Printed Pages: 24D592 **UID No:** 10081

Final Examination

Academic year 2024–2025

Program Name/Code: BE-CSE-CSBS

Subject Code: 23CSH-234

Subject Title: Object Oriented Programming

Semester:3

Time: 3 Hour **Maximum Marks: 60**

Instructions:

- **Thequestion paper is consisting of three sections. It is compulsory for students to attempt all questions of Section A and Section B.**
- **Question no. 10 & 11 of section C, are compulsory to be attempted.**
- **Students to attempt any one question from question no. 12 & question no. 13 of section C**

Q. No	Statement	CO Mapping
	Section A (5 x 2 = 10 marks)	
1	Differentiate between #define and const in C?	CO1
2	Explain the necessity of object-oriented programming.	CO3
3	Define single inheritance in C++.	CO5
4	Describe the polymorphism.	CO4
5	Compare function overloading and method overriding.	CO4
	Section B (4 x 5 = 20 marks)	
6	Explain the use of single line comments in C++ and how they differ from comments in C.	CO1
7	Discuss the concept of encapsulation in OOP. How does encapsulation contribute to the development of robust and maintainable code?	CO4
8	Describe polymorphism through dynamic binding in C++ with an example.	CO5
9	Explain why inheritance is important in object-oriented programming with an example.	CO5
	Section C (3 x 10 = 30 marks)	
10	Implement a C/C++ program that demonstrates the difference between local and global variables. Use functions to show their scope and lifetime.	CO2
11	Develop a real-world example using OOP concepts in C++. Design a simple library management system with classes for Book, Library, and Member. Implement features such as adding books, borrowing books, and returning books.	CO4
	Optional Question of Section C	
12	Describe how use case diagrams help in requirement capturing with an example.	CO5
	OR	
13	Explain how UML diagrams facilitate the design of object-oriented systems.	CO5

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Final Examination

Academic year 2024–2025

Program Name/Code: BE-CSE-CSBS

Subject Code: 23CSH-239

Subject Title: SOFTWARE ENGINEERING

Semester:3

***Time:* 3 Hour** **Maximum Marks: 60**

Instructions:

- **Thequestion paper is consisting of three sections. It is compulsory for students to attempt all questions of Section A and Section B.**
- **Question no. 10 & 11 of section C, are compulsory to be attempted.**
- **Students to attempt any one question from question no. 12 & question no. 13 of section C**

Q. No	Statement	CO Mapping
	Section A (5 x 2 = 10 marks)	
1	Define a Data Flow Diagram (DFD).What are the four main components of a Data Flow Diagram (DFD)?	CO1
2	Define the term "software design." What is the purpose of the software design process?	CO1
3	Summarize the differences between black box testing and white box testing.	CO1
4	Define "software reliability." Summarize Challenges in Achieving Software Reliability.	CO1
5	State SEI Capability Maturity Model (CMM).	CO1
	Section B (4 x 5 = 20 marks)	
6	Demonstrate the purpose of a Data Flow Diagram (DFD) in software engineering. Additionally, explain the different levels of DFDs in detail.	CO2
7	Illustrate three levels of the COCOMO model in detail.	CO2
8	Compare and contrast between verification and validation in software testing in detail.	CO3
9	Demonstrate Blackbox testing in detail including its features, advantages and disadvantages.	CO2
	Section C (3 x 10 = 30 marks)	
10	Analyze the purpose of a data dictionary in software development in detail.	CO3
11	Demonstrate any three common project estimation techniques in detail.	CO3
	Optional Question of Section C	
12	Illustrate the main factors that influence software quality in a software project. Also, explain in detail the factors affecting software reliability.	CO3
	OR	
13	Compare and contrast Unit, Integration, system and validation testing in detail.	CO3

difference between local and global variables. Use

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Final Examination

Academic year 2024–2025

Program Name/Code: BE-CSE-CSBS

Subject Code: 23CST-238

Subject Title: COMPUTER ORGANIZATION AND ARCHITECHTURE

Semester:3

Time: 3 Hour

Maximum Marks: 60

Instructions:

- **Thequestion paper is consisting of three sections. It is compulsory for students to attempt all questions of Section A and Section B.**
- **Question no. 10 & 11 of section C, are compulsory to be attempted.**
- **Students to attempt any one question from question no. 12 & question no. 13 of section C**

Q. No	Statement	CO Mapping
	Section A (5 x 2 = 10 marks)	
1	Define special-purpose registers (SPRs).	CO1
2	Compare memory mapped I/O and I/O mapped I/O.	CO1
3	List three common types of I/O device interfaces.	CO1
4	Mention the challenges associated with parallel processing, including synchronization and communication overhead.	CO1
5	Define DMA controller.	CO1
	Section B (4 x 5 = 20 marks)	
6	Explain the requirement of a program counter, stack pointer and status flags in the architecture of 8085 microprocessor.	CO2
7	Explain Memory Management Unit (MMU).	CO2
8	Explain the function of HOLD and HLDA in DMA Access.	CO2
9	Differentiate between Programmed I/O (PIO) and Interrupt-Driven I/O.	CO2
	Section C (3 x 10 = 30 marks)	
10	Illustrate with example the Arithmetic instruction and data transfer instructions of a microprocessor(8085/8086).	CO3
11	Illustrate the concept of Design of a simple hypothetical CPU with the help of diagram and flow chart.	CO3
	Optional Question of Section C	
12	Explain the concept of Multiple Instruction Single Data (MISD) architectures and discuss why they are less common.	CO3
	OR	
13	Illustrate with the help of diagram the application and need of DMA in I/O Data Transfer using peripherals.	CO3

difference between local and global variables. Use

advantages and disadvantages.

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Final Examination

Academic year 2024–2025

Program Name/Code: BE-CSE-CSBS

Subject Code: 23CST-236

Subject Title: FORMAL LANGUAGE AND AUTOMATA THEORY

Semester:3

Time: 3 Hour **Maximum Marks: 60**

Instructions:

- **Thequestion paper is consisting of three sections. It is compulsory for students to attempt all questions of Section A and Section B.**
- **Question no. 10 & 11 of section C, are compulsory to be attempted.**
- **Students to attempt any one question from question no. 12 & question no. 13 of section C**

Q. No	Statement	CO Mapping
	Section A (5 x 2 = 10 marks)	
1	Explain the application of Automata Theory.	CO1
2	Define CFG, CSG, PDA, and LBA.	CO1
3	Explain a non-deterministic Turing machine.	CO1
4	Explain a recursive language.	CO1
5	Evaluate whether a Turing machine can accept a context-free language and provide justification for your answer.	CO1
	Section B (4 x 5 = 20 marks)	
6	Explain the transition function of DFA and NDFA.	CO2
7	Analyse why a PDA is considered more powerful than a finite automaton.	CO2
8	Explain Church-Turing thesis.	CO2
9	Compare and contrast the powers of PDA and TM.	CO2
	Section C (3 x 10 = 30 marks)	
10	If I have a complex grammar then what kind of language will be generated and what type of machine will be required to accept it. Justify this statement with the help of respective Grammar, Automata and language.	CO3
	difference between local and global variables. Use	
11	Explain the pumping lemma for context-free languages (CFLs). State the lemma formally and illustrate its application with an example. Show how the lemma can be used to prove that the language is not context-free.	CO3
	Optional Question of Section C	
12	Give an example of an NP-Hard problem. Explain why you think it is an NP-Hard problem.	CO3
	OR	
13	Explain the Halting problem with the suitable example.	CO3

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Final Examination

Academic year 2024–2025

Program Name/Code: Bachelor of Engineering (Computer Science and Engineering) (Computer Science and Business Systems) (In association with TCS)

Subject Code: 23CSH-246

Subject Title: COMPUTATIONAL STATISTICS

Semester:3

Time: 3 Hour **Maximum Marks: 60**

Instructions:

- **Thequestion paper is consisting of three sections. It is compulsory for students to attempt all questions of Section A and Section B.**
- **Question no. 10 & 11 of section C, are compulsory to be attempted.**
- **Students to attempt any one question from question no. 12 & question no. 13 of section C**
- **Non - Scientific calculator is allowed.**

Q. No	Statement	CO Mapping
	Section A (5 x 2 = 10 marks)	
1	Explain the importance of the joint distribution in Multivariate Normal Distribution.	CO1
2	Describe the advantages of using Principal Component Analysis in data reduction.	CO3
3	Describe the factor analysis model with help of an example.	CO4
4	Describe clustering by partitioning methods and hierarchical clustering.	CO4
5	Explain the role of distance measures in clustering analysis.	CO4
	Section B (4 x 5 = 20 marks)	
6	Analyze the relationship between two variables within a Multivariate Normal Distribution: Given a bivariate normal dataset, derive and interpret the conditional distribution of one variable given the other. Discuss the implications for regression modeling. X1: 4 6 5 7 3 X2: 3 8 4 5 6	CO1
7	Differentiate between PCA performed on the covariance matrix and PCA performed on the correlation matrix.	CO3
8	Analyze the difference between exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) and discuss scenarios where each method is appropriate.	CO5
9	Analyze the impact of different distance measures on the clustering results in both hierarchical and K-Means clustering. Discuss how the choice of distance measure can affect the outcome.	CO4
	Section C (3 x 10 = 30 marks)	
10	Evaluate the various methods used to visualize bivariate data. Explain the construction and interpretation of scatter plots, including the identification of patterns, trends, and outliers. Discuss how scatter plot matrices can be used to visualize relationships between multiple pairs of variables. Illustrate your explanation with examples of scatter plots showing different types of relationships (linear, non-linear, no correlation).	CO2
11	Evaluate the effect of including prior probabilities in the discriminant analysis for the following dataset. • Sample Data: Observation | Feature1 | Feature2 | Actual Class Obs1 | 5.1 | 3.5 | Setosa Obs2 | 6.7 | 3.1 | Virginica Obs3 | 4.6 | 3.4 | Setosa Obs4 | 5.9 | 3.0 | Virginica Prior Probabilities | Setosa: 0.5, Versicolor: 0.3, Virginica: 0.2	CO4
	Optional Question of Section C	
12	Evaluate the role of distance measures in cluster analysis and Analyze how can different distance metrics (e.g., Euclidean, Manhattan, Cosine) affect the clustering results, and considerations made when choosing an appropriate distance measure.	CO4
	OR	
13	Analyze the process of clustering by partitioning methods, specifically K-Means clustering, and evaluate the profiling and interpretation of the clusters formed. Discuss the implications of the clusters for data-driven decision-making. • Sample Data: Observation | Var1 | Var2 | Var3 | Cluster Obs1 | 5.1 | 3.5 | 1.4 | 1 Obs2 | 4.9 | 3.0 | 1.4 | 1 Obs3 | 4.7 | 3.2 | 1.3 | 1 Obs4 | 6.4 | 3.2 | 4.5 | 2 Obs5 | 6.9 | 3.1 | 4.9 | 2 Obs6 | 5.5 | 2.3 | 4.0 | 2 Obs7 | 5.5 | 2.6 | 4.4 | 2 Obs8 | 6.3 | 3.3 | 6.0 | 3 Obs9 | 5.8 | 2.7 | 5.1 | 3 Obs10 | 7.1 | 3.0 | 5.9 | 3	CO4