

shilpa-2nd half-13-23

Con. 1374-13.

BS-5755

(2½ Hours)

[Total Marks : 60

- N. B. :** (1) All questions are **compulsory**.
 (2) **Figures to the right** indicate **full marks**.
 (3) Use of calculators and statistical tables is **allowed**.

1. Attempt any **three** :-

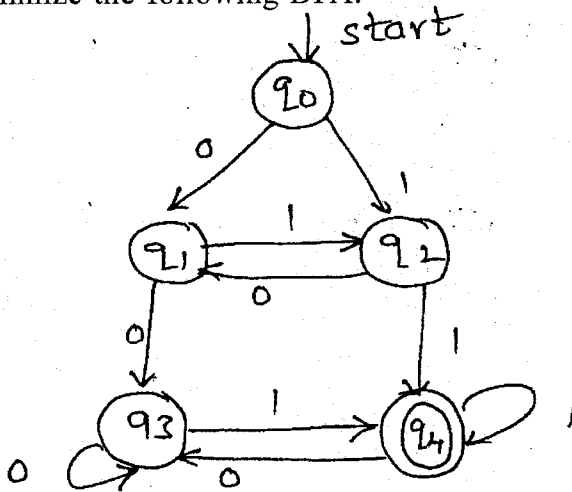
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- (a) Mention the features of High Level Language and explain them in brief.
 (b) Consider the statement :-
 $Cost = (2 * rate) + (start - finish - 100) * 2$ How compiler will process the statement ?
 (c) List and explain different types of statements used in High Level Language.
 (d) Define the following terms :-
 (i) Compiler (ii) Translator
 (iii) Tree [Parse] (iv) Alphabet.
 (e) Explain call by value and call by reference with suitable example.
 (f) Discuss cross compiler and boot strapping.

2. Attempt any **three** :-

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- (a) Write short note on compiler writing tools.
 (b) Minimize the following DFA.



- (c) Explain LEX with respect to following points :
 - Format of LEX
 - Dummy example.
 (d) Write different types of symbols used in Regular Expression. Develop Regular Expression for accepting strings over {a, b, c} starting with aa and ending with bb.
 (e) Explain with suitable example how NFA is different than DFA.
 (f) Convert following Regular Expression into FA.
 (i) $01^* + 001^*$ (ii) $1^* + 0^*$

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3. Attempt any three :-

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(a) Develop Predictive Parsing Table for the following grammar.

$$\begin{aligned} E &\rightarrow TA \\ A &\rightarrow +TA / \epsilon \\ T &\rightarrow FB \\ B &\rightarrow *FB / \epsilon \\ F &\rightarrow (E) / id \end{aligned}$$

(b) Consider the following Grammar [Use Bottom-up]

$$\begin{aligned} E &\rightarrow E + E \\ E &\rightarrow E * E \\ E &\rightarrow (E) \\ E &\rightarrow id \end{aligned}$$
Derive the string $id+id*id$ and Draw Parse Tree.

(c) Compute First and Follow for following :-

$$\begin{aligned} \text{(i)} \quad S &\rightarrow A + B / *A \\ A &\rightarrow \# B / B \# \\ B &\rightarrow *A / \# \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad S &\rightarrow (T) / a / \wedge \\ T &\rightarrow T, S / S \end{aligned}$$
(d) Derive the string $ibtibtaea$ using following production Rules :-
$$\begin{aligned} S &\rightarrow i Ct S \\ S &\rightarrow i Ct SeS / a \\ C &\rightarrow b \end{aligned}$$

(e) Explain drawbacks of Top down Parsing with Backtracking.

(f) Write a short note on Recursive Descent Parsing.

4. Attempt any three :-

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(a) Compute LR(0) item sets for following :-

$$\begin{aligned} S &\rightarrow CC \\ C &\rightarrow cC / d \end{aligned}$$

(b) Explain the construction of LR parsers and why they are popular ?

(c) Write an algorithm for constructing LALR table.

(d) State the Rules for constructing LR(0) parsing table.

(e) Construct LR(0) Parsing table from the following actions.

0
0b 1
0B 4
0E 3
0E 3 + 6
0E 3 + 6 b 2
0E 3 + 6 B 8
0E 3
Accept

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(f) Consider the following production Rules and Parsing table :-

- (i) $S' \rightarrow S$
- (ii) $S \rightarrow a AB e$
- (iii) $A \rightarrow Abc$
- (iv) $A \rightarrow b$
- (v) $B \rightarrow d$

State	Action						goto		
	a	b	c	d	e	\$	s	A	B
0	S2						1		
1						Acc			
2		S4						3	
3		S6		S7					5
4		r4		r4					
5					S8				
6			S9						
7					r5				
8						r2			
9		r3		r3					

Parse the string *abbcbcd* \$

5. Attempt any **three** :-

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- (a) Draw DFA for $0^* 10$ RE.
- (b) Explain Array and discuss its row major form.
- (c) Discuss different types of data elements.
- (d) Write a note on LL(1).
- (e) Explain in brief how Reduction is different than derivation.
- (f) Define the term Grammar and state its elements.

- N.B.:-** (1) All questions are compulsory
 (2) Figures to the right indicate full marks.
 (3) Use of calculators and statistical tables is allowed.

- Q.1. Attempt any Three :-
- What is twiddle factor? Find the IDFT of sequence with DFT [8, -2, 0, -2] 4
 - Explain by giving example, how digital system can be described from pole-zero plots of the system? 4
 - For each impulse response listed below, determine the corresponding system is (i) causal (ii) stable 4
 - $h(n) = \sin(n\pi/2)$
 - $h(n) = 2^n u(-n)$
 - Determine direct form-II realization for following LTI system 4
 $y(n) = x(n) - x(n-1) + 2x(n-2) - 3x(n-4)$
 - What is pole-zero plot? Why it is necessary? Draw pole-zero diagram for a system having transfer function $H(z) = 1 + z^{-4}$ 4
 - Determine the impulse response and frequency response of the filter define by $y(n) = x(n) + by(n-1)$ 4
- Q.2. Attempt any Three :-
- Consider second order LTI system. Discuss cascade form realization of FIR systems 4
 - How good windows can be designed? Explain Kaiser window. Why it is an optimum window? 4
 - Explain the steps for designing a digital filter. 4
 - Explain the characteristics of FIR filters with linear phase. 4
 - Realize the system given by difference equation, $y(n) = -0.1y(n-1) + 0.3y(n-2) + 0.5x(n) - 0.14x(n-2)$ Use parallel form, Is this system stable? Determine its impulse response. 4
 - Discuss issue with windowing. 4
- Q.3. Attempt any Three :-
- Explain properties of IIR filters. 4
 - Explain impulse invariant transformation technique for digitizing an analog filter. 4
 - Explain Approximation of derivatives method used to design IIR filters. 4
 - Discuss features of low pass Butterworth filter. 4
 - Explain Chebyshev type I filter. 4
 - Compare between impulse invariant and bilinear transformation for Elliptic filters. 4
- Q.4. Attempt any Three :-
- Using block diagram explain analog to digital conversion process. 4
 - What is the purpose of Bluestein's algorithm? How it is achieved? State the 4

- major significance of Bluestein algorithm.
- c. Discuss any one standard method used in digital filter for eliminating the low order bits. 4
 - d. Explain construction of an eight-point DFT from two four-point DFTs. 4
 - e. Explain recursive implementation of sliding spectrum. 4
 - f. State properties of Butterworth low pass filter. 4
- Q.5. Attempt any Three :-
- a. Draw and explain block diagram of a general-purpose linear phase FIR design procedure. 4
 - b. Why Radix-2 FFT is better algorithm for calculating DFT of a discrete signal as compared to direct computation of DFT using formula. 4
 - c. Compare between fixed-point arithmetic and floating-point arithmetic. Find 2's compliment of 0.11001 4
 - d. How rounding of a number of b bits is accomplished? 4
 - e. How response of a system can be obtained using DFT? 4
 - f. How response of a long sequence can be obtained using Overlap Save method? 4
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M.SC. – I (SEMESTER – I) (OCTOBER - 2013): PAPER – III

AGJ 2nd half(c)-con code 357

Con. 1645-13.

(2½ Hours)

BS-5852
[Total Marks : 60

- N. B.: (1) All questions are compulsory.
(2) Figures to the right indicate full marks.
(3) Use of calculators and statistical tables is allowed.
(4) Symbols have their usual meaning unless stated otherwise.

Q.1 Attempt any three:

- (a) Explain the multiplexing technique used by cellular systems for mobile communications? Write the advantages and disadvantages of small cells used in cellular system. (4)
- (b) Differentiate Demand assigned multiple access scheme with respect to explicit and implicit reservation. (4)
- (c) Explain the radiation pattern of directed antenna and sectorized antenna. (4)
- (d) Explain why communication will be difficult using narrowband signals and how to overcome this problem. (4)
- (e) Minimum shift keying method is used in most of the wireless systems. Explain with the help of diagram how to avoid phase shift in the resulting MSK signal. (4)
- (f) Explain the scenario of mobile terminated call and mobile originated call with the help of diagram. (4)

Q.2) Attempt any three:

- (a) Explain the different types of handover in GSM system with the help of a diagram. (4)
- (b) Describe packet reservation multiple access scheme along with the diagram. (4)
- (c) Explain four different types of orbits in a satellite system and their advantages and disadvantages. (4)

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(d) Explain with the help of diagram GSM TDMA frame,

(4)

(e) What are the different components of DECT system architecture reference model. Draw the diagram for the same.

(4)

(f) What are different inter frame spacing in medium access control layer.

(4)

Elaborate scenario of basic DFWMAC-DCF with several competing senders drawing the diagram.

Q.3) Attempt any three:

a) Write short note on: (i) DAB (ii) DVB

(4)

(b) What are infrastructure and adhoc networks. Explain them with architectural diagram of IEEE 802.11.

(4)

(c) How synchronization is achieved using a beacon frame in infrastructure and adhoc mode.

(4)

(d) How is localization, location update and roaming are done in GSM and reflected in the databases? What are typical roaming scenarios.

(4)

(e) What are the different components of GPRS architecture reference model. Draw the diagram for the same.

(4)

(f) Discuss HiperLAN1, HiperLAN2, HiperLAN3 with respect to application, topology and type of antenna used.

(4)

Q.4 Attempt any three:

(a) What are infra red and radio transmission. Write their advantages and disadvantages.

(4)

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- (b) Explain broadcast transmission and different broadcast patterns with the help of diagram. (4)
- (c) Discuss Agent advertisement and discovery in mobile network layer. (4)
- (d) Explain the functionality of mobile TCP and snooping TCP. (4)
- (e) Explain TCP slow start algorithm. (4)
- (f) Discuss frame structure of ACK, RTS and CTS packet. (4)

Q. 5 Attempt any three:

- (a) Differentiate between Tunneling and Reverse tunneling (4)
 - (b) Explain Direct Sequence Spread Spectrum (DSSS), (Dynamic Host Configuration Protocol) DHCP. (4)
 - (c) Write note on TETRA architecture with respect to frame structure. (4)
 - (d) Name reasons for the development of wireless ATM. What is one of the main difference to internet technologies from this point of view? Why did WATM not succeeded as stand alone technology, what parts of WATM succeeded. (4)
 - (e) What is wireless markup language (WML)? State various features of WML. (4)
 - (f) Problems with HTTP and HTML have led to different proprietary and standardized solutions. Discuss any three approaches that supports wireless access. (4)
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- N.B.** (1) All questions are compulsory.
 (2) **Figures** to the right indicate full marks.
 (3) Use of simple calculator is allowed.

1. Attempt any *three* of the following:
 - (a) Discuss what is meant by the following terms when describing the characteristics of the data in a data warehouse: (i) subject oriented, (ii) integrated, (iii) time-variant, (iv) non-updatable. 5.
 - (b) Write a short note on technical architecture plan of a data warehouse. 5.
 - (c) Explain information package by considering suitable example. 5.
 - (d) Explain discretization process to handle noisy data in preprocessing of data in data mining. Discretize {1, 4, 12, 16, 16, 18, 23, 26, 28} using equi-depth binning method by taking bin depth = 3. 5.

2. Attempt any *three* of the following:
 - (a) Explain with example denormalization process for dimension and fact tables. 5.
 - (b) Consider any single source fact about transactions happening in a grocery shop. Form a fact table and hence identify at least two dimensions and create star schema. 5.
 - (c) Define Data mining. Explain the need of data mining techniques. Can you apply these techniques on databases with less number of tuples? Explain. 5.
 - (d) Explain standardization process on data after acquiring it from source system. Give suitable example. 5.

3. Attempt any *three* of the following:
 - (a) Define clustering problem. Explain by giving suitable example why clustering techniques are unsupervised learning. 5.
 - (b) Construct 1-R rule for the following training set for classifying into classes A and B: 5.

A ₁	A ₂	A ₃	A ₄	A ₅	Class
3	7	2	9	1	A
5	8	2	9	2	B
4	1	1	1	3	B
6	8	2	1	4	B

Where A₁ to A₅ are the attributes. Find in which class following data lies using 1-R rule:

A ₁	A ₂	A ₃	A ₄	A ₅	Class
3	6	1	8	1	?
5	3	2	4	1	?

- (c) Represent the following distance matrix by dendrogram after clustering using average linkage criteria of agglomerative method. 5.

	M ₁	M ₂	M ₃	M ₄	M ₅
M ₁	0	1	2	2	3
M ₂	1	0	2	4	3
M ₃	2	2	0	1	5
M ₄	2	4	1	0	3
M ₅	3	3	5	3	0

- (d) Following table contains four types of medicines. Each medicine has two attributes x and y. 5.

Medicine	x	y
A	2	2
B	3	2
C	5	4
D	6	5

- (i) Consider each medicine as one point with attribute (x, y) and plot in a scatter diagram.
 (ii) Take initially medicines A and B as two centroids and hence form two clusters using 2-medoid method. Use Euclidean distance formula.

4. Attempt any *three* of the following:

- (a) Define an association rule. Can you use it for prediction? Justify your answer. 5.
 Is there a difference between classification rule and association rule? Explain.
 (b) Define support and confidence to measure the strength of an association rule. 5.
 For the following information, calculate support and confidence for the association rules (i) Apple → Durian, (ii) Cherry → Apple (iii) Banana, Cherry → Durian

Customers	Fruits
1	Apple, Banana, Cherry
2	Apple, Cherry, Durian
3	Banana, Cherry, Durian
4	Apple, Durian, Elderberry
5	Durian, Cherry, Elderberry

- (c) Using CART algorithm of classification, find the attribute that can be taken at the root of a decision tree for the following weather report: 5.

Outlook	Temperature		Humidity		Windy		Play						
	Yes	No	Yes	No	Yes	No	Yes	No					
Sunny or Rainy	5	5	Hot Or cool	5	3	High	3	4	False	6	2	9	5
Overcast	4	0	Mild	4	2	Normal	6	1	True	3	3		

- (d) Write a short note on text mining. 5.
