

SEM-VII      COMP (CBSEGS)      25/11/16

# Artificial Intelligence

QP Code : **31334**

(3 Hours)

[ Total Marks : 80 ]

- N. B. : (1) Each question carry 20 marks.  
 (2) Question 1 is compulsory.  
 (3) Attempt any three (3) from the remaining questions.  
 (4) Assume suitable data wherever required.

1. Attempt any four (4) questions from the following: 20
  - (a) Draw and explain architecture of Expert System.
  - (b) Explain Hill-climbing algorithm with an example.
  - (c) Give PEAS description for a Robot Soccer player. Characterize its environment.
  - (d) Explain Turing test designed for satisfactory operational definition of intelligence.
  - (e) Prove that A\* is admissible if it uses a monotone heuristic.
  - (f) Compare and Contrast problem solving agent and planning agent.
2. (a) Explain decision tree learning with an example. What are decision rules? How to use it for classifying new samples? 10
- (b) Write first order logic statements for following statements: 10
  - (i) If a perfect square is divisible by a prime p then it is also divisible by square of p.
  - (ii) Every perfect square is divisible by some prime.
  - (iii) Alice does not like Chemistry and History.
  - (iv) If it is Saturday and warm, then Sam is in the park.
  - (v) Anything anyone eats and is not killed by is food.
3. (a) Design a planning agent for a Blocks World problem. Assume suitable initial state and final state for the problem. 10
- (b) Find the probabilistic inference by enumeration of entries in a full joint distribution table shown in figure 1. 10
  - (i) No cavity when toothache is there
  - (ii) p (Cavity | toothache or catch)

	toothache		¬toothache	
	catch	¬catch	catch	¬catch
cavity	.108	.012	.072	.008
¬cavity	.016	.064	.144	.576

Figure 1.

[ TURN OVER

4. (a) Compare following informed searching algorithms based on performance measure with justification: Complete, Optimal, Time complexity and space complexity. 10
- Greedy best first
  - A\*
  - Recursive best-first (RBFS)

- (b) Apply alpha-Beta pruning on example given in Figure 2 considering first node as max. 10

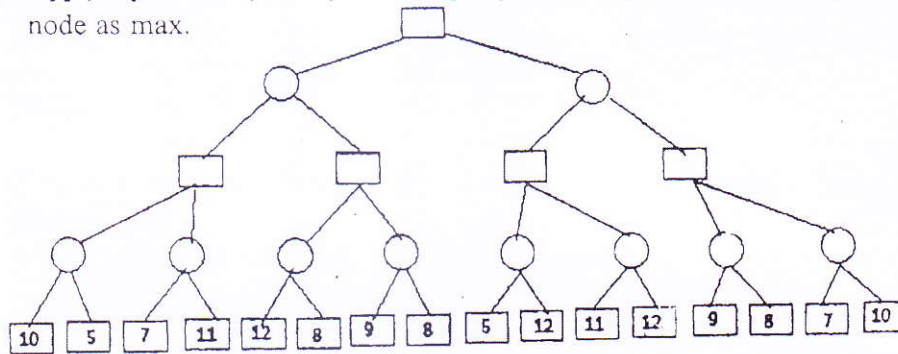


Figure 2.

5. (a) Explain how genetic algorithm can be used to solve a problem by taking a suitable example. 10
- (b) Consider the graph given in Figure 3 below. Assume that the initial state is A and the goal state is G Find a path from the initial state to the goal state using DFS. Also report the solution cost 10

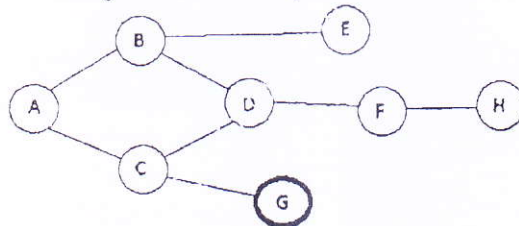


Figure 3.

6. (a) Explain the steps involved in converting the propositional logic statement into CNF with a suitable example 10
- (b) What are the basic building blocks of Learning Agent? Explain each of them with a neat block diagram. 10

B.E. Sem VII CBSSGS  
Computer Engg  
Cryptography & System Security  
(Time: 3hrs)

19/5/2016  
11 am to 2 pm  
QP Code : 31296

( Marks 80)

1. Question No 1 is compulsory.
2. Attempt any three out of the remaining five questions.

- Q1. (a) Explain software flaws with examples 05  
(b) List with examples the different mechanisms to achieve security 05  
(b) Explain with examples, keyed and keyless transposition ciphers 05  
(c) Elaborate the steps of key generation using RSA algorithm 05
- Q2. (a) A and B decide to use Diffie Hellman algorithm to share a key. They chose  $p=23$  and  $g=5$  as the public parameters. Their secret keys are 6 and 15 respectively. Compute the secret key that they share. 10  
(b) Explain working of DES. 10
- Q3. (a) What is access control? How does the Bell La Padula model achieve access control. 10  
Q3. (b) What is a digital signature. Explain any digital signature algorithm in detail. 10
- Q4. (a) Compare packet sniffing and packet spoofing. Explain session hijacking attack. 10  
Q4. (b) Explain working of Kerberos. 10
- Q5. (a) What is a firewall? What are the firewall design principles? 05  
Q5. (b) What are the various ways for memory and address protection. 05  
Q5. (c) Explain the significance of an Intrusion Detection System for securing a network. Compare signature based and anomaly based IDS. 10
- Q6. Write in brief about (any four): 20  
i) Email Security.  
ii) SSL handshake protocol  
iii) IPSec protocols for security  
iv) Denial of service attacks  
v) IDEA

# 311516 B.E. Comp. Tech. - C.B. 97 Structure - Adv. Algorithms

Q.P. Code No: 31380

N.B

- (1) Question no. 1 is compulsory.
- (2) Attempt any 3 from the remaining questions.
- (3) Assume suitable data if necessary.
- (4) Figures to right indicate full marks.

(3 Hours)

[Max Marks 80]

Q1(a) Explain all cases of Master method. Solve following Recurrences using Master Method. 05

a.  $T(n) = 4T(n/2) + n/\log n$

b.  $T(n) = 3T(n/3) + n/2$

c.  $T(n) = 6T(n/3) + n^2 \log n$

Q1(b) With a suitable example, explain the significance of the order of growth in analyzing the algorithm efficiency. 05

Q1(c) If  $f(n)$  denotes the number of moves in tower of Hanoi puzzle when  $n$  disks are involved, give a recurrence relation for  $f(n)$  and solve this recurrence relation. 05

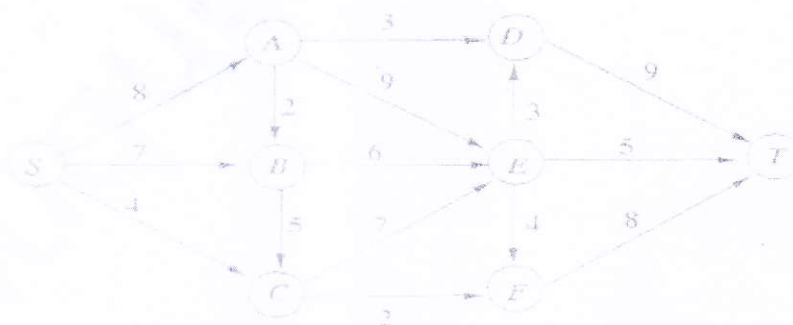
Q1(d) Explain bipartite matching. 05

Q2(a) Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is  $\langle 2, 10, 12, 5, 50, 60 \rangle$ . 12

Q2(b) Execute Graham's algorithm to find convex hull. 8

Q3(a) What is red-black tree? Show the red-black tree that results from the successive insertion of the following keys 41, 38, 31, 12, 19, 8 and the successive deletion of the following keys 8, 12, 19, 31. 10

Q3(b) Find maximum flow in the following flow network. 10





- Q4(a) Explain Cutting Rod problem. Given a table of prices  $p_i$  determine the maximum revenue  $r_n$  obtainable by cutting the rod. 10

Len	1	2	3	4	5	6	7	8	9	10
Price	3	4	6	9	16	20	22	24	26	30

- Q4(b) What is binomial heap? Explain it's properties. Explain the operations that can be carried out on binomial heap with example. 10

- Q5(a) Use Simplex method to maximize following objective function 12

$$z = 2x_1 + x_2 + 2x_3$$

Subject to the constraints

$$2x_1 + x_2 \leq 10$$

$$x_1 + 2x_2 + 2x_3 \leq 20$$

$$x_2 + 2x_3 \leq 5$$

where  $x_1 \geq 0$ ,  $x_2 \geq 0$ , and  $x_3 \geq 0$

- Q5(b) Explain Closest Pair of Points using divide and conquer. 8

- Q6(a) Find all pair shortest path using Johnson's algorithm for the following graph 12



- Q6(b) Explain Graham's algorithm to find convex hull. 8

**QP Code : 31395**

**DURATION: 3 hrs.**

**MAX MARKS: 80**

N.B.: (1) Question 1(one) is compulsory.  
(2) Figures to the right indicate full marks.

- |           |  |               |
|-----------|--|---------------|
| <b>Q1</b> | <b>Solve any 4</b>                             | <b>4*5=20</b> |
| a)        | List various benefits of ERP system.           | [5]           |
| b)        | How ERP and E-commerce related.                | [5]           |
| c)        | Explain generic type of SCM.                   | [5]           |
| d)        | Explain Electronic Data Interchange (EDI).     | [5]           |
| e)        | What is operational mathematical model of SCM? | [5]           |
| f)        | What is Business Intelligence (BI).            | [5]           |
- 
- |           |  |                |
|-----------|--|----------------|
| <b>Q2</b> | <b>Attempt any two</b>   | <b>2*10=20</b> |
| a)        | Discuss the importance of post implementation phase of ERP implantation. | [10]           |
| b)        | How is BPR connected with ERP explain.                                   | [10]           |
| c)        | What is pre-evaluation screening? Why it is required?                    | [10]           |
- 
- |           |  |                |
|-----------|--|----------------|
| <b>Q3</b> | <b>Attempt any two</b>   | <b>2*10=20</b> |
| a)        | List and explain various ERP technologies , also state where it is used      | [10]           |
| b)        | Explain the sales distribution business module of ERP with suitable example. | [10]           |
| c)        | Discuss the reason of growth in the due to ERP business modules.             | [10]           |
- 
- |           |   |                |
|-----------|---|----------------|
| <b>Q4</b> | <b>Attempt any two</b>                    | <b>2*10=20</b> |
| a)        | Explain SCOR model.                       | [10]           |
| b)        | Explain E-Procurement model with example. | [10]           |

- c) Explain various types of IT solutions used in SCM with example. [10]

**Q5** Attempt any two

2\*10=20

- a) Explain vehicle routing with suitable online current example such as OLA cabs etc. by focusing on its scenario. [10]
- b) Explain make versus buy model with example. [10]
- c) Explain business strategy and its types such as SRM and CRM. [10]

**Q6** Attempt any two

2\*10=20

- a) Explain the strategy used by these Mumbai dabbawalas, and also what can larger organizations with many more resources learn from this simplistic system? [10]

b) A family owned chemical manufacturer needed to replace its old information, inadequate system and solve some important business problems. The company was growing and management needed to understand customer profitability. A number of years ago the company implemented a tier III accounting and manufacturing system. This existing system had become inadequate. It was heavily modified, and the consulting firm that had made the modifications was out of business. There was no viable path to improve the existing system. The family owned business was growing and looking at acquisitions. At the same time management believed they had a critical problem: some customers were unprofitable, but the information available provided no insight into the problem. Now Consider yourself as the company manager and advise the suitable solution for the same. [10]

- c) Explain the revenue model used by Flipkart system and the supply chain strategy used by them to deliver the product on time? [10]

B-E (10m) in CBQS  
Digital Sig Processing

13/5/2016

**QP Code : 31256**

(3 hours)

Total Marks: 80

- N.B.
1. Question No. 1 is compulsory.
  2. Attempt any **three** questions out of remaining.
  3. Assume suitable data if **necessary** and justify the assumptions.
  4. Figures to the **right** indicate full marks.

- Q1 A For the given causal sequences  $x(n) = \{8, 9, 2, 3\}$  and  $h(n) = \{4, 3, 6\}$  find the cross correlation. 05
- B State the condition for stability of LTI system and determine for the given discrete time system  $h(n) = (0.3)^n u(n) + 5\delta(n)$ , is stable or not. 05
- C Differentiate IIR and FIR systems. 05
- D For the causal signal  $x(n) = \{2, 2, 4, 4\}$  compute four point DFT using DIT-FFT. 05
- Q2 A Check whether following system  $y(n) = 2x(n-1) + x(2n)$  is: 10
1. Linear or non Linear
  2. Causal or non-causal
  3. Time variant or Time invariant
  4. Static or Dynamic
- B Draw the radix 2 DIT flow graph and find the DFT of the sequence  $x(n) = \{10, 11, 8, 5\}$  using FFT flow graph. 10
- Q3 A For  $x(n) = \{2, 3, 4, 5, 1, 3\}$ , plot the following Discrete Time signals: 10
- 1.)  $x(n-1)$
  - 2.)  $x(n)u(-n)$
  - 3.)  $x(n-1)u(-n-1)$
  - 4.)  $x(-n)u(n)$
  - 5.)  $x(2n)$
- B Determine whether or not the following signals are periodic. 10
- If periodic specify its fundamental period.
1.  $x(n) = \sin(0.25\pi n + 0.4)$
  2.  $x(n) = \cos(0.5n\pi) + \sin(0.25n\pi)$
- Q4 A For the FIR/digital filter with impulse response given by 10
- $$h(n) = 2\delta(n) + 3\delta(n-1) + 4\delta(n-3) + \delta(n-4)$$
- sketch the magnitude response of the filter.
- B State any five DFT properties. 10

[TURN OVER]



QP Code : 31256

— 2 —

- Q5 A Find circular convolution of  $x_1(n) = \{5, 6, 2, 1\}$  and  $x_2(n) = \{3, 2, 1, 4\}$  by computing DFT of  $x_1(n)$  and  $x_2(n)$ . 10
- B Compute Linear Convolution of causal sequence  $x(n) = \{7, 6, 4, 5, 2, 4, 5, 2, 3\}$  and  $h(n) = \{1, 2, 3, 1\}$  using fast overlap save method. 10
- Q6 A Write a detailed note on Carls' Correlation Coefficient Algorithm. 10
- B Write a detailed note on DSP Processor and Architecture. 10

BE-VII / COMP / CBGS / <sup>Soft</sup> Computing / 31.05.2016

(3 Hours)

QP Code : 31392

[Total Marks : 80]



1. Question no. 1 is compulsory.

2. Solve any THREE out of FIVE remaining questions.

1. a. Define soft computing? Distinguish between soft computing and hard computing. 5
- b. Explain Mc Culloch Pitts neuron model with the help of an example. 5
- c. Determine (i)  $\alpha$ -level sets and strong  $\alpha$ -level sets for the following fuzzy set.  
 $A = \{(1,0.2), (2,0.5), (3,0.8), (4,1), (5,0.7), (6,0.3)\}$  5
- d. Explain linear separable and non-linearly separable pattern with example. 5
2. a. What is learning in neural network? Differentiate between supervised and unsupervised learning. 10
- b. Explain any four defuzzification methods with suitable example. 10
- c. Explain error back propagation training algorithm with the help of a flowchart. 10
- d. Explain genetic algorithm with the help of an example. 10
3. a. Prove the following identities: 10
- (i) For unipolar continuous activation function  $f^*(net) = o(1-o)$ .
- (ii) For bipolar continuous activation function  $f^*(net) = o(1-o^2) / 2$ .
4. a. Explain perceptron learning with the help of an example. 10
- b. Explain ANFIS architecture with neat diagram. 10
- c. Explain Mamdani type of fuzzy inference systems in detail. 10
5. a. Write note on any two of the following: 20
- i. Winner take all learning rule.
- ii. Learning vector quantization.
- iii. Character recognition using neural network.