Exam. Seat No [   ]

Total No. of Questions – 5   Total No. of Printed Pages – 2

Anekant Education Society's
Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati
(Autonomous)
Affiliated to Savitribai Phule Pune University, Pune
T.Y. B.Sc. (Computer Science) (Semester-V)
UCSCO -352: Theoretical Computer Science
(2022 Pattern)

Time : Two Hours   (No of Credits -03)   Total Marks : 60

N.B. :- (i) All questions are compulsory.
        (ii) Figures to the right indicate full marks.
        (iii) Neat diagrams must be drawn wherever necessary.

Q1. All questions are compulsory.   [12 M]

1. Find RE for language L such that it consists of the strings ending with 'bb' over $\Sigma=\{a, b\}$ 1
2. State True or False. Regular sets are closed under concatenation.   1
3. What is Nullable symbol?   1
4. Define left linear grammar.   1
5. Write formal definition of DFA.   2
6. Consider the following grammar,   2
   G= ({S, A}, {0, 1}, {S→ 0AS | 0 , A→ S1A | SS | 10}, S)
   Construct Parse Tree for given string "001100".
7. Eliminate useless symbols from the following grammar.   2
   S → AB | CA, A → a, B → BC | AB, C → aB | b, D → SS | d
8. Define Ambiguous grammar.   2

Q.2 Attempt any <u>three</u> of the following   [3 X 4 M = 12]

i. Convert following NFA to equivalent DFA.

   M= ({q0, q1, q2, q3}, {0, 1}, δ, {q0}, {q3})

δ	0	1
q0	{q0, q1}	q0
q1	q2	q1
q2	q3	q4
q3	Φ	q2

ii. Construct a FA for the following regular grammar-

   S → aA | bB

   A → aS | a

   B → bS | b

P.T.O.

iii. Show that the language $L=\{a^n b^{2n} \mid n>=0\}$ is not regular.

iv. Construct a PDA equivalent to the following CFG.

$S \rightarrow 0BB$,

$B \rightarrow 0S \mid 1S \mid 0$

Q.3 Attempt any <u>two</u> of the following.

[2 X 6 M = 12]

i. Define Moore machine. Design a Moore Machine that gives an output 'A' if the input string ends in 'bab' otherwise 'B.

ii. Construct DFA for language L which consists strings starts with 'ab' and ends with 'bc' over the $\Sigma = \{a, b, c\}$.

iii. Convert the following grammar into GNF.

$S \rightarrow AB \mid B$,

$A \rightarrow BS$,

$B \rightarrow A1 \mid 1$

Q.4 Attempt any <u>two</u> of the following

[2 X 6 M = 12]

i. Construct DFA for language L which consists strings starts with '0' having '012' as a substring and ends with '12' over $\Sigma = \{0, 1, 2\}$.

ii. Construct TM for language $L = \{a^n b^m c^{m+n} \mid m, n > 0\}$

iii. Construct PDA for language $Ł = \{a^n bc^n \mid n \geq 1\}$

Q.5 Attempt any <u>one</u> of the following

[1 X 12 M = 12]

a). Solve the following.

i. Define TM.

ii. Differentiate between recursive & Recursively Enumerable language [3M]

iii. Construct TM for language $L = \{ambn \mid n \geq m, m \geq 1\}$ [4M]

[5M]

b). Solve the following.

i. Construct the leftmost and rightmost derivation for the following grammar.

[3M]

$G = (\{S, A, B\}, \{0, 1\}, \{S \rightarrow A1B \mid 0, A \rightarrow 0A \mid \epsilon, B \rightarrow 0B \mid 1B \mid \epsilon\}, S)$ for the string "00101".

ii. Define Chomsky Hierarchy. [4M]

iii. Convert the following CFG into CNF. [5M]

$S \rightarrow ABA$

$A \rightarrow aA \mid \epsilon$

$B \rightarrow bB \mid \epsilon$

Total No. of Questions: 5

Instructions to the candidates:
1) All questions are compulsory.
2) Neat labelled diagrams must be drawn wherever necessary.
3) Figures to the right indicate full marks.

Q. 1 All questions are compulsory.

1. List compound data types in PHP? [1]

2. What does HTTP stands for? [1]
3. List any two features of PHP. [1]

4. Find output of following code

   ```php
   <?php
   $a= "1E3 points of light" + 1;
   var_dump($a);
   ?>
   ```
   [1]

5. What is PDO? [1]

6. How to create object in PHP ? Give example. [2]

7. What is associative array? Give one example. [2]

8. What is variable interpolation? Whether it is possible with single quoted string. [2]

Q. 2 Answer any three questions.

1. Explain types of strings in PHP. [4]
2. What is difference between equality(= =) and identity operators(= = =) in PHP? [4]
3. Discuss variable parameters in PHP with an example. [4]
4. What is Inheritance? Discuss with proper example. [4]

Q. 3 Answer any two questions.

1. Explain any two control statements in PHP with syntax and example. [6]
2. Explain serialization with the help of an example. [6]

1

3. Explain method overriding in OOP with suitable example. [6]

Q. 4 Answer <u>any two</u> questions.

1. Write a PHP to accept an array from user. Also accept a value to search from the user. Provide options: (a) Search the value (b) Search the value and display the key(if found) (c) Display all the keys if value is found many times. [6]

2. Write a PHP script to create an interface Shape and classes Circle, Rectangle and Square and display area of the selected Shape. (Use the concept of interface) Display menu (a) Triangle (b) Square (c) Circle [6]

3. Consider a table Hospital(hospno, hospname, city). Write a PHP program to accept city name and display the hospitals located in the user specified city name. (using PDO). [6]

Q. 5 Answer <u>any one</u> question.

1. A hotel is visited by many customers in a city. The hotel manager wants to store the information of the orders given by the customers. The manager of the hotel wants to focus on the top ten menu dishes ordered by the customer for a particular month. Design a solution (program/programs) for the above mentioned problem in PHP. [12]

2. A bookshop is visited by many customers in a city. The bookshop owner wants to store the information of the sales. The owner of the bookshop wants to find the top ten customers for a particular month. Design a solution (program/programs) for the above mentioned problem in PHP. [12]

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Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati
(Empowered Autonomous)
Affiliated to Savitribai Phule Pune University, Pune
T.Y. B.Sc. (Computer Science) (Semester-VI) Examination
UCSCO-355: Advanced Java Programming
(Paper - V) (2022 Pattern)
(Credit – 03)

Time: 2.00 Hour

Total Marks: 60

N.B. :- (i) All questions are compulsory.
    (ii) Figures to the right indicate full marks.
    (iii) Neat diagrams must be drawn wherever necessary.

Q.1 Attempt the following (Short answer questions). (12)
i) What are the types of JDBC Architecture? (01)
ii) Listout the classes in Collection. (01)
iii) What is DNS? (01)
iv) Write any two differences between Set and List (01)
v) What are the two ways two create Thread? (02)
vi) What is the purpose of BorderLayout in AWT? (02)
vii) What are Prepared statements? (02)
viii) Explain InetAddress Class and list out methods. (02)

Q.2 Write short notes on any three of the following. (12)
i) What is Iterator? Explain with methods.
ii) Explain Servlet lifecycle with diagram and methods.
iii) How to use controls - JMenuBar, JMenu, and JMenuItem? Provide an example.
iv) Explain difference between execute(), executeQuery(), and executeUpdate() methods.

Q.3 Attempt any two of the following. (12)
i) Explain the steps involved in creating a JDBC program to fetch and display data from a database. Provide an example.
ii) Compare and contrast the three types of JSP scripting elements: declarations, scriptlets, and expressions, with syntax.
iii) Write a note on Event, event sources and event listeners.

Q.4 Attempt any two of the following. (12)
i) Explain how JSP implicit objects are used. Provide examples of their usage.
ii) Write a servlet program to display student data from database, accept data from HTML form.
iii) Write a client-server program which displays the server machine's date and time on the client machine.

Q.5 Attempt any one of the following (Long answer questions). (12)
i) What is a layout manager and what are different types of layout available in Java Swing?
ii) Explain the following in terms of Thread
    a) Draw Thread Life Cycle. Explain each phase.
    b) Explain Difference between Process based multitasking and Thread based multitasking

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Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati
(Autonomous)
Affiliated to Savitribai Phule Pune University
T.Y. B.Sc. (Computer Science) Sem. – V (Paper – VI)
UCSCO -356: Object Oriented Software Engineering
(2022 Pattern)

Time : 2.00 Hours   (No. of Credits -3)   Total Marks : 60

Instructions to the candidates:

1) Neat diagrams must be drawn wherever necessary.

2) Figures to the right indicate full marks.

3) All questions carry equal marks.

Q1) Attempt all of the following: [12]

a) What is Inheritance?   [1]

b) What is test script?   [1]

c) Define link attributes.   [1]

d) Define the object "Customer" with possible attributes and operations with visibility.   [1]

e) Which Symbol is used to draw component?   [2]

f) "A class is object types." State True /False. Justify.   [2]

g) What is meant by collaboration ?   [2]

h) What is purpose of use case view?   [2]

Q2) Attempt any three of the following: [3X4m =12]

a) What is Generalization? State the significance of Generalization.

b) Differentiate between Link and Association with suitable examples.

c) Discuss the components of Activity Diagram.

d) Give benefits of iterative development.

Q3) Attempt any two of the following: [2×6M=12]

a) Write a note on Rambaugh method

b) Draw a class diagram of Student Admission system for this applying relationship association with multiplicity. Use generalization and aggregation.

c) What is use of component diagram? Explain it with suitable example.

Q4) Attempt any two of the following: [2×6M=12]

a) Compare between Alpha and Beta testing.

b) Draw class diagram for college library system consisting of at least three classes. Define appropriate relationships, association with multiplicity.

c) Draw class diagram for Hospital Management System consisting of at least three classes. Define appropriate relationships, association with multiplicity

Q5) Attempt the following: [12]

a) The Government announces a scheme for LPG subsidy for Indian citizens, where applications are invited online. Many citizens have to apply and provide complete details with various documents such as adhar card, income certificate and bank details. Applicants can first register on the site then government authority's gives one time password on mobile to verify the applicants. After successful registration, applicants can add, edit, delete and upload documents as and required. After final submission government authority's e-verify the documents and allowed or disallowed the application. Consider above case and draw the following diagrams.

i) Use case diagram.

ii) Sequence diagram. [4]

b) What is Integration Testing? Explain role of stub. [4]

OR [4]

b) For an automated vending machine for Coffee/Tea, a customer deposits a coin, select Coffee/Tea and get proper quantity of it, from machine. Draw a state transition diagram For the same. [4]

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Affiliated to Savitribai Phule Pune University, Pune

T.Y. B.Sc. (Computer Science) (Semester-VI)

UCSCO361 – Advanced Operating System

(2022 Pattern)

Time : Two Hours   (No. of Credits -03)   Total Marks : 60

N.B. :- (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

(iii) Neat diagrams must be drawn wherever necessary.

Q1. (A) All questions are compulsory.   [1 Mark Each]

1. What is Dynamic Linking?

2. What is Overlapped Swapping?

3. What is Link?

4. What is Seek Time?

(B) All questions are compulsory.   [2 Mark Each]

1. List Various Operations on File.

2. What is Segmented Paging?

3. What is the function of Device Management Module?

4. What is Swapping?

Q2. Answer any three questions.   [4 Marks Each]

1. Write difference between MFT and MVT

2. What is Synchronous and Asynchronous Data Transfer?

3. Describe Tree Structure Directory in detail.

4. Explain the Architecture of Distributed Operating System

Q3. Answer any two questions.   [6 Marks Each]

1. Write a note on Applications of I/O Interface.

2. Explain Contiguous Allocation in detail.

3. Explain the types of Real Time Operating System

P.T.O.

Q4. Answer any <u>two</u> questions.

[6 Marks Each]   Tot

1. Explain Disk Based and Tape Based System.
2. Solve the following example and check whether the Belady's Anomaly is present or not
   Reference string: 1,2,3,4,1,2,5,1,2,3,4,5
3. Solve the following example with FIFO and SSTF disk scheduling algorithm
   20, 150, 90, 70, 30, 60.Current Head Position is 50
4. How Free Space Management is done in File System?

Q5. Answer any <u>one</u> question.

[12 Marks Each]

1. How the Transparency maintained in Distributed Operating System and explain various types of Transparencies linked with DOS.
2. Write the comparison between Windows and Linux Operating System

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T.Y. B.Sc. (Computer Science) (Semester-VI)

UCSCO -362: Compiler Construction

(2022 Pattern)

Time : Two Hours   (No of Credits -03)   Total Marks : 60

N.B. :- (i) All questions are compulsory.
        (ii) Figures to the right indicate full marks.
        (iii) Neat diagrams must be drawn wherever necessary.

Q1. All questions are compulsory.   [12]

1. State True or False, "Bootstrapping is useful in implementation of cross compiler".   1

2. What are tokens?   1

3. What is LEX?   1

4. What does second 'L' stand for in LL (1) parser.   1

5. Discuss the structure of a YACC program.   2

6. What is conflict? Which type of conflict can occurs in LR parser?   2

7. List different methods of memory allocation.   2

8. What is translator? Give example.   2

Q2. Answer any three questions.   [3 X 4 M=12]

1. Write a LEX program to find out factorial of given number.

2. Differentiate between top-down and bottom-up parsing.

3. Construct RDP for the following grammar

   S→ aA | bB , A→ aA| b , B→ dB| b

4. Find FIRST and FOLLOW for the following grammar.

   S→ aABb | ∈

   A→ Amd | ∈

   B→ SAn | hn | ∈

P.T.O.

Q3. Answer any <u>two</u> questions.   [2 X 6 M =12]

1. Check following grammar is LL1 grammar or not?

   S→ S# | aA | b| cB | d

   A→ aA | b

   B→ cB | d

2. Find out following grammar is Operator precedence grammar or not.

   E→ E+E | E*E | (E) | id

3. What is code optimization? Explain code optimization techniques.

Q4. Answer any <u>two</u> questions.   [2 X 6 M = 12]

1. Find out Leading and Trailing symbols of the following grammar.

   E→ E+T | T

   T→ T*F | F

   F→ (E) | id

2. Find out LALR parse table for the following grammar.

   E→ AA

   A→ aA | d

3. What is DAG? Construct DAG for the expression b * (a + c) + (a + c) * d.

Q5. Answer any <u>one</u> question.   [1 X 12 M =12]

1. What is compiler? Explain phases with diagram. Also state the factors affecting pass structure of a compiler?

2. Show that the following grammar is SLR(1) but not LL(1)?

   S→ SA| A

   A→ a

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Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati
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T.Y. B.Sc. (Computer Science) (Semester-VI)
UCSCO363: Higher Layer of Computer Network & Network Security
(2022 Pattern) Paper-III

[No. of Credits – 03]

Time: 2 Hrs]   [Max marks: 60

Instructions to the candidates:
1) All questions are compulsory.
2) Neat labelled diagrams must be drawn wherever necessary.
3) Use of calculator and log table is allowed.
4) Figures to the right indicate full marks.

[1 Mark each]

Q. 1 A] Attempt the following.

1. Define Congestion.

2. Define Logical Address.

3. Define Socket address

4. Which file type can be transferred on FTP?

[2 Mark each]

B] Attempt the following:

1. Define Plain Text and Cipher Text

2. Name protocols of Network layer

3. For address 104.14.28.85 identify the type of network and find the Network address?

4. State the abbreviation of RTP, RTCP

[4 Mark each]

Q. 2 Attempt <u>any three</u> of the following.

1. What is routing? Explain all properties of Routing algorithms?

2. What are the duties / functions of Transport layer.

3. Explain FTP in detail

4. What would be the cipher text of the message "Invitation to attend the meeting at 11 am at New Delhi", Using Transposition Cipher, using key: "NCBTZQARX"

Q. 3 Attempt <u>any two</u> of the following. [6 Mark each]

1. Write a note on BOOTP & DHCP.

2. Explain steps of Video digitization process.

3. Draw and explain segment format of TCP.

Q. 4 Attempt any two of the following. [6 Marks each]

1. Find the error and write it, if any in the following IPv4 addresses
   a) 111.56.045.78   b) 221.34.7.7.67
   c) 75.45.301.14   d) 110010.23.14.67

2. Discuss the format and operation of HTTP messages.

3. Given two prime numbers P= 7 and Q =17. Find out N, E and D in an RSA encryption Process.

Q. 5 Write <u>any one</u> (A OR B) of the following. [12 Mark each]

A)

1. Explain adaptive and non-adaptive routing algorithms.

2. What are the key principles of security.

OR

B)

1. Describe the working of Transmission Control Protocol (TCP) along with its features.

2. Explain the architecture of the WWW, including client, server, URL, and cookies.

7-4-2025

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Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati

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T.Y. B.Sc. (Computer Science) (Sem-VI)

UCSCO364: Advanced Web Development

(2022 Pattern)

Time: 2 Hrs]   (No. of Credits: 03)   [Max marks: 60

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Neat labelled diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*

Q. 1 (A) Attempt each of the following.   **(1 Mark each)**

i) State the different values of readyState and its meaning in AJAX program.

ii) Which JavaScript event is called for SHIFT key?

iii) In which sections of HTML code, we can write JavaScript block?

iv) State the benefit of JSON.

(B) Attempt each of the following.   **(2 Marks each)**

i) State the different applications of AJAX.

ii) What is difference between prompt and confirm popup boxes in JavaScript?

iii) Write the syntax of json_decode.

iv) What is the difference between session and cookies?

Q. 2 Answer any three questions.   **(4 Marks each)**

i) What is sticky form? Explain with the help of a suitable example.

ii) Explain in detail about the features of CodeIgniter framework.

iii) Explain onmouseup() and onmousedown() events in JavaScript.

iv) Write a program in PHP using JSON to accept seat number and updated marks from the user. Modify the marks of user specified seat number in "results.json" file. The "results.json" file contains seat number, name, class, marks and department name.

Q. 3 Answer any two questions.   **(6 Marks each)**

i) Explain about map, filter and reduce methods in JavaScript.

ii) Discuss three kinds of popup boxes in JavaScript.

iii) Write a PHP program using AJAX which accepts email address from user. If the email address is invalid, display message "Invalid Email address". If the email

1

address is empty, display message "Please enter email address". Otherwise display appropriate message to user (use onkeyup event).

Q. 4 Answer any two questions.

(6 Marks each)

i) Write a PHP program to accept employee details(emp_id, ename, address) on first page. On second page accept earning (Basic, DA, HRA, TA). On third page print employee Information (Emp_id, Ename, Address, Basic, DA, HRA, TA, Total).

ii) Describe the steps involved in implementing AJAX concept through PHP.

iii) Write a program for a customer registration form using JavaScript. The form requires customer to enter following information:

Customer Name: Must contain text only, between 5 to 30 characters long.

Customer Address: Must be alphanumeric(letters and numbers), between 10 to 50 characters long.

Mobile Number: Must be valid mobile number not exceeding 10 digits.

PAN Number: Must be a valid PAN number format.

Q. 5 Answer any one question.

(12 Marks each)

i) You have to develop an online superstore multi-step order processing form. This form must maintain user data across multiple pages and it must also check the validation of inputs provided by user. If the user does not respond within 10 minutes, the application should automatically terminate and the data should be cleared. After the successful submission of the order processing data, the data should be saved to the database. Design a solution (program/programs) for the mentioned problem in PHP.

ii) You have to develop a multi-step online application process for an online learning platform. The user can register for different courses having different fees. The application must handle user data across multiple pages and must also perform validation of inputs provided by user. After the successful submission of the user data, the data should be saved to the database. Design a solution (program/programs) for the mentioned problem in PHP.

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Seat	
No.	

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Tuljaram Chaturchand College
of Arts, Science and Commerce, Baramati
(Empowered Autonomous)

Affiliated to Savitribai Phule Pune University

T.Y. B.Sc. (Computer Science) (Semester-VI) Examination

UCSCO365: Advanced Java Technologies - Framework

(2022 Pattern)

Time: 2.00 Hour

Total Marks: 60

N.B. :- (i) All questions are compulsory.
   (ii) Figures to the right indicate full marks.
   (iii) Neat diagrams must be drawn wherever necessary.

Q1. All questions are compulsory. (12)

1. State True/False: Hibernate uses SQL queries instead of HQL. [1]
2. State True/False: Spring is a lightweight framework. [1]
3. State True/False: Spring MVC does not support form handling. [1]
4. State True/False: Spring Boot simplifies dependency management. [1]
5. What is the purpose of the 'hibernate.cfg.xml' file? [2]
6. Explain AOP (Aspect-Oriented Programming) in Spring.? [2]
7. Explain how form validation works in Spring MVC. [2]
8. What is the difference between Spring Boot and Spring MVC? [2]

Q2. Answer any three questions.   [3 X 4 M=12]

1. Explain Hibernate Architecture with a diagram.
2. Describe the IoC container and its types.
3. How to write hibernate configuration file? Explain with <hibernate-configuration>
4. List out the entities involved in flow of Spring Web MVC. Explain every entity in detail.

Q3. Answer any <u>two</u> questions.   [2 X 6 M =12]

1. Name Hibernate O/R mapping types with syntax.
2. What is Autowiring in Spring? Explain with an example.
3. Describe the importance of the '@RequestMapping' annotation.

Q4. Answer any <u>two</u> questions.   [2 X 6 M = 12]

1. How does the '@ModelAttribute' annotation work in Spring MVC?
2. Explain the architecture of Spring Boot.
3. What is bean? Explain its Configuration Metadata.

Q5. Answer any one question.   [1 X 12 M =12]

1. Explain Bean Inheritance with example (write 2 beans class, 1 controller class and one config/XML file)
2. Spring vs. Spring Boot vs. Spring MVC

Total No. of Questions – 5

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Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati
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Affiliated to Savitribai Phule Pune University, Pune
T.Y. B.Sc. (Computer Science) (Semester-V)
UCSCO3501 – System Programming and Operating System
(2022 Pattern)

Time: Two Hours   (No of Credits -03)   Total Marks: 60

N.B.:- (i) All questions are compulsory.
     (ii) Figures to the right indicate full marks.
     (iii) Neat diagrams must be drawn wherever necessary.

[1 Mark Each]

Q1. (A) All questions are compulsory.

    1. What is Swapping?
    2. What is thread?
    3. Write the use of LTORG statement
    4. What is race condition?

[2 Mark Each]

  (B) All questions are compulsory.

    1. What are the tasks of Process Management Module?
    2. Write the tasks of Analysis Phase.
    3. What is the role of Short Term Scheduler?
    4. Explain scheduling techniques.

[4 Marks Each]

Q2. Answer any three questions.
    1. Explain any two Multithreading Models.
    2. Differentiate between system programming and application programming.
    3. What is Dining Philosopher Problem?
    4. How forward reference problem is handled?

[6 Marks Each]

Q3. Answer any two questions.

    1. What is Process? Explain Process State Transition
    2. Explain term deadlock recovery
    3. Write the simulator program with Opcode
       i.   To calculate maximum of three numbers
       ii. To calculate area of circle.

Q4. Answer any <u>two</u> questions.

1. Write the difference between Variant-I and Variant-II Intermediate code.
2. How Deadlock is Identified Explain with Example.
3. Solve the following example with the help of Banker's Algorithms

	Allocation				Max			
	A	B	C	D	A	B	C	D
P0	0	6	3	2	0	6	5	2
P1	0	0	1	2	0	0	1	2
P2	1	0	0	0	0	7	5	0
P3	1	3	5	4	2	3	5	6
P4	0	0	1	4	0	6	5	6

Total Resources			
A	B	C	D
3	14	12	12

4. Solve the following example by FCFS and Round Robin CPU Scheduling Algorithm consider time slice 2 units for RR scheduling

Process	Burst Time	Arrival Time
P1	5	0
P2	4	2
P3	2	2
P4	4	4

Q5. Answer any <u>one</u> question.

1. Write a assembly program for calculating addition of two numbers and explain step by step translation process convert it in to target code.
2. What is System Call? What are the types of system calls and write system calls in Windows and Unix OS of each type.

Total No. of Questions – 5   Total No. of Printed Pages – 2

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Affiliated to Savitribai Phule Pune University, Pune

T.Y. B.Sc. (Computer Science) (Semester-V)

UCSCO3501 – System Programming and Operating System

(2022 Pattern)

Time: Two Hours   (No of Credits -03)   Total Marks: 60

N.B.:- (i) All questions are compulsory.
       (ii) Figures to the right indicate full marks.
       (iii) Neat diagrams must be drawn wherever necessary.

Q1. (A) All questions are compulsory.   [1 Mark Each]

     1. What is Swapping?
     2. What is thread?
     3. Write the use of LTORG statement
     4. What is race condition?

(B) All questions are compulsory.   [2 Mark Each]

     1. What are the tasks of Process Management Module?
     2. Write the tasks of Analysis Phase.
     3. What is the role of Short Term Scheduler?
     4. Explain scheduling techniques.

Q2. Answer any three questions.   [4 Marks Each]

     1. Explain any two Multithreading Models.
     2. Differentiate between system programming and application programming.
     3. What is Dining Philosopher Problem?
     4. How forward reference problem is handled?

Q3. Answer any two questions.   [6 Marks Each]

     1. What is Process? Explain Process State Transition
     2. Explain term deadlock recovery
     3. Write the simulator program with Opcode
         i. To calculate maximum of three numbers
         ii. To calculate area of circle.

Q4. Answer any _two_ questions.   **[6 Marks Each]**

1. Write the difference between Variant-I and Variant-II Intermediate code.
2. How Deadlock is Identified Explain with Example.
3. Solve the following example with the help of Banker's Algorithms

	Allocation				Max			
	A	B	C	D	A	B	C	D
P0	0	6	3	2	0	6	5	2
P1	0	0	1	2	0	0	1	2
P2	1	0	0	0	0	7	5	0
P3	1	3	5	4	2	3	5	6
P4	0	0	1	4	0	6	5	6

Total Resources			
A	B	C	D
3	14	12	12

4. Solve the following example by FCFS and Round Robin CPU Scheduling Algorithm consider time slice 2 units for RR scheduling

Process	Burst Time	Arrival Time
P1	5	0
P2	4	2
P3	2	2
P4	4	4

Q5. Answer any _one_ question.   **[12 Marks Each]**

1. Write a assembly program for calculating addition of two numbers and explain step by step translation process convert it in to target code.
2. What is System Call? What are the types of system calls and write system calls in Windows and Unix OS of each type.

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Affiliated to Savitribai Phule Pune University, Pune

T.Y. B.Sc. (Computer Science) Examination Semester-V

CSCO3501: System Programming & Operating System

(2019 Pattern)

Time: Two Hours   **Total Marks: 60**

N.B. :- (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

(iii) Draw neat labelled diagram.

Q1. All questions are compulsory.   (12)

1. Define application program   1

2. What is Simulator?   1

3. What is the instruction format of Simulator?   1

4. Define Assembler?   1

5. Define Linker and Loader   2

6. Define Arrival Time and Wait Time   2

7. What is the use of TII?   2

8. Define Short Term Scheduler.   2

Q2. Answer any three questions.   [3 X 4 M=12]

1. Explain Process state transition.

2. How to prevent the system from Deadlock?

3. How to evaluate the Scheduling Algorithms?

4. Consider a system with 7 processes A through G and 6 types of resources R through W with one resource for each type. A holds R wants S. B holds nothing wants T. C holds nothing wants S. D holds U wants S and T. E holds T wants V. F holds W wants S. G holds V wants U. check whether system will suffer from deadlock or not?

Q3. Answer any <u>two</u> questions.

[2 X 6 M =12]

1. Write a Simulator Program with object code to calculate area of Circle.

2. Write a Simulator Program with object code to calculate maximum of Two Numbers.

3. Write a Simulator Program with object code to calculate swapping of two numbers.

Q4. Answer any <u>two</u> questions.

[2 X 6 M = 12]

1. Solve the following Examples with all given FCFS, and Non Preemptive SJF CPU Scheduling Algorithms.

Process	Burst Time	Arrival Time
P1	5	1
P2	7	0
P3	3	3
P4	10	2

2. Solve the following examples by Non Preemptive and Preemptive Priority Scheduling

Process	Burst Time	Arrival Time	Priority
P1	5	0	3
P2	4	2	1
P3	2	2	4(high)
P4	4	4	2

3. Consider the following snapshot of system. Available (1,5,2,0) of types A, B, C, D respectively. Is the system in safe state? Answer the following using Banker's Algorithm.

Process	Allocation				Max			
	A	B	C	D	A	B	C	D
P0	0	6	3	2	0	6	5	2
P1	0	0	1	2	0	2	1	2
P2	1	0	0	0	1	7	5	0
P3	1	3	5	4	2	3	5	6
P4	0	0	1	4	0	6	5	6

Q5. Answer any <u>one</u> questions.

[1 X 12 M =12]

1. Explain program execution process with the help of system programs and operating system.

2. What are the various types of System Calls? Explain all in detail.

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T.Y. B.Sc. (Computer Science) (Semester-V)

CSCO -3502: Theoretical Computer Science

(2019 Pattern)

Time : Two Hours   (No of Credits -03)   Total Marks : 60

N.B. :- (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

(iii) Neat diagrams must be drawn wherever necessary.

Q1. All questions are compulsory.   **[12]**

i.   Finite Automata has more than one final States. (True/False)   1

ii. Write the meaning of notation δ in DFA.   1

iii. Write RE for the set A= {ε, a, aa, aaa, aaaa, ….}   1

iv. Define Turing Machine.   1

v.   Differentiate between Moore and Mealy machine.   2

vi. What is derivation tree? State the types of derivation trees.   2

vii. Define Unit production with example.   2

viii. Define Push Down Automata.   2

Q2. Answer any _three_ questions.   **[3 X 4 M=12]**

i.   Construct DFA to accept the set of all strings over {0, 1} such that string ends with '00' or '11'.

ii. Construct FA for RE : $(0+1)^* \ 01 +(1+0)^* 11$

iii. Write the applications of Regular Expression.

iv. Convert following NFA with ε moves to DFA.
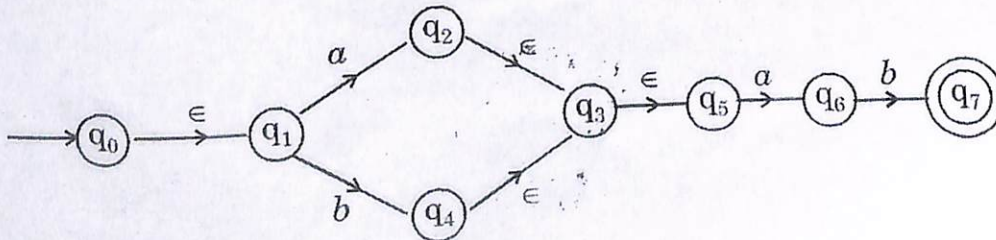
Q3. Answer any two questions.   [2 X 6 M =12]

i.   Convert the following grammar in CNF.

        $S \rightarrow ABA$

        $A \rightarrow aA \mid \epsilon$

        $B \rightarrow bB \mid \epsilon$

ii.   Construct PDA for $L = \{a^n b^{2n+1} \mid n > 1\}$

iii. Explain the Chomsky hierarchy of grammar.

Q4. Answer any two questions.   [2 X 6 M = 12]

i.   Construct Moore machine to accept all strings over $\{a, b\}$ and produces output '\$' if string ends in 'aa', produces output '#' if string ends in 'bb' else produces output '@'.

ii.   Minimize the following DFA.

$M = (\{A, B, C, D, E\}, \{0, 1\}, \delta, A, \{E\})$ where δ is given by

δ	0	1
A	B	C
B	B	D
C	B	C
D	B	E
*E	B	C

iii. Construct TM for $L = \{a^n b^m c^n \mid n, m >= 1\}$.

Q5. Answer any one question.   [1 X 12 M =12]

i.   What do you mean by Phase Structured Grammar? Write formal definition? Explain BNF, CNF and GNF forms with example. States applications of Grammar.

ii.   What is Pumping Lemma? States its applications and also give its statement Regular Language. Show that $L = \{a^n b^m c^{n+m} \mid n, m >= 1\}$ is not regular language.

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T.Y. B.Sc. (Computer Science) (Sem-V)

CSCO3504: Web Development-I

(2019 Pattern)

Time: 2 Hrs]   [Max marks: 60

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Neat labelled diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*

Q. 1 All questions are compulsory.

1. What is variable interpolation?   [1]
2. What is anonymous function?   [1]
3. State the difference between indexed array and associative array.   [1]
4. What is interface?   [1]
5. What is the difference between strpos() and strrpos() function?   [2]
6. What is the difference between array() and range() function?   [2]
7. What is autoloading of classes?   [2]
8. Write the syntax statement to create a connection object using PDO.   [2]

Q. 2 Answer any three questions.

1. Explain in detail about the data types in PHP.   [4]
2. Explain in detail about the different ways to represent a string in PHP. [4]
3. Explain with suitable example the difference between array_splice() and
   array_slice() function.   [4]
4. What are traits? Explain with proper example.   [4]

Q. 3 Answer any two questions.

1. Write a menu driven PHP program to accept small string, large string, replacement string. Check whether small string appears at the start of large string and display appropriate message to the user.

                                                                           [6]

2. Write a menu driven program in PHP to accept an array from user. Provide options :

(a) Sort the array without changing the keys

(b) Sort the array with keys changed

[6]

3. Create a class Person with data members person_id, pname, designation, salary. Accept information from user and create object for Person class. Display the person information accepted from user in formatted manner.

[6]

Q. 4 Answer any two questions.

1. Consider a table Department (deptno, deptname, location). Write a PHP program to accept location name from user and display the details of the departments which are located at the user specified location. (use PDO)

[6]

2. Consider a table Student(rollno, name, class). Write a PHP program to accept student name from user and delete the record of the user specified student name using PDO.

[6]

3. Write a menu driven program to accept inputs such as height, width, radius and options such as rectangle, circle. Display the area of the user specified shape (use interface).

[6]

Q. 5 Answer any one question.

1. The examination department of a college wants to store the details of the performance of students in the examinations. The examination department wants to generate the merit list of the students based on their aggregate marks. After the merit list preparation, it is to be displayed for the information of students. Design a solution (program/programs) for the above mentioned problem in PHP.

[12]

2. In a company, there are various departments having employees working it. The company wants to store the information of employees and generate the payroll details of employees. From the system, the company wishes to generate department wise budget for the salaries. Design a solution (program/programs) for the above mentioned problem in PHP.

[12]

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otal No. of Questions – 5]   [Total No. of Printed Pages – 2

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Affiliated to Savitribai Phule Pune University

T.Y. B.Sc. (Computer Science) (Semester-VI) Examination
CSCO3601: Advanced Operating System
(2019 Pattern)

Time: Two Hours   Total Marks: 60

N.B. :- (i) All questions are compulsory.
    (ii) Figures to the right indicate full marks.
    (iii) Draw neat labelled diagram wherever necessary.

Q1. All questions are compulsory.   **(12)**

1. What is Page Fault?   1
2. What is Internal Fragmentation?   1
3. What is VTOC?   1
4. How to calculate Physical Address?   1
5. What are the various types of File?   2
6. List the various RTOS?   2
7. What is Static and Dynamic Linking?   2
8. What is Swapping?   2

Q2. Answer any three questions.   **[3 X 4 M=12]**

1. Explain Sequential Access of File System
2. Explain the architecture of Distributed Operating System
3. Differentiate between MFT and MVT.
4. Write a note on Segmentation.

P.T.O.

Q3. Answer any <u>two</u> questions.   [2 X 6 M =12]

1. Solve the following example by LRU and Optimal Replacement Algorithm
   Reference String: 1,2,3,4,1, 2, 5 , 1, 2, 3, 4, 5 with 3 free frames

2. Consider the following segment table. What are the physical address for given
   logical addresses?

Segment	Base	Length
0	600	120
1	1200	350
2	75	85
3	1760	90
4	2510	680

   I. 0125   II. 1310   III. 388   IV. 277   V. 4444

3. What is thrashing and how it is handled?

Q4. Answer any <u>two</u> questions.   [2 X 6 M = 12]

1. Assume that there are 200 tracks are present on each surface of the disk. If
   Request queue is 98, 183, 37, 122, 14, 124, 65, 67 and initial position of the head
   is 53. Apply SCAN and C-SCAN disk scheduling and calculate total head
   movement.

2. Write a note on File Access methods.

3. What is Synchronous and Asynchronous data transfer?

Q5. Answer any <u>one</u> questions.   [1 X 12 M =12]

1. Discuss various memory management techniques? How it is implemented?
2. Write various types of Operating Systems and explain it with their application
   areas.

Total No. of Questions – 5   Total No. of Printed Pages – 2

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Affiliated to Savitribai Phule Pune University, Pune
T.Y. B.Sc. (Computer Science) (Semester-VI)
CSCO -3602: Compiler Construction
(2019 Pattern)

Time : Two Hours   (No of Credits -03)   Total Marks : 60

N.B. :- (i) All questions are compulsory.
  (ii) Figures to the right indicate full marks.
  (iii) Neat diagrams must be drawn wherever necessary.

Q1. All questions are compulsory.   [12]

1. State True or False, "Lexical analysis is also called as parser".   1
2. What are pattern?   1
3. What is YACC?   1
4. What does second 'L' stand for in LL (0) parser.   1
5. Discuss the structure of a LEX program.   2
6. List types of conflict can occur in LR parser.   2
7. List different methods of memory allocation.   2
8. What is translator? Give example.   2

                                                            [3 X 4 M=12]

Q2. Answer any _three_ questions.

1. Write a LEX program to find out factorial of given number.
2. Differentiate between top-down and bottom-up parsing.
3. Construct RDP for the following grammar
   S→ Aab | aBb , A→ Aa| b , B→ bB| b
4. Find FIRST and FOLLOW for the following grammar.
   S→ aAB | bA | ∈
   A→ aAb | ∈
   B→ bB | c

                                                            P.T.O.

Q3. Answer any <u>two</u> questions.   [2 X 6 M =12]

   1. Check following grammar is LL1 grammar or not?

     S→ S | ^ | (R)

     A→ S,T | B

     R→ T

   2. What is code optimization? Explain code optimization techniques.

   3. Find out following grammar is Operator precedence grammar or not.

     E→ E+E | E*E | (E) | id

Q4. Answer any <u>two</u> questions.   [2 X 6 M = 12]

   1. Find out Leading and Trailing symbols of the following grammar.

     S→ S | ^ | (R)

     A→ S,T | B

     R→ T

   2. Find out CLR parse table for the following grammar.

     E→ AA

     A→ aA | d

   3. What is DAG? Construct DAG for the expression a * (b + c) + (b + c) * d.

Q5. Answer any <u>one</u> question.   [1 X 12 M =12]

   1. What is compiler? Explain phases with diagram.

   2. Show that the following grammar is SLR(1) but not LL(1)?

     S→ SA| A

     A→ a

Total No. of Questions: 5

Total No. of Pages: 2

Anekant Education Society's

Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati

(Empowered Autonomous)

T.Y. B.Sc. (Computer Science) – (Semester – VI)

CSCO3604: Web Development-II

(2019 Pattern)

Time: 2 Hrs]

[Max marks: 60

Instructions to the candidates:

1) _All questions are compulsory._
2) _Neat labelled diagrams must be drawn wherever necessary._
3) _Figures to the right indicate full marks._

Q. 1 All questions are compulsory.

i) What is the use of isset function? [1]

ii) State True or False. $_GET is superglobal array in PHP. [1]

iii) Which event in JavaScript is called when a mouse pointer is moved away from a region? [1]

iv) Which JavaScript event is called for SHIFT key? [1]

v) What is the difference between session and cookie? [2]

vi) Can we implement multipage processing without using session or cookies in PHP? Justify your answer. [2]

vii) State two advantages of AJAX. [2]

viii) State the different values of status and its meaning. [2]

Q. 2 Answer any three questions.

i) Explain in detail about alert, prompt and confirm popup boxes in JavaScript. [4]

ii) Explain about built-in functions in JavaScript. [4]

iii) Write a JavaScript program to demonstrate onmouseup, onmousedown events. [4]

iv) Write about keyboard events in JavaScript. [4]

Q. 3 Answer any two questions.

i) Write a PHP program which accepts user id and password on the first form, upon submitting the first form the user is prompted to add address, city, contact number on the second form. After submitting the second form display the details of the

1

information accepted from user in well formatted manner.(use cookies or session)

[6]

ii) Write a PHP program using AJAX which accepts username from user. If the username is having less than 8 characters, display message "Username less than 8 characters". If the username is empty, display message "Please en er username"(use onkeyup event).

[6]

iii) Write a PHP program using AJAX which accepts the string from the user and displays the course titles containing the user input as a substring.(use an array to store the course titles).

[6]

Q. 4 Answer any two questions.

i) Write about the features of Symfony in detail.

[6]

ii) Differentiate between CodeIgniter Framework and Laravel Framework.

[6]

iii) Explain in detail the steps involved in implementing AJAX concept through PHP.

[6]

Q. 5 Answer any one questions.

i) Describe the advantages and disadvantages of server side scripting. [12]

ii) Compare between server side scripting and client side scripting. [12]

* * * * * * * * * *