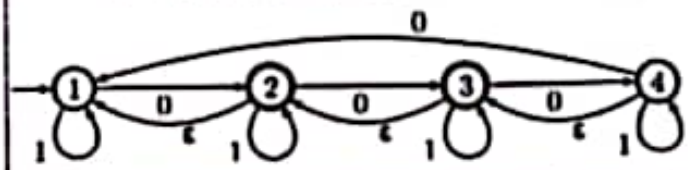
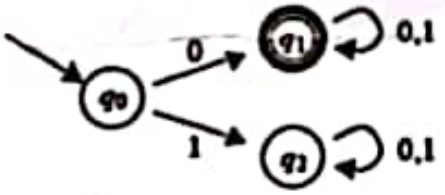
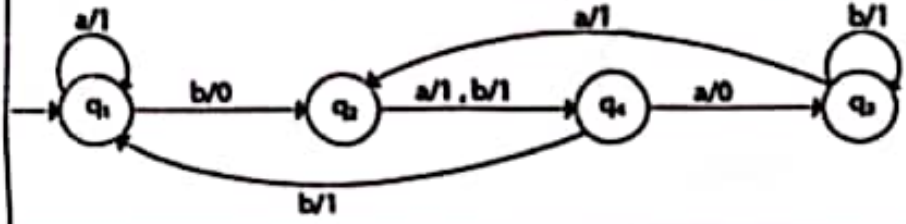
QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

MID-SEMESTER EXAMINATION OF FIRST SEMESTER – THIRD YEAR (5TH SEMESTER) 2023, 20-BATCH, B.S (CS)

SUBJECT: THEORY OF AUTOMATA

Dated: 08.03.2023 Maximum Marks: 20 Time Allowed: 01 Hours.

NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.		QUESTION	CLOs	Taxonomy Level	PLOs	Marks
Q. 01	(a)	What is DFA? When is a string said to be accepted and rejected by a DFA?	1	C2	2	04
	(b)	Design DFA for the following languages defined over Σ = {0, 1}. i. {w| w contains all strings without substring 101} ii. {1(10)*11} iii. {w| w contains even number of 0's}	2	C5	4	06
Q. 02	(a)	Convert the following NFA to DFA. 	3	C2	3	05
	(b)	For the DFA and its corresponding language L given below, show that the DFA is closed under reverse and complement operations. To justify your answer, give corresponding DFAs to accept L^R and $\overline{L}$.  $L = \{0x \mid x \in \{0,1\}^*\}$	1	C2	2	05
Q. 03	(a)	Convert the following Mealy machine to Moore machine. 	3	C2	3	05
	(b)	For the Mealy machine given in Q.03(a) above, and obtained Moore machine after translation, run the string 'abbbab' on both machines to show what states and output string is reached.	1	C2	2	05

The End

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

MID-SEMESTER EXAMINATION OF FIRST SEMESTER – THIRD YEAR (5TH SEMESTER) 2023, 20-BATCH, B.S (CS)

SUBJECT: THEORY OF PROGRAMMING LANGUAGE

Dated: 10.03.2023 Maximum Marks: 20 Time Allowed: 01 Hour,

NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.	Question	CLO	Taxonomy Level	PLO	Marks
Q. 01	Define Language generators and Recognizers describing the syntax of any programming language?	1	C1	2	10
Q. 02	How to parse a+b*c using this grammar? <expr> ::= <expr> + <expr> | <expr> * <expr> | a | b | c Define Ambiguity in Grammar and How to resolve this ambiguity?	1	C3	2	10
Q. 03	Explain Concept of Bindings, Type Binding and scope Binding in detail.	1	C2	2	10

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

MID-SEMESTER EXAMINATION OF FIRST SEMESTER – THIRD YEAR (5TH) 2023, 20-BATCH, B.S (CS)

SUBJECT: SOFTWARE ENGINEERING

Dated: 09.03.2023 Maximum Marks: 20 Time Allowed: 01 Hour

NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No		QUESTION	CLO	Taxonomy Level	PLO	Marks
Q. 01	(A)	What is software evolution? Also, discuss the software evolution laws in detail.	1	C1	2	05
	(B)	Briefly discuss software paradigms and their components.	1	C2	2	05
Q. 02		What are the characteristics of good software? Discuss in detail.	1	C1	2	10
Q. 03		What is the software development life cycle? Also, discuss SDLC activities in detail.	1	C1	2	10

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

MID-SEMESTER EXAMINATION OF FIRST SEMESTER – THIRD YEAR (5TH SEMESTER) 2023, 20-BATCH, B.S (CS)

SUBJECT: ADVANCED OBJECT ORIENTED PROGRAMMING

Dated: 06.03.2023 Maximum Marks: 20 Time Allowed: 01 Hour,

NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Question No.		Question	CLO	Taxonomy level	PLO	Marks
Q. 01	a)	Describe the Object Oriented programming in the perspective of C++ and JAVA. Such as **Simple, Robust, Distributed and Portable?**	1	C2	2	3
	b)	Explain the History of JAVA.	1	C2	2	4
	c)	Describe the term Object References and class instantiation in java.	1	C2	2	3
Q. 02	a)	Define with examples the term **class, object, abstraction, contract and implementation** in object oriented programming. What is message passing in java?	1	C2	2	3
	b)	Explain the term **PILLERS** in Object Oriented Programming with possible description and discussion.	1	C2	2	3
	c)	Write a program for compile time polymorphism in java.	1	C2	2	4
Q. 03	a)	Describe the **ENCAPSULATION** with suitable programming example of **Check** class with possible members in java.	1	C2	2	5
	b)	Explain the term **INHERITANCE** in java with example of class **A** super class with **fun1 ( )** method with message and class **B** as sub class with **fun2 ( )** message showing that subclass using the behavior of super class without Object or Class instantiation.	1	C2	2	5

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

MID-SEMESTER EXAMINATION OF FIRST SEMESTER – THIRD YEAR (5TH) 2023, 20-BATCH, B.S (CS)

SUBJECT: OPERATING SYSTEMS

Dated: 13.03.2023 Maximum Marks: 20 Time Allowed: 01 Hour

NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No		QUESTION	CLO	Taxonomy Level	PLO	Marks
Q. 01	(A)	Explain Process Control Block, and define various pieces of information associated with a specific process.	1	C2	3	05
	(B)	As a process executes, it changes its state. With the help of a diagram, define the general states of a process in its lifetime.	1	C1	3	05
Q. 02	(A)	What resources are used when a thread is created? How do they differ from those used when a process is created?	1	C1	3	05
	(B)	Differentiate between data and task parallelism in context to multicore programming, and use necessary diagrams.		C4	3	05
Q. 03		Write short notes on any three of the following: 1. Concurrency and Parallelism 2. System calls 3. Benefits of Multi-threading 4. Amdahl's law 5. Types of OS	1	C2	3	10

*** Good Luck ***

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER – THIRD YEAR 2023 OF 20-BATCH, B.S (CS)

SUBJECT: ADVANCED OBJECT ORIENTED PROGRAMMING

Dated: 01.06.2023 | Maximum Marks: 60 | Time Allowed: 3 Hours.

NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.		QUESTION	CLO	Taxonomy Level	PLO	Marks
Q. 01	(a)	Describe the object oriented languages such as C++ and JAVA origination with comparison of language features such as Dynamic, Secure, Multithreaded, Architecture Neutral.	1	C2	2	04
	(b)	What is polymorphism? What are the types of polymorphism? What is message passing in java.	2	C2	1	04
	(c)	Write a program for runtime polymorphism of class A super class and B as sub class with fun1 () message(s) be called using main method.	3	P3	3	04
Q. 02	(a)	What is casting? Why it is needed in java? What is syntax of casting in JAVA? Describe the difference between narrowing and widening conversion? What are relational operators in java?	1	C2	1	06
	(b)	What are primitive data types in java? What is the width and ranges of integer only in java?	1	C2	1	03

	(c)	Write the output of the following operators with operands int a=4,b=2;
		i) System.out.println(a&b);
		ii) System.out.println(a^b);
		iii) System.out.println(a|b);
			3	P3	3	03

Q. 03	(a)	What do you mean by Constructor in java? What is overloaded constructor? What is difference between explicit and default constructor in java?	1	C2	1	04
	(b)	What is String? What are different types of string in java? How String is different from Arrays?	1	C2	1	04
	(c)	What is Swing? How it is different from AWT?	1	C2	1	04

Q. 04	(a)	What is Math class in java? What is the type of Math class in java? Explain briefly the rounding functions of Math class java. What is output of the following
		i) System.out.println(Math.ceil(4.5));
		ii) System.out.println(Math.floor(-2.5));
		iii) System.out.println(Math.round(2.5));
			1,3	C2,P3	1	04

	(b)	What are decision making statements in java? What are types of loops in java? Draw the activity diagram for do while statement in java?	1,3	C2,P3	1	04
	(c)	Write a program in java to display a) Numbers from 100 to 1 using for loop b) Even numbers from 1 to 100 using while loop c) Odd numbers from 1 to 100 using for loop d) Message of Hello Quest 10 times using do-while loop	3	C2	3	04
Q. 05		Write a Note on three of the following: a) The Pillars of OOP b) Identifiers in java c) Arrays in java d) Object references e) Literals in java	1	C2	1	12

The End

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER – THIRD YEAR, 2023 OF 20-BATCH, B.S (CS)

SUBJECT: SOFTWARE ENGINEERING

Dated: 05.06.2023 Maximum Marks: 60 Time Allowed: 03 Hours.

NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No		QUESTION	CLO	Taxonomy Level	PLO	Marks
Q. 01	(A)	What are some commonly used techniques for requirement elicitation in software engineering, and what are their characteristics?	1	C3	2	06
	(B)	How does the requirements engineering process contribute to the overall success of software development projects, and what metrics and measures can be used to assess the quality of software requirements?	1	C1	2	06
Q. 02	(A)	What are the different levels of software design, and how does modularization play a role in achieving modifiability and reusability in software systems?	2	C1	2	06
	(B)	Discuss the concepts of coupling and cohesion in software design. How do high levels of coupling and low levels of cohesion impact the maintainability and testability of a software system?	2	C3	2	06
Q. 03	(A)	What are the different types of Data Flow Diagrams (DFDs) commonly used in software engineering? How are they used to represent the flow of data within a system?	2	C1	2	06
	(B)	How can the integration of Structure Charts, HIPO Diagrams, and Entity-Relationship Models enhance the clarity and completeness of a system's design and documentation?	2	C3	2	06
Q. 04		What are the key differences between function-oriented design and object-oriented design as software design strategies? Explain how software design approaches can be used to guide the overall design process.	3	C3	2	12
Q. 05		How does software design complexity impact the overall quality of a software system? Discuss the concept of Cyclomatic complexity as a measure of software complexity. Explain the concept of function points, how they can be used to measure the size and complexity of a software application.	3	C4	2	12

*** Good Luck ***

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER – THIRD YEAR, 2023 OF 20-BATCH, B.S (CS)

SUBJECT: OPERATING SYSTEMS

Dated: 12.06.2023 Maximum Marks: 60 Time Allowed: 3 Hours.

NOTE: ATTEMPT ALL QUESTIONS. ASSUME SUITABLE DATA WHEREVER NECESSARY.

<table>
<tr><th>Q. No.</th><th></th><th>Question</th><th>CLO</th><th>PLO</th><th>Tax: Level</th><th>Marks</th></tr>
<tr><td>01</td><td></td><td>Consider the following set of processes, with the length of CPU burst time given in milliseconds. The processes are assumed to have arrived in the order P1, P2, P3, P4, and P5, all at time 0.
<table>
<tr><th>Process</th><th>Burst Time</th><th>Priority</th></tr>
<tr><td>P1</td><td>2</td><td>2</td></tr>
<tr><td>P2</td><td>1</td><td>1</td></tr>
<tr><td>P3</td><td>8</td><td>4</td></tr>
<tr><td>P4</td><td>4</td><td>2</td></tr>
<tr><td>P5</td><td>5</td><td>3</td></tr>
</table>
Draw Gantt charts that illustrate the execution of those processes using SJF and Priority scheduling algorithms with preemption. Calculate average waiting time for each algorithm and suggest which one is better for the given scenario.</td><td>2</td><td>3</td><td>C4</td><td>12</td></tr>
<tr><td>02</td><td>(a)</td><td>Illustrate how a binary semaphore can be used to implement mutual exclusion among n number of processes.</td><td>2</td><td>3</td><td>C3</td><td>06</td></tr>
<tr><td></td><td>(b)</td><td>Show that, if the wait ( ) and signal ( ) semaphore operations are not executed atomically, then mutual exclusion may be violated.</td><td>2</td><td>3</td><td>C3</td><td>06</td></tr>
<tr><td>03</td><td></td><td>Define critical section problem and three requirements a critical section problem's solution must provide? Peterson's solution provides a good algorithmic description for solving the critical-section problem. Write simple definition (code) for turn and flag variables used in Peterson's solution.</td><td>3</td><td>4</td><td>C1</td><td>12</td></tr>
<tr><td>04</td><td></td><td>Demonstrate and construct Total and Need matrices from the given resource information in the table using Banker's (deadlock avoidance) algorithm. Is the system in safe state? If yes then find the safe sequence.
<table>
<tr><th rowspan="2">Process</th><th colspan="3">Allocation</th><th colspan="3">Max</th><th colspan="3">Available</th></tr>
<tr><th>A</th><th>B</th><th>C</th><th>A</th><th>B</th><th>C</th><th>A</th><th>B</th><th>C</th></tr>
<tr><td>P0</td><td>1</td><td>0</td><td>1</td><td>4</td><td>3</td><td>1</td><td>3</td><td>3</td><td>0</td></tr>
<tr><td>P1</td><td>1</td><td>1</td><td>2</td><td>2</td><td>1</td><td>4</td><td></td><td></td><td></td></tr>
<tr><td>P2</td><td>1</td><td>0</td><td>3</td><td>1</td><td>3</td><td>3</td><td></td><td></td><td></td></tr>
<tr><td>P3</td><td>2</td><td>0</td><td>0</td><td>5</td><td>4</td><td>1</td><td></td><td></td><td></td></tr>
</table></td><td>3</td><td>4</td><td>C3</td><td>12</td></tr>
<tr><td>05</td><td></td><td>Demonstrate and describe any three of the following:
<ol>
<li>Page Fault</li>
<li>Live Lock</li>
<li>Race condition</li>
<li>Dinning Philosopher Problem</li>
<li>Deadlock Prevention</li>
</ol></td><td>3</td><td>4</td><td>C3</td><td>12</td></tr>
</table>

Good Luck

QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER – THIRD YEAR 2023 OF 20-BATCH B.S (CS)

SUBJECT: THEORY OF PROGRAMMING LANGUAGE

Dated: 08.06.2023 Maximum Marks: 60 Time Allowed: 3 Hours.

NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.		QUESTION	CLO	Taxonomy Level	PLO	Marks
Q. 01		What is syntax and Semantics in the context of programming languages? Explain with example and also discuss the role of language recognizers and generators.	1	C3	3	12
Q. 02		Discuss briefly the various data types commonly used in programming languages, including primitive data types, character string types, user-defined ordinal types, and array types. Provide examples for each data type, highlighting their purpose and usage in programming.	2	C3	3	12
Q. 03		Explain the key concepts related to arithmetic expressions, overloaded operators, type conversions, and relational and Boolean expressions in programming languages. Provide examples for each concept, showcasing their functionality and significance in programming.	2	C5	3	12
Q. 04		Discuss the concepts of polymorphism and inheritance in Python, and explain how they contribute to object-oriented programming. Provide an example program that demonstrates both polymorphism and inheritance, highlighting their usage and benefits in the context of the program.	3	C3	3	12
Q. 05		Write Short notes on any three of the following. a) Features of Modern Interpreted Languages vs old Interpreted Languages. b) Scripting Languages c) Web Programming and its Characteristics d) Difference Between Algorithms, Pseudocodes and Coding. e) Static and Dynamic Scoping	3	C2	2	12

The End

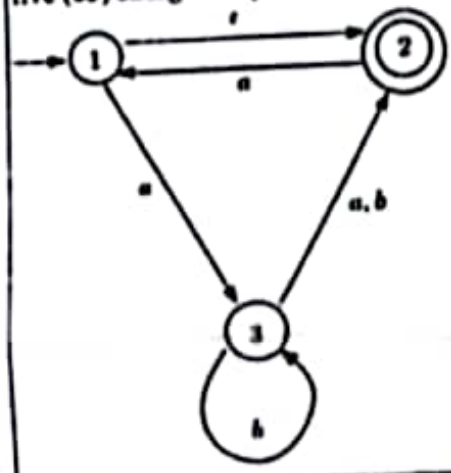
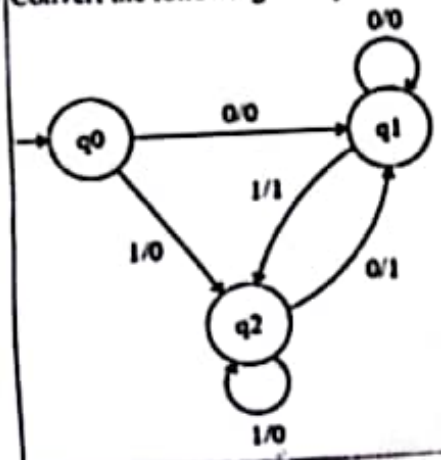
QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER – THIRD YEAR, 2023 OF 20 BATCH, B.S (CS)

SUBJECT: THEORY OF AUTOMATA

Dated: 29.05.2023 Maximum Marks: 60 Time Allowed: 3 Hours.

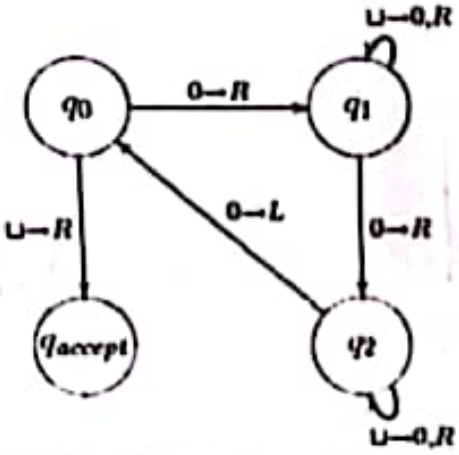
NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.		QUESTION	CLOs	Taxonomy Level	PLOs	Marks
Q. 01		Design DFA for the following languages/expressions. i. a(aa)* ii. {w| w contains substring bab} defined over the alphabet {a,b} iii. {w| w contains odd number of b's} defined over the alphabet {a,b}	2	C5	4	12
Q. 02		Convert the following NFA to an equivalent DFA. Write at least five (05) strings accepted by both machines. 	3	C2	3	12
Q. 03	(a)	Convert the following Mealy machine to Moore machine. 	3	C2	3	6
	(b)	For the Mealy machine given in Q.03(a) above, and obtained Moore machine after conversion, run the string '1101' on both machines to show what states and output string is reached.	3	C2	3	6

P.T.O

1 1 0 1 0 0 1

q0 q1 q2 q1 q1 q2 q1 q1

Q. 04	(a)	Give CFG for the language 'L' defined as L= {0^n11|n>=1}.	2	C5	4	4
	(b)	For the Grammar {S→AS|a, A→SbA|SS|ba} provide left most derivation order and derivation tree for the string **aabbaaa.**	3	C2	3	4
	(c)	For the Grammar S→bS|b, defined over Σ = {b}, construct an equivalent DFA.	3	C2	3	4
Q. 05	(a)	What is Turing machine? Consider the TM M drawn below (all missing transitions go implicitly to the state **qreject** and move the head to the right). The input alphabet is Σ = {0} and the start state of M is q0. Give three different strings (over Σ*) that do not belong to L(M) and one string which belong to L(M). *M*: 	4	C2	2	6
	(b)	What does it mean by the power of a machine? With the help of an example, prove that stay option TM has the same power as standard TM.	4	C2	2	6

The End