Vivekanand Education Society's Institute of Technology

An Autonomous Institute Affiliated to University of Mumbai

End Semester Examination
Oct/Nov 2023

Max marks: 60
Branch: Computer Engineering
Name of the Course: Theoretical Computer Science
Course code: CSC501

Duration: 2 hours
Semester: V
QP Code: CSC501_012023-24

N.B. (1) Attempt any three out of the five questions.
(2) Figures to the right indicate full marks.
(3) Assume suitable data if necessary.

Q.1 (a) Differentiate between recursive and recursive enumerable languages. 5

(b) Write the regular expression for language:
$L(R) = \{ w \mid w \in \{0, 1\}^* \}$ with at the most three zeros. 5

(c) Exemplify Chomsky Heirarchy. 5

(d) Check and justify whether PCP with two lists x = (b, a, aba, bb) and y = (ba, ba, ab, b) have a solution? 5

Q.2 (a) Design moore m/c for following:-
If input ends in 101 then output should be A, if input ends in 110 output should be B, otherwise output should be C and convert it into mealy m/c 10

(b) Consider the following grammar 10
S→ i C t S | i C t S e S | a
C→ b
For the string 'ibtaeibta' find the following:
(i) Leftmost derivation
(ii) Rightmost derivation
(iii) Parse tree
(iv) Check if above grammar is ambiguous.

Q.3 (a) Construct PDA to check $\{\mathbf{wcwR} \mid w \{a,b\}^*\}$ where **wR** is reverse of w & c is a constant. 10

(b) State and explain pumping Lemma for Context Free Languages. Find out whether the language $L = \{x^n y^n z^n \mid n \geq 1\}$ is context free or not. 10

Q.4 (a) Construct Turing Machine to check wellformedness of parenthesis. 10

(b) Convert following CFG to CNF 10

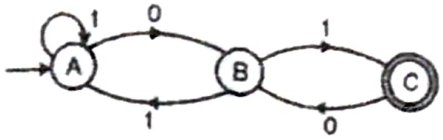
S-> 0A0 | 1B1 | BB

A->C

B->S | A

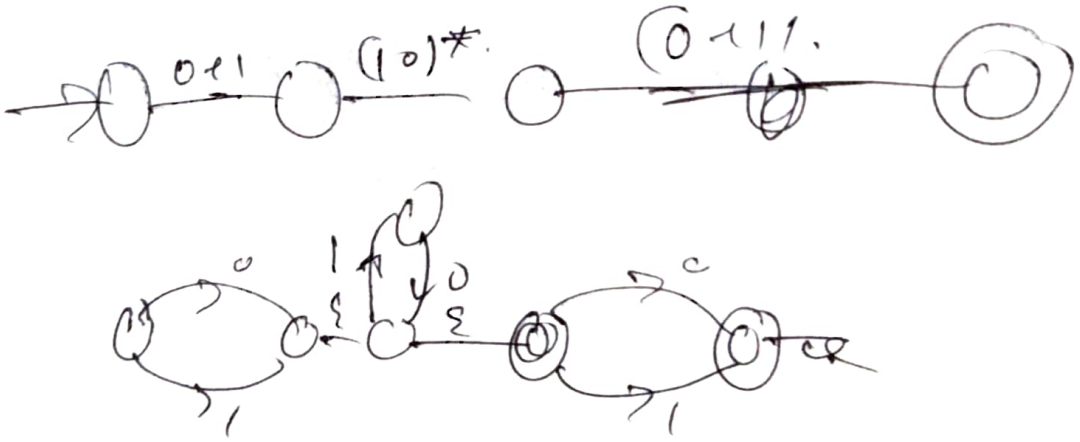
C->S | ϵ

Q.5 (a) Obtain a regular expression for the FA shown below using Arden's theorem: 10



(b) Convert (0+1)(10)*(0+1) into NFA with ε- moves and obtain DFA. 10

X------X------X-----X



G.P.code - CSC501_012023-24

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End Semester Examination
Oct/Nov 2023

Max marks: 60 | Duration: 2 hours
Branch: Computer Engineering | Semester: V
Name of the Course: Software Engineering | QP Code: CSC502_032023-24
Course code: CSC502

N.B. (1) Attempt any three out of the five questions.
(2) Figures to the right indicate full marks.
(3) Assume suitable data if necessary.

Q.1 (a) Compare and contrast the Waterfall model and the Agile model in terms of their key principles and when they are most suitable for a project. 10

(b) How does Capability Maturity Model give benefit to the Organization? Explain various CMM levels along with its associated KPA's. 10

Q.2 (a) Explain various tools and techniques used for requirement gathering. 10

(b) Design state transition diagram for Elevator Control System. 10

Q.3 (a) Calculate FP value for a project with the following characteristics. Use the Function Point Analysis method. Also, assume 20 hours of effort per function point and calculate the estimated efforts required for the same project. 10

- 5 External Inputs (EI)
- 3 External Outputs (EO)
- 4 External Inquiries (EQ)
- 2 External Interface Files (EIF)
- 1 External Output Interface File (EOIF)

Average Compl. Factor

(b) What are the differences between a Gantt chart and a PERT chart, and when would you use each for scheduling? 10

Q.4 (a) Illustrate the SCM process. 10

(b) Explain Coupling and Cohesion. Explain the types of Cohesion with example. 10

Q.5 (a) What are primary goals of software testing? Discuss the importance of integration testing in identifying and addressing issues related to the interaction between software components. 10

(b) What are the key goals of software maintenance. Explain the different types of software maintenance, including corrective, adaptive, perfective, and preventive maintenance. 10

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End Semester Examination
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Max marks: 60 | Duration: 2 hours
Branch: Computer Engineering | Semester: V
Name of the Course: Computer Network | QP Code:CSC503_022023-24
Course code: CSC503

N.B. (1) Attempt any three out of the five questions.
(2) Figures to the right indicate full marks.
(3) Justify Answers with Neat sketch wherever Necessary, Assume suitable data if necessary.

Q.1	(a)	What is ALOHA? Explain with a diagram the two different types of ALOHA also comment on throughput for the same.	10
	(b)	Define Framing. List different methods in Framing and explain any two framing method in details	10
Q.2	(a)	List different types of classes in classful addressing and specify Network Id and Host Id of Each Class A company is granted the site address 201.70.64.0 (class C). The company needs six subnets. Design the subnets.	15
	(b)	Draw the OSI Layered Architecture and briefly explain each Layer.	5
Q.3	(a)	Demonstrate three way handshaking in TCP connection establishment with suitable diagram.	10
	(b)	Explain detailed functions of ARP, RARP, ICMP and IGMP.	10
Q.4	(a)	Define Network topology and discuss various network topologies along with advantages and disadvantages of each.	10
	(b)	What is TCP Congestion? Explain TCP congestion control Mechanism.	10
Q.5	(a)	Explain UDP Protocol?	5
	(b)	Explain the need for DNS (Domain Name System) and describe the protocol functioning.	5
	(c)	A bit stream 10011001 11100010 00100100 10000100 is transmitted to the receiver. Apply hecksum error detection scheme and check whether data will be accepted at receiver	5
	(d)	Explain TCP timers	5

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End Semester Examination
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Max marks: 60	Duration: 2 hours
Branch: Computer Engineering	Semester: V
Name of the Course: Data Warehousing & Mining	QP Code: CSC504_032023-24
Course code: CSC504	

N.B. (1) Attempt any three out of the five questions.
(2) Figures to the right indicate full marks.
(3) Assume suitable data if necessary.

Q.1 (a) Differentiate between star schema and snowflake schema. Design star schema for a company sales with three dimensions such as Location, Item and Time. 10

(b) Explain major steps in the ETL process. 10

Q.2 (a) Describe the steps involved in Data Mining when viewed as a process of Knowledge Discovery. 5

(b) Suppose that the data for analysis includes the attribute salary. We have the following values for salary (in thousands of dollars), given in increasing order: 10
30, 36, 47, 50, 52, 52, 56, 60, 63, 70, 70, 110.

(i) What are the mean, median, mode and midrange of the data?
(ii) Find the first quartile (Q1) and the third quartile (Q3) of the data.
(iii) Show the boxplot of the data.

(c) Suppose that the data for analysis includes the attribute age. The age values for the data tuples are given in ascending order as follows: 5
13, 15, 16, 16, 19, 20, 23, 29, 33, 41, 44, 53, 62, 69, 72
Use min-max normalization to transform the value 45 for age in the range [0.0,1.0]

Q.3 (a) Define Accuracy of a classifier. Explain the various methods for evaluating the accuracy of a classifier. 5

(b) Differentiate between Agglomerative and Divisive clustering methods. 5

(c) Using the following training dataset, create a classification model using a decision tree and draw the final tree. 10

Tid	Income	Age	Own House
1	Very High	Young	Yes
2	High	Medium	Yes
3	Low	Young	Rented
4	High	Medium	Yes
5	Very High	Medium	Yes
6	Medium	Young	Yes
7	High	Old	Yes
8	Medium	Medium	Rented
9	Low	Medium	Rented
10	Low	Old	Rented
11	High	Young	Yes
12	Medium	Old	Rented

Q.4 (a) Explain K-means clustering algorithm. Apply the K-means algorithm for the following dataset with 3 clusters. 10
Dataset = {2, 3, 6, 8, 9, 12, 15, 18, 22}

(b) Consider the transaction database given below. Use Apriori algorithm with minimum support count = 2 and minimum confidence = 60%. Find all frequent itemsets and strong association rules. 10

TID	Items
100	1, 3, 4
200	2, 3, 5
300	1, 2, 3, 5
400	2, 5
500	1, 3, 5

Q.5 (a) What is web mining? Explain web structure mining and web usage mining in detail. 10

(b) Explain multilevel association rule mining in detail with the help of an example. 5

(c) Explain different OLAP operations with examples. 5

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End Semester Examination
Oct/Nov 2023

Max marks: 60
Branch: Computer Engineering
Name of the Course: Internet Programming
Course code: CSDLO5012

Duration: 2 hours
Semester: V
QP Code: CSDLO5012_022023-24

N.B. (1) Attempt any three out of the five questions.
(2) Figures to the right indicate full marks.
(3) Assume suitable data if necessary

Q.1 (a) Write a code to change the background color of the DIV element after every 10 seconds. Write both the HTML and JavaScript code for this dynamic effect. 5

(b) Describe the new form input types introduced in HTML5, How do these input types improve user experience and data validation in web forms? 5

(c) What is a web browser? Explain working of web browsers in detail. 5

(d) What is the use of the XMLHttpRequest object? What are the steps to send an asynchronous request to a server using AJAX? 5

Q.2 (a) Create an HTML program that takes user inputs and uses JavaScript for validation. If the validation is successful, create a JavaScript function that displays an alert with a personalized greeting, including the user's name and age. 10

The program should include the following elements:

- A text input field where the user can enter their name.
- A numeric input field where the user can enter their age.
- A submit button.

Implement JavaScript code to perform the following validations:

- Check if the name input is not empty.
- Check if the age input is a number and the user is at least 18 years old.
- Display appropriate error messages if the validation fails.
- Prevent the form from being submitted if validation fails.

(b) Analyze and demonstrate the distinctions between the GET and POST methods used in PHP for data transfer in web applications. Support your explanations with practical examples that showcase the implications of choosing one method over the other in different scenarios. 10

Q.3	(a)	Explain the advantages of JSX in React and also create a simple React program that prints "Hello, World!" using JSX.	10
	(b)	Explain the CSS animation property with it's sub-properties. Provide example of how you can create animations for elements on a web page using CSS.	10
Q.4	(a)	What is REST API? What are the principles of REST API.	10
	(b)	Explain the key features and components of the Django framework. Also explain steps in implementing CRUD operations using suitable examples.	10
Q.5	(a)	Explain what JSON is and why it is widely used in web development and data interchange. Provide a brief comparison between JSON and XML.	5
	(b)	What are the characteristics of RIA?	5
	(c)	What is the DNS lookup process in Internet Communication?	5
	(d)	Explain the key differences between React and standard JavaScript for rendering user interfaces.	5

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