x1+x2+x3 \leq 6$ and $x1, x2, x3 \geq 0$

B With respect to LPP,What is testing for optimality? How it is carried out? 6

C Define feasible and optimal solution. 2

Q. 3 A What is importance of probability distribution functions?Explain any two types of continuous probability distribution functions. 6

B Find the range of values of 'P' and 'Q'with the entry (2,2) as a saddle point for given matrix representation of a game. 6

	Player B		
Player A	2	4	5
	10	7	Q
	4	P	6

C Differentiate between decision under risk and decision under certainty. 6

OR

Q. 4 A What is the expectation of the number of failure preceding the first success in an infinite series of independent trials with constant probability of success 'P' in each trail? 6

B Consider the following pay-off table. 6

Acts	Events			
	E1	E2	E3	E4
A1	40	200	-200	100
A2	200	0	200	0
A3	0	100	0	150
A4	-50	400	100	0

Probabilities of events are P(E1)=0.2 , P(E2)0.15 , P(E3)= 0.4,P(E4)=0.25.Calculate expected pay-off the expected loss of each action.

C Solve the following game. 6

	B1	B2	B3
A1	1	7	2
A2	0	2	7
A3	5	1	6

Q. 5 A What is queuing system?Explain queuing systems transient state and steady state. 8

B A software tester finds that the time spent on debugging and fixing the error has an exponential distribution with mean 30 min per module. The arrival of modules is Poisson with an average of 10 modules per day of 8 hours. What is expected time per day? How many modules are there on average? 8

OR

Q. 6 A At what average rate must a clerk at a supermarket work in order to ensure a probability of 0.9 that the customer will not have to wait longer than 12 minutes?It is assumed that there is only one counter to which customer arrive in a Poisson fashion at an average rate of 15 per hour.The length of service by the clerk has an exponential distribution. 8

B State and prove the arrival distribution theorem.(Pure birth process). 8

SECTION II

Q. 7 A Find the sequence of jobs that minimizes the total elapsed time to complete the following set of jobs on two machines. 10

Job	1	2	3	4	5	6
Machine A	3	12	5	2	9	11
Machine B	8	10	9	6	3	1

Also calculate the ideal time for both machines.

B Draw the network diagrams for the following set of activities and identify 8

dummy activities.

1.A <B,C; B<D,E; C<E; E<F; D,F<G; G<H;

2.Consider the following table.

Activity	A	B	C	D	E	F	G	H	I
Immediate Predecessor	-	-	-	A	B,C	A	C	D,E,F	D

OR

Q. 8 A Find the sequence of jobs that minimizes the total elapsed time to complete the four jobs on five machines. 8

	Machines				
Job	M1	M2	M3	M4	M5
A	7	5	2	3	9
B	6	6	4	5	10
C	5	4	5	6	8
D	8	3	3	2	6

B Consider a project consists of series of tasks labeled A to I with following relationship and constraints. Construct network diagram , Network analysis table and identify critical path. 10

A<D,E; B,D >F; C<G; B<H; F,G<I

Find also the optimum time of completion of project ,the time of completion of each task is as follows.

Task	A	B	C	D	E	F	G	H	I
Time	23	8	20	16	24	18	19	4	10

Q. 9 A Find the maximum or minimum of the function 8

$f(x)=X_1^2 + X_2^2 + X_3^2 - 4X_1 - 8X_2 - 12X_3 + 56$

B Discuss Lagrangian multiplier method to provide necessary condition for an optimum when constraints are equations. 8

OR

Q. 10 A Formulate following description as non-linear programming problem 8

A company manufactures two products A and B.A takes 30 minutes while B 15 minutes for each unit.Maximum machine time available is 35 hours per week.Products A and B requires 2 kg and 3 kg of raw material per unit respectively.Available quantity of raw material is 180 kg per week. Product A and B have unlimited marked potential sell for 200 Rs and 500 Rs respectively. Manufacturing cost for A and B are $2x^2$ and $3y^2$ Respectively. Find how much of each product should be produces per week?[X is quantity of product A and Y is quantity B]

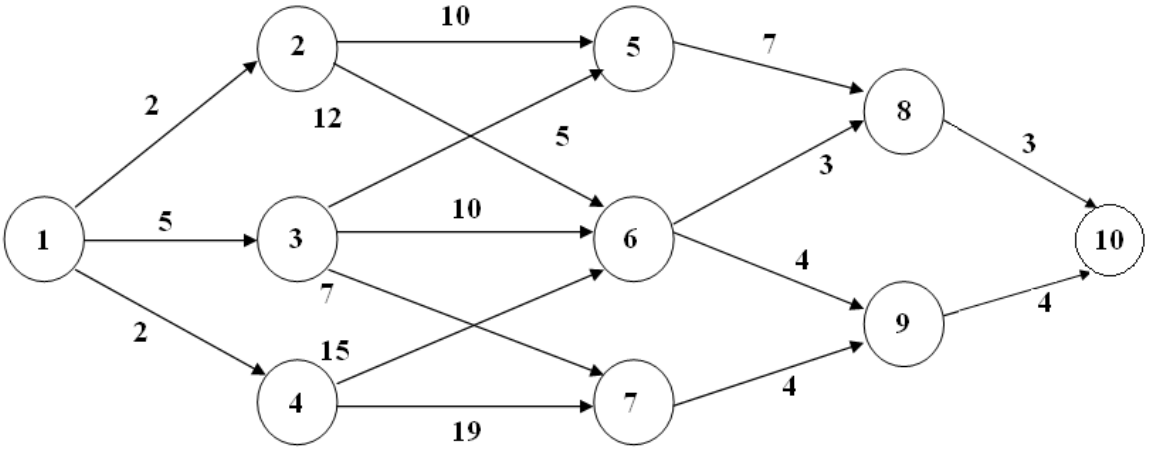
B Use separable programming algorithm to convert following specification to non-linear problem. 8

Max z = $X^1 + X_2^4$,subject to constraints $3x_1 + 2X_2^2 \leq 9$, $X_1, X_2 \geq 0$

[Note:NLP problem formulation only,do not solve formulated NLP problem]

Q. 11 A What is dynamic programming?State and explain Bellman's principle of optimality in dynamic programming. 8

B Solve the following minimum path problem instance using dynamic programming for path node 1 to node 10. 8



OR

Q. 12 A Explain single additive constraints,additively separable return model of dynamic programming. 8

B Using dynamic programming solve minimize $z = y_1^2 + y_2^2 + y_3^2$ subject to constraints $y_1 + y_2 + y_3 \geq 15$, y_1 , y_2, ,$y_3 \geq 0$ 8

[Total No. of Questions: *12*] **[Total No. of Printed Pages:** *2*]

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B. E. (*Computer Engg***) Examination - 2013**

Cloud Computing (2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 ***Answer 3 questions from Section I and 3 questions from Section II***

2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books.***

3 *Black figures to the right indicate full marks.*

4 *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	What is demand self service? Explain how it is implemented in cloud computing platforms.	08
	B	Compare and contrast utility computing, elastic computing and cloud computing.	08
	C	Explain monitoring challenge in cloud computing.	02
		OR	
Q.2	A	Explain the component stack of SaaS , PaaS and IaaS.	08
	B	Explain with suitable diagram Amazon and Google Cloud models.	08
	C	Explain Network bottlenecks challenge in cloud computing.	02
Q. 3	A	What is multi-tenancy? Explain in brief different ways to achieve multi-tenancy in application software.	08
	B	What is service composition? Distinguish mashup and traditional service composition.	08
		OR	
Q. 4	A	What is data access control for enterprise applications? Explain with example, how data access control can be implemented.	08
	B	Explain how rich internet applications work. Compare with traditional web applications.	08
Q. 5	A	Explain structure of Google App Engine's Data store and its underlying technologies.	08
	B	Explain with suitable example; how a relational join could be executed in parallel using map reduce model.	08
		OR	

Q. 6	A	Explain architecture of Amazon Dynamo. How vector timestamp mechanism is used in this architecture?	08
	B	What is parallel efficiency? Discuss parallel efficiency for Map Reduce model.	08

SECTION II

Q. 7	A	Why Cloud Computing brings new threats? Explain security issue from virtualization, vulnerability in virtualization and risk prevention in VMM.	10
	B	Define trusted cloud computing and explain cloud service provider Risks?	08
		OR	
Q. 8	A	Explain various security threats and vulnerabilities inherent in virtualized systems. Discuss VM-Specific Security Techniques.	10
	B	What is identity management? Explain issues in implementing Identity Management.	08
Q. 9	A	Explain various design issues that are to be addressed when designing a QoS- aware middleware architecture for Cloud Computing.	08
	B	Explain Quality of Service (QoS) monitoring in cloud computing environment.	08
		OR	
Q. 10	A	Explain different module of the Quality of Service (QoS) aware Cloud Architecture.	08
	B	Enlist and explain the Quality of Service (QoS) issues that are to be addressed while designing a real time application over cloud platform.	08
Q. 11	A	Explain Encalytus cloud Computing infrastructure and its components.	08
	B	Enlist and explain different features and functions of Apache Vitual Computing Lab.	08
		OR	
Q. 12	A	Explain various components of Xen Cloud Platform.	08
	B	Explain various components within the Enomal Elastic Computing Platform.	08

[Total No. of Questions: *12*] **[Total No. of Printed Pages: 3]**

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B. E. (*Computer & Electronics***)/ Examination - 2013**

Information Security(2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 ***Answer any 3 questions from each Section.***

2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books***.

3 *Black figures to the right indicate full marks.*

4 *Neat diagrams must be drawn wherever necessary.*

5 *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	List and explain OSI security services.	8
	B	Explain the following OSI security mechanisms: (i)Digital signature (ii)Access control (iii)Data Integrity (iv)Authentication exchange	10
		OR	
Q.2	A	Explain the significance of information security from legal,ethical and professional point of view in an organization.	8
	B	Differentiate between a block cipher and a stream cipher.What are two general approaches to attack a cipher?	10
Q. 3	A	Explain differential and linear cryptanalysis with suitable examples.	8
	B	Explain block cipher modes of operation.	8
		OR	
Q. 4	A	Explain 3-DES algorithm with example.	8
	B	Explain AES algorithm with example.	8

Q. 5	A	What are the three broad categories of applications of public key cryptosystems?	8
	B	Explain RSA algorithm and its application.	8
		OR	
Q. 6	A	List four general categories of schemes for the distribution of public keys?	8
	B	Explain Diffie-Hellman key exchange.	8
		SECTION II	
Q. 7	A	What is message authentication code?	8
	B	What types of attacks are addressed by the message authentication?What is the difference between a message authentication code and a one way hash function?	8
		OR	
Q. 8	A	Explain MD5 algorithm with suitable example.	8
	B	What are the properties of digital siganatures?What requirements should a digital signature satisfy?	8
Q. 9	A	Describe the Transport and Tunnel modes of IPSec.	8
	B	Describe the difference types of Intrusion detection system.	8
		OR	
Q. 10	A	What are differences in SSL and TLS? Explain in detail?	8
	B	What services are provided by IPSec? Explain the ESP header format used in IPSec?	8
Q. 11		Write a short note on any three. (i)PEM & PGP (ii)S/MIME (iii)Radix 64 (iv)Electronic commerce security	18
		OR	
Q. 12	A	Write a short note on secure electronic transaction with a neat diagram show secure electronic commerce components.	8
	B	What is Radix 64 (R64) conversion? Explain with suitable example.	10