



**Sri Indu Institute of  
Engineering & Technology**

Recognized Under 2(f) of UGC Act 1956

Approved by AICTE, New Delhi

Affiliated to JNTUH, Hyderabad.

# **COURSE FILE**

**ON**

# **DATA STRUCTURES**

**Course Code – CS302PC**

**II B.Tech I-SEMESTER**

**A.Y.: 2022-2023**

**Prepared by**

**Mrs.D.Rajeshwari**  
**Assistant Professor**

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SRI INDU INSTITUTE OF ENGG & TECH.  
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 1C.

  
**PRINCIPAL**  
Sri Indu Institute of Engineering & Techn.  
Sheriguda(Vill), Ibrahimpatnam  
R.R. Dist. Telangana-501 510.



## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

<b>Academic Year</b>	2022-2023
<b>Course Title</b>	Data Structures
<b>Course Code</b>	CS302PC
<b>Programme</b>	B.Tech
<b>Year &amp; Semester</b>	II year I-semester
<b>Branch &amp; Section</b>	CSE-A
<b>Regulation</b>	R18
<b>Course Faculty</b>	Mrs. D.Rajeshwari, Assistant Professor

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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### INSTITUTE VISION AND MISSION

#### **Vision:**

To become a premier institute of academic excellence by providing the world class education that transforms individuals into high intellectuals, by evolving them as empathetic and responsible citizens through continuous improvement.

#### **Mission:**

**IM1:** To offer outcome-based education and enhancement of technical and practical skills.

**IM2:** To continuous assess of teaching-learning process through institute-industry collaboration..

**IM3:** To be a centre of excellence for innovative and emerging fields in technology development with state-of-art facilities to faculty and students fraternity.

**IM4:** To create an enterprising environment to ensure culture, ethics and social responsibility among the stakeholders

*B. Renuka Kaul*  
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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### DEPARTMENT VISION AND MISSION

#### Vision:

To become a prominent knowledge hub for learners, strive for educational excellence with innovative and industrial techniques so as to meet the global needs.

#### Mission:

- DM1 :** To provide ambience that enhances innovations, problem solving skills, leadership qualities, decision making, team-spirit and ethical responsibilities.
- DM2 :** To impart quality education with professional and personal ethics, so as to meet the challenging technological needs of the industry and society.
- DM3 :** To provide academic infrastructure and develop linkage with the world class organizations to strengthen industry-academia relationships for learners.
- DM4 :** To provide and strengthen new concepts of research in the thrust area of Computer Science and Engineering to reach the needs of Government and Society.

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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### PROGRAM EDUCATIONAL OBJECTIVES

- PEO1:** To develop trained graduates with strong academic and technical skills of modern computer science and engineering.
- PEO2:** To promote trained graduates with leadership qualities and the ability to solve real time problems using current techniques and tools in interdisciplinary environment.
- PEO3:** To motivate the graduates towards lifelong learning through continuing education and professional development.

### PROGRAM SPECIFIC OUTCOMES

- PSO1 : Professional Skills:** To implement computer programs of varying complexity in the areas related to Web Design, Cloud Computing, Network Security and Artificial Intelligence.
- PSO2: Problem-Solving Skills:** To develop quality products using open ended programming environment.

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## PROGRAMME OUTCOMES (POs)

- PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**JAWAHARLALNEHRUTECHNOLOGICALUNIVERSITYHYDERABAD****B.Tech.inCOMPUTERSCIENCEANDENGINEERING  
COURSESTRUCTURE&SYLLABUS(R18)  
ApplicableFrom2019-20 Admitted Batch****II YEAR I SEMESTER**

S.No.	Course Code	CourseTitle	L	T	P	Credits
1	CS301ES	AnalogandDigitalElectronics	3	0	0	3
2	CS302PC	DataStructures	3	1	0	4
3	MA303BS	ComputerOrientedStatisticalMethods	3	1	0	4
4	CS304PC	ComputerOrganizationandArchitecture	3	0	0	3
5	CS305PC	ObjectOrientedProgrammingusingC++	2	0	0	2
6	CS306ES	AnalogandDigitalElectronicsLab	0	0	2	1
7	CS307PC	DataStructuresLab	0	0	3	1.5
8	CS308PC	ITWorkshopLab	0	0	3	1.5
9	CS309PC	C++ProgrammingLab	0	0	2	1
10	*MC309	GenderSensitizationLab	0	0	2	0
		<b>TotalCredits</b>	<b>14</b>	<b>2</b>	<b>12</b>	<b>21</b>

**II YEAR II SEMESTER**

S.No.	Course Code	CourseTitle	L	T	P	Credits
1	CS401PC	DiscreteMathematics	3	0	0	3
2	SM402MS	BusinessEconomics&FinancialAnalysis	3	0	0	3
3	CS403PC	OperatingSystems	3	0	0	3
4	CS404PC	DatabaseManagementSystems	3	1	0	4
5	CS405PC	JavaProgramming	3	1	0	4
6	CS406PC	OperatingSystemsLab	0	0	3	1.5
7	CS407PC	DatabaseManagementSystemsLab	0	0	3	1.5
8	CS408PC	JavaProgrammingLab	0	0	2	1
9	*MC409	ConstitutionofIndia	3	0	0	0
		<b>TotalCredits</b>	<b>18</b>	<b>2</b>	<b>8</b>	<b>21</b>

## CS302ES:DATASTRUCTURES

II Year B.Tech. CSE I-Sem

L T P C  
3 1 0 4

**Prerequisites:** A course on "Programming for Problem Solving".

### Course Objectives:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms

### Course Outcomes:

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

### UNIT-I

**Introduction to Data Structures**, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

### UNIT-II

**Dictionaries:** linear list representation, skip list representation, operations - insertion, deletion and searching.

**HashTable Representation:** hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

### UNIT-III

**Search Trees:** Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations-Insertion, Deletion and Searching, Red – Black, Splay Trees.

### UNIT-IV

**Graphs:** Graph Implementation Methods. Graph Traversal Methods.

**Sorting:** Heap Sort, External Sorting-Model for external sorting, Merge Sort.

### UNIT-V

**Pattern Matching and Tries:** Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

### TEXTBOOKS:

1. Fundamentals of Data Structures in C, 2<sup>nd</sup> Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, PHI/Pearson Education.

### REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2<sup>nd</sup> Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.





# SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501 510

Website: <https://siiet.ac.in/>

## COURSE OUTCOMES

Course: Data Structures (C212)

Class: II – CSE-A - Section

After completing this course the student will be able to:

- C212.1 Ability to decide on the data structures like stack, queues and list representation for Real Time Systems. (Application)
- C212.2 Design the programs using a variety of Data Structures such as List and Hashing Representation. (Synthesis)
- C212.3 Analyze and implement the various kinds of data structures in the trees. (Analysis)
- C212.4 To illustrate the structures by using AVL, Red and Splay Tree Representation (Comprehension)
- C212.5 To gain the knowledge on Searching, Sorting and Graphs are represented In Memory. (Knowledge)
- C212.6 To evaluate the String, Pattern Matching and Tries algorithms for information storing and retrieval in a real time system. (Evaluation)

### Mapping of course outcomes with program outcomes:

High -3

Medium -2

Low-1

PO/PSO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C212.1	2	3	1	1	-	-	-	-	-	-	-	-	1	-
C212.2	1	3	2	-	-	-	-	-	-	-	-	-	1	-
C212.3	1	2	3	-	1	-	-	-	-	-	-	2	-	2
C212.4	1	3	2	1	2	-	-	-	-	-	-	2	-	-
C212.5	1	2	1	-	-	-	-	-	-	-	-	2	-	-
C212.6	1	2	2	-	2	-	-	-	-	-	-	2	-	2
AVG	1.1	2.5	1.6	1	0.8	-	-	-	-	-	-	2	1	1



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## COURSE OUTCOMES

### CO – PO / PSO Mapping Justification

Course: Data Structures (CS302PC)

Class: II – CSE – A - Section

#### PROGRAMME OUTCOMES (POs):

- PO1 Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2 Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3 Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4 Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5 Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- PO12 Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

#### PROGRAM SPECIFIC OUTCOMES (PSOs):

- PSO1 Professional Skills:** The ability to implement computer programs of varying complexity in the areas related to web design, cloud computing and networking.
- PSO2 Problem-Solving Skills:** The ability to develop quality products using open ended programming environment.

**C212.1** Ability to decide on the data structures like stack, queues and list representation for Real Time Systems. (Application)

	<b>Justification</b>
<b>PO1</b>	Gain knowledge on data structures and able to choose appropriate data structure(level 2)
<b>PO2</b>	Identify the List representation of data structures . (Level 3)
<b>PO3</b>	Design the programs on stack . (Level 1)

<b>PO4</b>	Develop the programs on stacks, queues etc
<b>PSO1</b>	Discover the importance of real time systems in Data structures.

**C212.2** Design the programs using a variety of Data Structures such as List and Hashing Representation. (Synthesis)

	<b>Justification</b>
<b>PO1</b>	Gain knowledge on Hash representation..(level 1)
<b>PO2</b>	Students able to analyse the performance analysis of various algorithms (Level 3)
<b>PO3</b>	Able to design best algorithms by finding the time and space complexities
<b>PSO1</b>	Discovers Time Complexity of Programs.

**C212.3** Analyze and implement the various kinds of data structures in the trees. (Analysis)

	<b>Justification</b>
<b>PO1</b>	Gain knowledge on how to design programs for data structures(Level 1)
<b>PO2</b>	To design the programs students need to analyse the problem
<b>PO3</b>	Develop the programs on Trees
<b>PO5</b>	Develop the programs in c using turbo c editor
<b>PS12</b>	Ability to use these concepts in future scope. (level 2)
<b>PSO2</b>	Discover the Knowledge of ,Binary search trees

**C212.4** To illustrate the structures by using AVL, Red and Splay Tree Representation (Comprehension)

	<b>Justification</b>
<b>PO1</b>	Gains knowledge on various searching and Tree methods
<b>PO2</b>	Analyze the solving of searching and Tree methods
<b>PO3</b>	Able to design algorithms for Tree methods
<b>PO4</b>	Develops programs on Red, AVL, Splay Trees.(Level 1)
<b>PO5</b>	Develop programs for searching and sorting methods
<b>PS12</b>	Ability to use these concepts in future scope. (level 2)

**C212.5** To gain the knowledge on Searching, Sorting and Graphs are represented In Memory. (Knowledge)

	<b>Justification</b>
<b>PO1</b>	Gains knowledge on various searching and sorting methods
<b>PO2</b>	Analyse the various searching and sorting methods
<b>PO3</b>	develop the programs using various data structures
<b>PS12</b>	Ability to use these concepts in future scope. (level 2)

**C212.6** To evaluate the String, Pattern Matching and Tries algorithms for information storing and retrieval in a real time system. (Evaluation)

	<b>Justification</b>
<b>PO1</b>	Gains knowledge on string pattern matching
<b>PO2</b>	Analyze the program before designing the program
<b>PO3</b>	Develop the algorithms on pattern matching
<b>PO5</b>	Develop programs using turbo c editor
<b>PS12</b>	Ability to use these concepts in future scope. (level 2)
<b>PSO2</b>	Discover the Knowledge of ,Tries.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**ACADEMIC CALENDAR 2022-23**

**B. Tech./B.Pharm. II YEAR I & II SEMESTERS**

**I SEM**

S. No	Description	Duration	
		From	To
1	Commencement of I Semester classwork	<b>28.11.2022</b>	
2	1 <sup>st</sup> Spell of Instructions	28.11.2022	21.01.2023 (8 Weeks)
3	First Mid Term Examinations	23.01.2023	30.01.2023 (1 Week)
4	Submission of First Mid Term Exam Marks to the University on or before	04.02.2023	
5	2 <sup>nd</sup> Spell of Instructions	31.01.2023	29.03.2023 (8 Weeks)
6	Second Mid Term Examinations	31.03.2023	08.04.2023 (1 Week)
7	Preparation Holidays and Practical Examinations	10.04.2023	15.04.2023 (1 Week)
8	Submission of Second Mid Term Exam Marks to the University on or before	15.04.2023	
9	End Semester Examinations	17.04.2023	29.04.2023 (2 Weeks)

Note: No. of Working / Instructional Days: 93

**II SEM**

S. No	Description	Duration	
		From	To
1	Commencement of II Semester classwork	<b>01.05.2023</b>	
2	1 <sup>st</sup> Spell of Instructions (including Summer Vacation)	01.05.2023	08.07.2023 (10 Weeks)
3	<b>Summer Vacation</b>	15.05.2023	27.05.2023 (2 Weeks)
4	First Mid Term Examinations	10.07.2023	15.07.2023 (1 Week)
5	Submission of First Mid Term Exam Marks to the University on or before	22.07.2023	
6	2 <sup>nd</sup> Spell of Instructions	18.07.2023	11.09.2023 (8 Weeks)
7	Second Mid Term Examinations	12.09.2023	16.09.2023 (1 Week)
8	Preparation Holidays and Practical Examinations	19.09.2023	23.09.2023 (1 Week)
9	Submission of Second Mid Term Exam Marks to the University on or before	23.09.2023	
10	End Semester Examinations	25.09.2023	07.10.2023 (2 Weeks)

Note: No. of Working / Instructional Days: 92

  
 29/11/22  
 REGISTRAR



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Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana - 501 510

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### TIME TABLE FOR A.Y 2022-23

**Class: II-B. Tech CSE -A**

**Semester: I**

**LH. NO: A-301**

**W.E.F:28-11-2022**

Period/ Day	1	2	3	4	1:00- 1:30	5	6	7
	9:40-10:30	10:30-11:20	11:20-12:10	12:10-1:00		1:30-2:20	2:20-3:10	3:10-4:00
Monday	COSM	ITWS LAB(BATCH-I)/ A&DE LAB(BATCH-II)			L	A&DE	DS	C++
Tuesday	COSM	C++	COA	DS	U	A&DE	CO-C/SS/DAA	
Wednesday	C++	COSM	INT	COA	N	DS LAB(BATCH-I)/ C++ LAB(BATCH-II)		
Thursday	DS	GS LAB		COSM/DS(T)	C	C++	A&DE	SPORTS
Friday	COA	DS LAB(BATCH-II)/ C++ LAB(BATCH-I)			H	A&DE	LIB	DS/COSM(T)
Saturday	C++	DS	COUN	COA	ITWS LAB(BATCH-II)/ A&DE LAB(BATCH-I)			

(T) - Tutorial (concern faculty)

Subject Code	Subject Name	Name of the Faculty	Subject Code	Subject Name	Name of the Faculty
CS301ES	Analog and Digital Electronics	Mrs. S.Alekhyas	CS309PC	C++ Programming Lab	Mrs P H Swarna Rekha/ Mrs.P.Sourajanya/ Mrs. G.Swapna
CS302PC	Data Structures	Mrs. D.Rajeshwari	MC309	Gender Sensitization Lab	Mrs S Swapna
MA303BS	Computer Oriented Statistical Methods	Mrs. B.Ramadevi		CO-C/SS/DAA	Mrs. D.Rajeshwari
CS304PC	Computer Organization and Architecture	Dr. Sasikumar D	Sports	Sports	Mr K Veera Kishore
CS305PC	Object Oriented Programming Using C++	Mrs P H Swarna Rekha	Internet	Internet	Mrs. Ch Sai Vijaya
CS306ES	Analog and Digital Electronics Lab	Mrs. S.Alekhyas	LIB	Library	Mrs P H Swarna Rekha
CS307PC	Data Structures Lab	Mrs. D.Rajeshwari/ Mrs D.Uma/ Mrs.A.Sudha	COUN	Counselling	Mrs.R.Sruvanthi
CS308PC	IT Workshop Lab	Mrs T Ramya Priya/ Mrs.Ch.Sai Vijaya/ Mrs. Jakkala Priyanka			
Class In-Charge : Mrs. D.Rajeshwari		Mentor 1 : Mrs. D.Rajeshwari	Mentor 2: Mrs P H Swarna Rekha		

*[Signature]*  
Class In-Charge

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Website: <https://siiet.ac.in/>

## Department Computer Science and Engineering 2022-23; 1<sup>st</sup> semester

Course Title	DATA STRUCTURES
Course Code	CS302PC
Programme	B.Tech
Year & Semester	II-year I-semester
Regulation	R18
Course Faculty	Mrs.D.RAJESHWARI, Assistant Professor , CSE

### Lesson Plan

S.NO	Unit	TOPIC	Number of Sessions Planned	Teaching method/Aids	REFERENCE
1.	1	Introduction to Data Structures	1	Black Board	T1
2.		abstract data types	1	Black Board	T1
3.		Linear list – singly linked list implementation,	1	Black Board	T1
4.		Insertion operation on linear list,	1	Black Board	T1
5.		<b>Tutorial 1:(Singly linked list)</b>	1	Black Board	T1
6.		deletion g operation on linear list	1	Black Board	T1
7.		Searching operation on linear list		Black Board	T1
8.		Stacks-Operations,	1	Black Board	T1
9.		array and linked representations of stacks	1	Black Board	T1
10.		<b>Tutorial 2:(Stack Operations)</b>	1	Black Board	T1
11.		stack applications	1	Black Board	T1
12.		Queues-operations	1	Black Board	T1

13.		array representations	1	Black Board	T1
14.		linked representations	1	Black Board	T1
15.		<b>Tutorial 3:</b> (Queue operations)	1	Black Board	T1
16.		<b>Dictionaries:</b> linear list representation	1	Black Board	T1
17.		skip list representation	1	Black Board	T1
18.		operations -- insertion, deletion	1	Black Board	T1
19.		Searching operations.	1	Black Board	T1
20.		<b>Tutorial 4:</b> (linear list operations)	1	Black Board	T1
21.					
22.	2	Hash Table Representation:	1	Black Board	T1
23.		hash functions	1	Black Board	T1
24.		Collision resolution-separate chaining	1	Black Board	T1
25.		open addressing	1	Black Board	T1
26.		<b>Tutorial 5:</b> (Hash Table Representation)	1	Black Board	T1
27.		linear probing	1	Black Board	T1
28.		quadratic probing	1	Black Board	T1
29.		double hashing	1	Black Board	T1
30.		rehashing	1	Black Board	T1
31.		<b>Tutorial 6:</b> (Linear Probing,double hashing)	1	Black Board	T1,W1
32.		extendible hashing.	1	Black Board	T1
33.			Search Trees:	1	Black Board
34.		Binary Search Trees	1	Black Board	T1
35.		Definition, Implementation	1	Black Board	T1
36.		<b>Tutorial 7:</b> (Binary search tree)	1	Black Board	
37.		Operations	1	Black Board	T1
38.		Searching	1	Black Board	T1
39.		Insertion	1	Black Board	T1
40.		Deletion	1	Black Board	T1
41.		<b>Tutorial 8:</b> (Searching operations)	1	Black Board	T1

42.	3	AVL Trees	1	Black Board	T1
43.		Definition	1	Black Board	T1
44.		Height of an AVL Tree	1	Black Board	T1
45.		Operations	1	Black Board	T1
46.		<b>Tutorial 9:</b> (AVL tree)	1	Black Board	T1
47.		Insertion	1	Black Board	T1
48.		Deletion	1	Black Board	T1
49.		Searching	1	Black Board	T1
50.		Red –Black Tree	1	Black Board	T1
51.		<b>Tutorial 10:</b> (Red-Black tree)	1	Black Board	T1
52.		Splay Trees.	1	Black Board	T1
53.		Graphs	1	Black Board	T1
54.		Graph Implementation Methods	1	Black Board	T1
55.		Adjacency Matrix	1	Black Board	T1
56.		<b>Tutorial 11:</b> (Graph Implementation Methods)	1	Black Board	T1
57.		Adjacency list	1	Black Board	T1
58.		4	Graph Traversal Methods.	1	Black Board
59.	BFS(Breadth First Search)		1	Black Board	T1
60.	DFS(Depth First Search)		1	Black Board	T1
61.	<b>Tutorial 12:</b> (BFS,DFS)		1	Black Board	
62.	Sorting		1	Black Board	T1
63.	Heap Sort		1	Black Board	T1
64.	Max heap		1	Black Board	T1
65.	Min heap		1	Black Board	T1
66.	<b>Tutorial13:</b> (Heapsort,max heap&min heap)		1	Black Board	T1
67.	External Sorting		1	Black Board	T1
68.	Model for external sorting		1	Black Board	T1
69.	Merge Sort.	1	Black Board	T1	
70.		Pattern Matching and Tries:	1	Black Board	T1
71.		<b>Tutorial14:</b> (Externalsorting, Pattern matching algorithm)	1	Black Board	T1

72.	5	Pattern matching algorithms- Brute force,	1	Black Board	T1
73.		the Boyer –Moore algorithm	1	Black Board	T1,R1
74.		the Knuth-Morris-Pratt algorithm	1	Black Board	T1
75.		Standard Tries	1	Black Board	T1
76.		<b>Tutorial15</b> :(Boyer-Moore alg,KMP Alg)		Black Board	T1
77.		Compressed Tries	1	Black Board	T1
78.		Suffix tries.	1	Black Board	T1

### TEXT BOOKS:

**T1**-Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.

**T2**-Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

### REFERENCE BOOKS

R1-Data Structures: A Pseudo code Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.

### WEB REFERENCES

<https://www.javatpoint.com/data-structure-tutorial>

<https://www.geeksforgeeks.org/data-structures/>

<https://www.hackerearth.com/practice/data-structures/advanced-data-structures/trie-keyword-tree/tutorial/>

### VIDEO REFERENCES

<https://nptel.ac.in/courses/106102064>



# SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501 510

Website: <https://siiet.ac.in/>

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## LECTURE NOTES

### Unit 1 link:

<https://drive.google.com/file/d/1xW1JnZZeo1XiZT5TRxCTt40SFW58dhrB/view?usp=sharing>

### Unit 2 link:

<https://drive.google.com/file/d/1F0x0qTh7EMJCYhwtnlM-n6IdqAAw0eeU/view?usp=sharing>

### Unit 3 link:

<https://drive.google.com/file/d/1x-4q-7hNsWcP1iUkaC-93UQKTnob9s76/view?usp=sharing>

### Unit 4 link:

<https://drive.google.com/file/d/17W-RSIZHvj6bFiJTSN6-9KZJh3pHwhX/view?usp=sharing>

### Unit 5 link:

[https://drive.google.com/file/d/1eCfj3WnWuNAv82zyR\\_6fuY-6gJ5iWGu-/view?usp=sharing](https://drive.google.com/file/d/1eCfj3WnWuNAv82zyR_6fuY-6gJ5iWGu-/view?usp=sharing)





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## POWER POINT PRESENTATION

### PPT link:

Unit-1

<https://drive.google.com/file/d/1P2OVzMI8zpO2nqeci3Ev7rOapORAb1un/view?usp=sharing>

Unit-2

<https://drive.google.com/file/d/1TAxYt5w8ITX2eMtUpHpI0e8fnMIVkJLY/view?usp=sharing>

Unit-3

<https://drive.google.com/file/d/1eemXEOgVH9X6REBv4WEaBWOECjdvf1pO/view?usp=sharing>

Unit-4

<https://drive.google.com/file/d/1ysBCtZvObTffJKRKgHVNSD1MGDFwDWpw/view?usp=sharing>

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**B.Tech II Year I Semester Examinations, October - 2020**

**DATA STRUCTURES**

**(Common to CSE, IT) Time: 2 hours Max.**  
**Marks: 75**

**Answer any five questions All questions carry equal marks**

- - -

- a) Write an algorithm of Insert and Delete operation in Singly Linked List.
- b) Convert the following infix expression into postfix expression  
 $A + B - C * D * E \$ F \$ G$  [7+8]
2. Explain about the various hash collision resolution techniques with an example. [15]
3. Insert the following list of elements from the AVL tree. Delete the elements 18, 2 and 30 from the AVL tree 12, 30, 36, 18, 25, 9, 4, 2, 17, 14, 20, 47 [15]
- 4.a) Differentiate between BFS and DFS.
- b) Explain about external sorting with an example. [7+8]
- 5.a) Write an algorithm of compressed Trie.
- b) Explain about the Brute force algorithm with an example. [7+8]
- 6.a) Write a program to implement stack using linked list.
- b) Explain the operations of Queue with an example. [8+7]
7. Explain about:
  - a) Rehashing
  - b) Extendible hashing. [15]
8. Write an algorithm to delete an element from the binary search tree. [15]

---ooOoo---

Code No: 153AK

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, September - 2021

DATA STRUCTURES  
(Common to CSE, IT, ITE)

Time: 3 hours

Max. Marks: 75

Answer any five questions All  
questions carry equal marks

---

- 1.a) Write an algorithm of Push and Pop operations on a stack.  
b) Differentiate between stack and queue. [8+7]
2. Insert the following list of elements into the hash table by using Quadratic probing (size of Hash table is 13) 65, 34, 79, 114, 26, 85, 55, 89, 22, 98. [15]
3. Insert the following list of elements from the Red- Black tree. Delete the elements 18, 2 and 30 from the Red-Black tree 12, 30, 36, 18, 25, 9, 4, 2, 17, 14, 20, 47. [15]
4. Sort the following list of elements by using Merge sort  
30, 56, 78, 99, 12, 43, 10, 24, 85 [15]
- 5.a) Write an algorithm of Standard Trie.  
b) Explain the features that distinguish between Boyer Moore algorithm from the conventional algorithms. [7+8]
- 6.a) Write an algorithm for insertion of node at last position in Linear Linked List.  
b) Evaluate the following postfix expression using stack. Show each step  
 $5\ 3\ +\ 6\ 2\ /\ * 3\ 5\ * +$ . [7+8]
7. Write an algorithm of skip list operations insertion and deletion. [15]
8. Explain the operations of Splay tree with an example. [15]

---ooOoo---

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, August/September - 2022

## DATA STRUCTURES

(Common to CSE, IT, ECM, CSBS, CSIT, ITE, CSE(SE), CSE(CS), CSE(AIML), CSE(DS), CSE(IOT),  
CSE(N))

Time: 3 Hours

Max.Marks:75

**Answer any five questions All  
questions carry equal marks**

- - -

- 1.a) The following numbers 10, 20, 50, 30, 90, 60 (Top) are present in a stack of size 10. Perform the following operations in sequence. pop(), push(30), push(40), pop(), push(60), pop(), pop(), pop() What is the peek element at last? Draw and explain it.
- b) Implement a queue data structure using Single Linked list. [8+7]
- 2.a) The Professor Lilly is very strict in class room. She never gives the attendance to those who are coming last in her class. Write a function to help Professor to delete the last Occurrence of a student from the list.
- b) Implement a stack data structure using Single Linked list. [8+7]
- 3.a) Explain how Insertion, Deletion and Search is done in skip lists with example.
- b) What is the expected number of probes for both successful and unsuccessful searches in a linear probing table with load factor 0.25? [7+8]
- 4.a) Given the input (4371, 1323, 6173, 4199, 4344, 9679, 19891), a fixed table size of 10, and a hash function  $H(X) = X \text{ mod } 10$ , show the resulting quadratic probing hash table.
- b) Outline Double Hashing with an example. [8+7]
- 5.a) In an initially empty AVL tree insert the following keys: DEC, JAN, APR, MAR, JUL, AUG, OCT, FEB, NOV. Draw AVL tree after every insertion and apply rotations where ever necessary.
- b) Briefly discuss about different cases of imbalance that might be caused by a red-black tree insertion and corresponding methods to rebalance the tree. [7+8]
- 6.a) Construct Splay tree with the following node values: 18, 10, 5, 28, 13, 25, 42, 3, 56, 2, 68, 1, 90. And perform normal splaying at nodes 1 and at node 90.
- b) Explain insertion operation with following numbers into Red Black tree 45, 10, 8, 9, 34, 35, 12, 60, 90. [7+8]
- 7.a) Assume a list containing 4500 records is to be sorted using a computer with internal memory capable of sorting at most 750 records at a time and input list is maintained on a disk that has block length of 250 records. For this scenario explain how external sorting may be performed to accomplish the task.
- b) Compare BFS and DFS with suitable examples. [8+7]

- 8.a) Solve the Boyer-Moore algorithm for the following  
Example: Text: ABCABCDABABCDABCDABDE  
Pattern: ABCDABD
- b) Solve the Knuth Morris-Pratt algorithm for the following  
Example: Text: HEREISASIMPLEEXAMPLE  
Pattern: EXAMPLE

[8+7]

---oo0oo-

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# Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

I- Mid Examinations, JAN 2023

Set-I

Year & Branch: II-CSE (A,B&C)

Date: 23-01-2023 (AN)

Subject: Data Structures

Max. Marks: 10

Time: 60 MINS

Answer any TWO Questions. All Questions Carry Equal Marks

2 \* 5 = 10 marks

1. Define SLL and Program to perform operations of single linked list?

(C212.1)(KNOWLEDGE) 5M

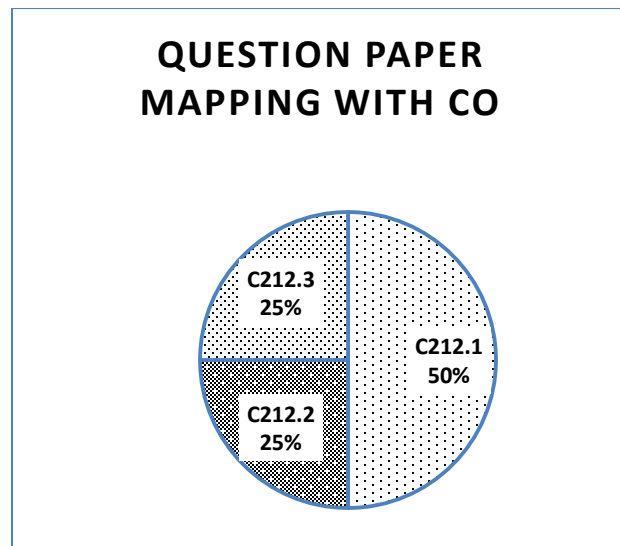
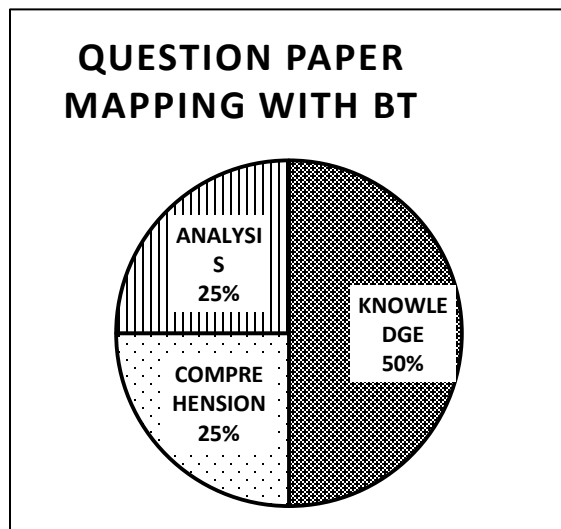
2. Explain FIFO and write a program to FIFO using linkedlist?(C212.1) (COMPREHENSION) 5M

3. Discuss collision Resolution techniques in hashing? Write about Dictionary Data Structure with an example?

(C212.2)(ANALYSIS) 5M

4. Define binary tree? Write its representations and mention the properties of it?

C212.3) (KNOWLEDGE) 5M



# Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

I - Mid Examinations, JAN-2023

Set-II

Year & Branch: II-CSE(A,B&C)

Date: 23-01-2023(AN)

Subject: Data Structures

Max. Marks: 10

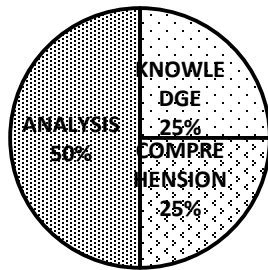
Time: 60 MINS

Answer any TWO Questions. All Question Carry Equal Marks

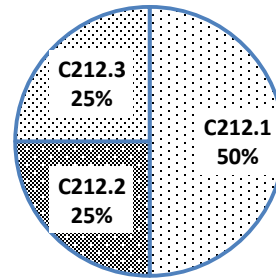
2 \* 5 = 10 marks

1. Classify different types of Data Structure? Write a Program to perform operations of single linked list?  
(C212.1) (ANALYSIS) 5M
2. Describe LIFO and it's performing operations by using arrays with example program?  
(C212.1) (KNOWLEDGE) 5M
3. Explain Skip list Representations and perform its operations with example?  
(C212.2)(COMPREHENSION) 5M
4. Analyze AVL tree and explain the rotations performed when tree is not balanced?  
(C212.3)(ANALYSIS) 5M

## QUESTION PAPER MAPPING WITH BT



## QUESTION PAPER MAPPING WITH CO



# Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.TECH. II YEAR I SEM., I Mid Term Examinations, January- 2023

DATA STRUCTURES

Objective Exam

Name : \_\_\_\_\_ Hall Ticket No.

--	--	--	--	--	--	--	--	--	--

Answer All Questions. All Questions Carry Equal Marks. Time: 20Min. Marks: 10.

I Choose the correct alternative:

1. Minimum number of fields in each node of a doubly linked list is \_\_\_\_ [ ]  
(A) 2 (B) 3 (C) 4 (D) None of the above
2. A linear collection of data elements where the linear node is given by means of pointer is called? [ ]  
a) Linked list b) Node list c) Primitive list d) Unordered list
3. On which principle does stack work? [ ]  
A) FILO B) FIFO C) LILO D) Both a and c above
4. What is the value of the postfix expression  $6\ 3\ 2\ 4\ +\ -\ * \ ?$  [ ]  
a) 1 b) 40 c) 74 d) -18
5. A normal queue, if implemented using an array of size MAX\_SIZE, gets full when? [ ]  
a)  $Rear = MAX\_SIZE - 1$  b)  $Front = (rear + 1) \bmod MAX\_SIZE$   
c)  $Front = rear + 1$  d)  $Rear = front$
6. What is a hash table? [ ]  
a) A structure that maps values to keys b) A structure that maps keys to values  
c) A structure used for storage d) A structure used to implement stack and queue
7. If several elements are competing for the same bucket in the hash table, what is it called? [ ]  
a) Diffusion b) Replication c) Collision d) Duplication
8. Which among the following is the best technique to handle collision? [ ]  
a) Quadratic probing b) Linear probing c) Double hashing d) Separate chaining
9. Which of the following is the correct function definition for quadratic probing? [ ]  
a)  $F(i)=i^2$  b)  $F(i)=i$  c)  $F(i)=i+1$  d)  $F(i)=i^2+1$
10. What is the speciality about the inorder traversal of a binary search tree? [ ]  
a) It traverses in a non increasing order b) It traverses in an increasing order  
c) It traverses in a random fashion d) It traverses based on priority of the node

## II. Fill in the blanks:

11. Linked list is generally considered as an example of -----type of memory allocation.
12. A linear collection of data element given by mean of pointer is called -----
13. In a stack, if a user tries to remove an element from an empty stack it is called -----  
-----
14. A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as -----
15. A queue follows -----
16. -----is not a theoretical problem but actually occurs in real implementations of probing.
17. -----problem occurs due to linear probing?
18. -----is not a collision resolution strategy for open addressing?
19. The number of edges from the root to the node is called ----- of the tree.
20. -----is a full binary tree?

# Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

## I- Mid Examinations, JAN-2023

Year & Branch: II CSE-A,B& C

Time: 60mins

Subject: **Data Structures**

Max marks:10

Date:23-01-2023(AN)

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### ANSWER KEY

**Descriptive paper key link:**

**SET-1:**

<https://drive.google.com/file/d/1FON4H5pFNkXaueLmkJZifBKc5CyOr0Vp/view?usp=sharing>

**SET2:**

[https://drive.google.com/file/d/1CYcs5ZsA4Z3LjrcwW5h\\_uuwFO7zK25dF/view?usp=sharing](https://drive.google.com/file/d/1CYcs5ZsA4Z3LjrcwW5h_uuwFO7zK25dF/view?usp=sharing)

### DATA STRUCTURES OBJECTIVE KEY

**I. Choose the correct alternative:**

**Answers:**

**I - Objectives**

1. B
2. A
3. A
4. D
5. A
6. B
7. C
8. A
9. A
10. B

**II- Fill in the blanks**

1. Dynamic
2. Linked list
3. Underflow
4. Queue
5. FIFO
6. Clustering
7. Primary collision
8. Rehashing
9. Depth
10. every node is either a leaf or has two children



# Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

II- Mid Examinations, MAY-2023

Set - I

Year&Branch: II CSE (A,B,C),CS,AI&ML&IOT

Date: 3-05-2023(AN)

Subject: CS302ES: Data Structures

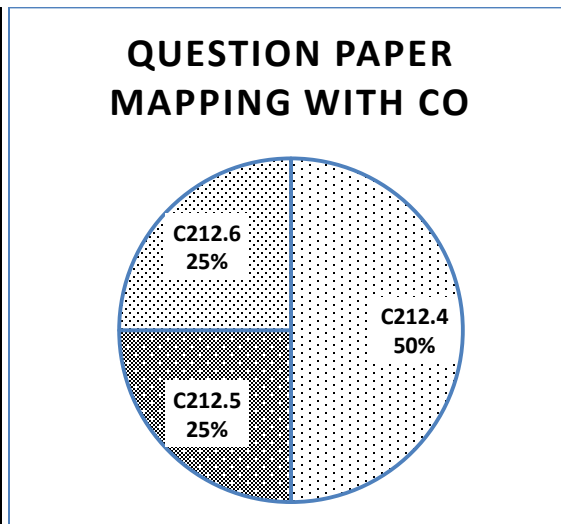
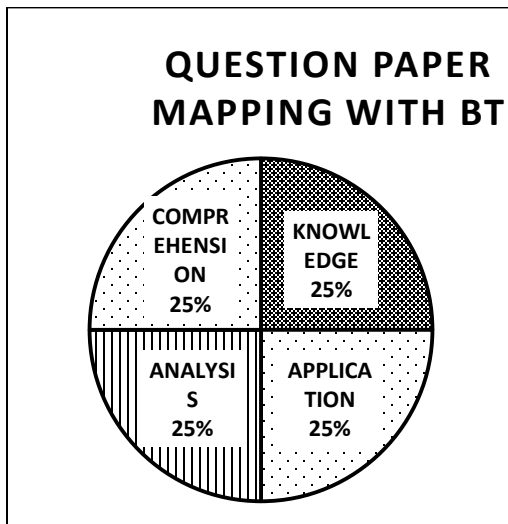
Marks: 10

Time: 60 min

Answer any TWO Questions. All Question Carry Equal Marks

2\*5=10 marks

- 1 Define AVL tree &Summarise the AVL tree insertion, and searching operations with your own Example. (5M)(C212.4)(Evaluation)
- 2 Explain in detail about Heap sort and Merge sort algorithm with example programs (5M) (C212.4) (Comprehension)
- 3 Write about graph Traversal methods? (5M) (C212.5)(Knowledge)
- 4 Analyze the pattern matching algorithms Knuth-Morris-Pratt and boyer moore (5M)(C212.6) (Analysis)



# Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

II- Mid Examinations, MAY-2023

Set - II

Year&Branch: II CSE(A,B,C),CS,AI&ML&IOT

Date:03-05-2023(AN)

Subject: CS302ES: Data Structures

Marks: 10

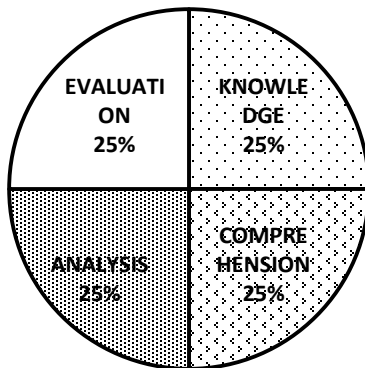
Time: 60 min

Answer any TWO Questions. All Question Carry Equal Marks

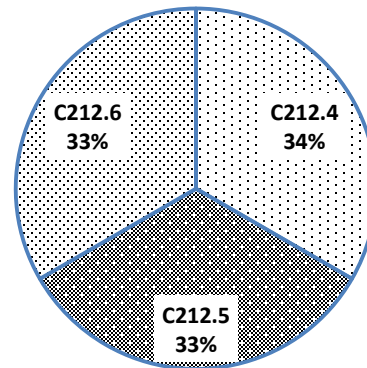
2\*5=10 marks

- 1 Write about Red Black tree and Splay tree with examples (5M) (C212.4) (Knowledge)
- 2 Classify the graph Traversal methods and its Applications with example?? (5M) (C212.5) (Application)
- 3 Compare the pattern matching algorithms brute force and boyar Moore algorithm (5M)(C212.6) (Analysis)
- 4 Explain about Compressed Tries and Suffix tries? (5M)(C212.6) (Comprehension)

## QUESTION PAPER MAPPING WITH BT



## QUESTION PAPER MAPPING WITH CO



# Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.TECH. II YEAR I SEM., II- Mid Term Examinations, MAY- 2023

## DATA STRUCTURES

### Objective Exam

Name : \_\_\_\_\_ Hall Ticket No.

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**Answer All Questions. All Questions Carry Equal Marks. Time: 20Min. Marks: 10.**

**I Choose the correct alternative:**

1. The no of external nodes in a full binary tree with n internal nodes is \_\_\_\_ [ ]  
(A) n (B) n+1 (C) 2n (D) 2n+1
2. Suppose a complete binary tree has height  $h > 0$ . The minimum no. of leaf nodes possible in term of h are? []  
a)  $2^h - 1$  b)  $2^{h-1} + 1$  c)  $2^{h-1}$  d)  $2^{h+1}$
3. When a binary tree is converted in to an extended binary tree, all the nodes of a binary tree in the external nodes becomes []  
A) Internal nodes B) External nodes C) Root nodes D) None
4. If n numbers are to be sorted in ascending order in  $O(n \log n)$  time, which of the tree can be used [ ]  
a) Binary tree b) Binary search tree c) Max-heap d) Min-heap
5. If every node u in G is adjacent to every other node v in G, A graph is said to be..... [ ]  
a) Isolated b) Complete c) Finite d) Strongly connected
6. A Binary tree can have? [ ]  
a) Can have 2 children b) Can have 1 children c) Can have 0 children d) All
7. Why to prefer red-black trees over AVL-trees? [ ]  
a) Because red-black is more rigidly balanced. b) AVL tree store balance factor in every node which cost space c) AVL tree fails at scale efficient d) Red-Black is more
8. Which of the following special type of trie is used for fast searching of the full texts? [ ]  
a) Ctrie b) Hash tree c) Suffix tree d) T tree
9. What is the number of edges present in a complete graph having n vertices? [ ]  
a)  $(n*(n+1))/2$  b)  $(n*(n-1))/2$  c) n d) None
10. Which of the following is the efficient data structure for searching words in dictionaries [ ]  
a) BST b) Linked list c) Balanced BST d) Trie

**II. Fill in the blanks:**

11. Trie is also known as -----
12. A graph is said to be ----- if its edges are assigned data
13. A binary tree T has n-leaf nodes. The number of degree 2 in T is -----
14. The operation of processing each element in the list is known as-----
15. What is an AVL tree -----
16. A program to search a contact from phone directory can be implemented efficiently using----  
-----
17. What is the name of elements present in patterns-----
18. In red-black tree every new node has-----color.
19. AVL stands for-----
20. Booyer-Moore pattern matching algorithm is-----.

# Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

## II- Mid Examinations, MAY-2023

Year & Branch: II CSE-A,B& C

Time:60mins

Subject: **Data Structures**

Max marks:10

Date: **03-05-2023(AN)**

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### ANSWER KEY

**Descriptive paper key link:**

#### SET-1

[https://drive.google.com/file/d/1JpmxX\\_SkdA07\\_A2DASv8StPN4w65d3Rc/view?usp=sharing](https://drive.google.com/file/d/1JpmxX_SkdA07_A2DASv8StPN4w65d3Rc/view?usp=sharing)

#### SET-2

[https://drive.google.com/file/d/10c\\_9HjwZ4A8CgbhHNTmpCXHD1-56mhNR/view?usp=sharing](https://drive.google.com/file/d/10c_9HjwZ4A8CgbhHNTmpCXHD1-56mhNR/view?usp=sharing)

## DATA STRUCTURES

### OBJECTIVE KEY

#### I - Objectives

11. B
12. C
13. A
14. D
15. B
16. D
17. B
18. C
19. B
20. D

#### II- Fill in the blanks

11. Digital tree
12. Labeled
13. (n-1)
14. Traversal
15. Height balanced tree
16. Trie
17. Pattern variables
18. Red
19. Adelson Velski Lendiss
20. Backward chaining algorithm



# SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501 510

Website: <https://siiet.ac.in/>

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## ASSIGNMENT- 1

## SUBJECT: Data Structures

1. Classify different types of Data Structure? Write a Program to perform operations of single linked list? **(C212.1) (ANALYSIS)**
2. Describe LIFO (Stack) and its performing operations by using arrays with example program? **(C212.1) (Knowledge)**
3. Explain Skip list Representations and perform its operations with example? **(C212.2)(Comprehension)**
4. Explain FIFO (Queue) and write a program to FIFO using arrays? **(C212.1)(Comprehension)**
5. Discuss collision Resolution techniques in hashing? Write about Dictionary Data Structure with an example? **(C212.1) (ANALYSIS)**



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Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501 510

Website: <https://siiet.ac.in/>

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**SUBJECT: Data Structures**

**ASSIGNMENT- 1 KEY LINK :**

[https://drive.google.com/file/d/10Ucb84WQO8MvdKomygSNfpa4If\\_y5PCL/view?usp=sharing](https://drive.google.com/file/d/10Ucb84WQO8MvdKomygSNfpa4If_y5PCL/view?usp=sharing)



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## ASSIGNMENT- 2

## SUBJECTS: WEB TECHNOLOGIES

1. Define AVL tree & Summarise the AVL tree insertion, and searching operations with your own Example. **(C212.4)(Evaluation)**
2. Explain in detail about Heap sort and Merge sort algorithm with example programs? **(C212.4) (Comprehension)**
3. Write about graph Traversal methods and applications? **(C212.5) (Application)**
4. a) Analyze the pattern matching algorithms brute force, Knuth-Morris-Pratt and Boyer-Moore? **(C212.6) (Analysis)**  
b) Explain about Compressed Tries and Suffix tries? **(C212.6) (Comprehension)**
5. Write about Red Black tree and Splay tree with examples? **(C212.4) (Knowledge)**





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**SUBJECT: WEB TECHNOLOGIES**

**ASSIGNMENT- 2 KEY LINK**

[https://drive.google.com/file/d/1qdH-4MYKKx2tIOsG\\_8axiawNJxY-jbdg/view?usp=sharing](https://drive.google.com/file/d/1qdH-4MYKKx2tIOsG_8axiawNJxY-jbdg/view?usp=sharing)



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Website: <https://siiet.ac.in/>

Course Title	DATA STRUCTURES
Course Code	CS302ES
Programme	B.Tech
Year & Semester	II Year I-Semester, CSE-A& AI&ML
Regulation	R18
Course Faculty	Mrs,Rajeshwari D, Assistant Professor , CSE

Weak Students:

S No	Roll no	No of backlogs	Internal-I Status	Internal-II Status
1	21X31A0507	4	16	17
2	21X31A0510	5	15	16
3	21X31A0512	5	15	15
4	21X31A0531	4	14	16
5	21X31A0535	4	14	14
6	21X31A0539	5	15	17
7	21X31A0544	4	15	16
8	21X31A0546	4	15	16

Advanced learners:

S No	Roll No	(SGPA)	Gate Material
1	21X31A0504	8.047	Abstract Data Types, Stack, Queue, AVL Trees, Red-Black tree, Binary Search tree, Graphs, Tries
2	21X31A0506	8.19	
3	21X31A0525	8.14	
4	21X31A0534	8.23	
5	21X31A0540	8.04	
6	21X31A0550	8.07	



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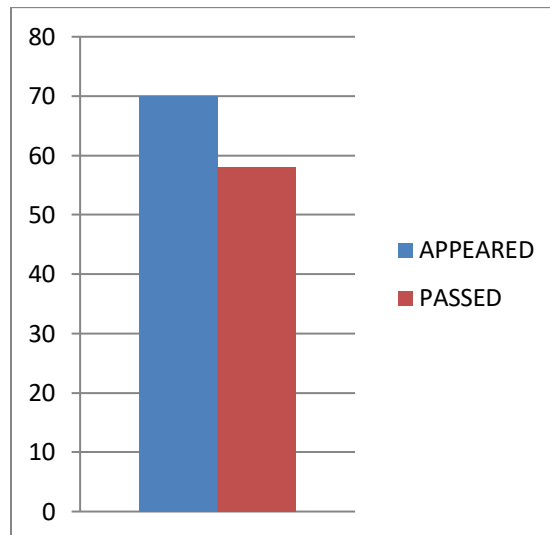
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## BATCH CSE-II BTECH I SEM CSE-A RESULT ANALYSIS

ACADAMIC YEAR	COURSE NAME	NUMBER OF STUDENTS		QUESTION PAPER SETTING		PASS%
		APPEARED	PASSED	INTERNAL	EXTERNAL	
2022-23	Data Structures	70	58	COURSE FACULTY	JNTUH	82%





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## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### REMEDIAL CLASSES TIME TABLE

A.Y 2022-23

SEMESTER-I

BRANCH/ SEC	MON 4.00 PM- 5.00 PM	TUE 4.00 PM-5.00 PM	WED 4.00 PM- 5.00 PM	THUR 4.00 PM- 5.00 PM	FRI 4.00 PM- 5.00 PM
II CSE-A	A&DE	DS	C++	COA	COSM
II CSE-B	DS	A&DE	COSM	C++	COA
II CSE-C	COSM	COA	A&DE	DS	C++
III CSE-A	SE	FLAT	CN	WT	PPL
III CSE-B	WT	CN	SE	PPL	FLAT
III CSE-C	FLAT	WT	PPL	CN	SE
IV CSE-A	C&NS	DM	CC	POE	RTS
IV CSE-B	CC	RTS	C&NS	DM	POE
IV CSE-C	RTS	CC	POE	C&NS	DM

  
HOD

Computer Science & Engg. Dept.  
SRI INDU INSTITUTE OF ENGG & TECH.  
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 10

  
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Sri Indu Institute of Engineering & Techn.  
Sheriguda(Vill), Ibrahimpatnam,  
Ranga Reddy Dist, Telangana -501 510



# SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Computer science and Engineering

## Course Outcome Attainment (Internal Examination-1)

Name of the faculty : Mrs. Rajeshwari D  
 Branch & Section: CSE -A  
 Course Name: Data Structures

Academic Year: 2022-23  
 Examination: I Internal  
 Year: II Semester: I

S.No	HT No.	Q1a	Q1b	Q1c	Q2a	Q2b	Q2c	Q3a	Q3b	Q3c	Q4a	Q4b	Q4c	Obj1	A1
<b>Max. Marks ==&gt;</b>														10	5
1	21X31A0501	5						2						9	5
2	21X31A0502				5			5						10	5
3	21X31A0503				2			4						8	5
4	21X31A0504				5			3						9	5
5	21X31A0505				2			5						9	5
6	21X31A0506	5						5						10	5
7	21X31A0507				1			2						8	5
8	21X31A0508				2			5						9	5
9	21X31A0509	5						4						10	5
10	21X31A0510							1						9	5
11	21X31A0511				2			5						9	5
12	21X31A0512				2									8	5
13	21X31A0513	3						5						9	5
14	21X31A0514	3				4								9	5
15	21X31A0515				2			5						9	5
16	21X31A0516				2									9	5
17	21X31A0517				2			4						8	5
18	21X31A0518				2			3						9	5
19	21X31A0519	1						3						9	5
20	21X31A0520	2						4						9	5
21	21X31A0521				2			5						10	5
22	21X31A0522	3						3						9	5
23	21X31A0523	5						4						10	5
24	21X31A0524	3						4						9	5
25	21X31A0525	5						5						10	5
26	21X31A0526				2			5						10	5
27	21X31A0527				2			4						9	5
28	21X31A0528	1						2						8	5
29	21X31A0529	1						5						9	5
30	21X31A0530	4						3						9	5
31	21X31A0531										1			8	5
32	21X31A0532				2			3						9	5
33	21X31A0533	5						5						10	5
34	21X31A0534	5						5						10	5
35	21X31A0535				1									8	5
36	21X31A0536	1			2									9	5
37	21X31A0537				2			4						9	5
38	21X31A0538	3						5						8	5
39	21X31A0539							4						8	5
40	21X31A0540	5						5						10	5
41	21X31A0541				2			4						9	5
42	21X31A0542	3						3						9	5
43	21X31A0543	3						4						8	5
44	21X31A0544				0			4						8	5
45	21X31A0545				5			2						9	5
46	21X31A0546				2			1						8	5
47	21X31A0547							1						8	5
48	21X31A0548	2						5						9	5

49	21X31A0549				1			4						8	5
50	21X31A0550				1			3						7	5
52	21X31A0552				1			4						7	5
53	21X31A0554				4			5						10	5
54	21X31A0555				2			4						9	5
55	21X31A0556				2			5						9	5
56	21X31A0557	4						5						10	5
57	21X31A0559				3			3						9	5
58	21X31A0560	5						4						10	5
59	21X31A0561				2			3						8	5
60	21X31A0562	3						3						9	5
61	21X31A0563				3			5						9	5
62	21X31A0564				4			5						9	5
63	21X31A0565				3			5						9	5
64	22X35A0501	3						5						9	5
65	22X35A0502				4			2						9	5
66	22X35A0503				2			3						7	5
67	22X35A0504				2			2						7	5
68	22X35A0505	4						4						10	5
69	22X35A0506				2			3						9	5
70	22X35A0507				2			3						9	5
71	22X35A0508				2			4						9	5
Target set by the faculty / HoD		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	3.00
Number of students performed above the target		27	0	0	40	1	0	64	0	0	1	0	0	70	70
Number of students attempted		27	0	0	40	1	0	64	0	0	1	0	0	70	70
Percentage of students scored more than target		100%			100%	100%		100%			100%			100%	100%

**CO Mapping with Exam Questions:**

CO - 1	y				y									y	y
CO - 2								y						y	y
CO - 3											y			y	y
CO - 4														y	y
CO - 5															
CO - 6															

**CO Attainment based on Exam Questions:**

CO - 1	100%				100%									100%	100%
CO - 2								100%						100%	100%
CO - 3											100%			100%	100%
CO - 4														100%	100%
CO - 5															
CO - 6															

CO	Subj	obj		Asgn	Overall	Level
CO-1	100%	100%		100%	100%	3.00
CO-2	100%	100%		100%	100%	3.00
CO-3	100%	100%		100%	100%	3.00
CO-4		100%		100%	100%	3.00
CO-5						
CO-6						

Attainment Level	
1	40%
2	50%
3	60%

Attainment (Internal 1 Examination) = **3.00**



45	21X31A0545	5						5						9	5
46	21X31A0546							2						8	5
47	21X31A0547													9	5
48	21X31A0548							4		5				8	5
49	21X31A0549				3			1						7	5
50	21X31A0550				3			2						8	5
51	21X31A0552							2		2				7	5
52	21X31A0554	5								5				9	5
53	21X31A0555	3								2				8	5
54	21X31A0556									4				7	5
55	21X31A0557	5						5						9	5
56	21X31A0559							1		3				7	5
57	21X31A0560	5						5						9	5
58	21X31A0561	3						2						7	5
59	21X31A0562	5						3						7	5
60	21X31A0563				4			5						8	5
61	21X31A0564	5						5						9	5
62	21X31A0565				3			4						7	5
62	22X35A0501				1			5						7	5
62	22X35A0502				5			4						7	5
62	22X35A0503							5		1				7	5
62	22X35A0504							3		4				7	5
62	22X35A0505	5						4						9	5
62	22X35A0506	5						3						8	5
62	22X35A0507	4						1						7	5
62	22X35A0508	5						3						8	5
Target set by the faculty / HoD		3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	6.00	3.00
Number of students performed above the target		39	0	0	10	0	0	32	0	0	18	0	0	69	70
Number of students attempted		42	0	0	18	0	0	43	0	0	22	0	0	70	70
Percentage of students scored more than target		93%			56%			74%			82%			99%	100%

**CO Mapping with Exam Questions:**

CO - 1															
CO - 2															
CO - 3															
CO - 4	y												y	y	
CO - 5				y									y	y	
CO - 6								y			y		y	y	

**CO Attainment based on Exam Questions:**

CO - 1															
CO - 2															
CO - 3															
CO - 4	93%												99%	100%	
CO - 5				56%									99%	100%	
CO - 6								74%			82%		99%	100%	

CO	Subj	obj	Asgn	Overall	Level
CO-1					
CO-2					
CO-3					
CO-4	93%	99%	100%	97%	3.00
CO-5	56%	99%	100%	85%	3.00
CO-6	78%	99%	100%	92%	3.00

Attainment Level	
1	40%
2	50%
3	60%

Attainment (Internal Examination-2) = **3.00**





# SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Computer science and Engineering

## Course Outcome Attainment (University Examinations)

Name of the faculty : Mrs. Rajeshwari D

Academic Year:

2022-23

Branch & Section: CSE -A

Year / Semester:

II / I

Course Name: Data Structures

S.No	Roll Number	Marks Secured
1	21X31A0501	36
2	21X31A0502	47
3	21X31A0503	35
4	21X31A0504	43
5	21X31A0505	27
6	21X31A0506	48
7	21X31A0507	33
8	21X31A0508	26
9	21X31A0509	44
10	21X31A0510	17
11	21X31A0511	40
12	21X31A0512	15
13	21X31A0513	33
14	21X31A0514	32
15	21X31A0515	26
16	21X31A0516	11
17	21X31A0517	36
18	21X31A0518	26
19	21X31A0519	27
20	21X31A0520	27
21	21X31A0521	26
22	21X31A0522	26
23	21X31A0523	33
24	21X31A0524	28
25	21X31A0525	44
26	21X31A0526	70
27	21X31A0527	35
28	21X31A0528	26
29	21X31A0529	38
30	21X31A0530	27
31	21X31A0531	2
32	21X31A0532	26
33	21X31A0533	42
34	21X31A0534	47
35	21X31A0535	1

S.No	Roll Number	Marks Secured
36	21X31A0536	32
37	21X31A0537	26
38	21X31A0538	29
39	21X31A0539	6
40	21X31A0540	43
41	21X31A0541	26
42	21X31A0542	40
43	21X31A0543	39
44	21X31A0544	6
45	21X31A0545	40
46	21X31A0546	7
47	21X31A0547	32
48	21X31A0548	33
49	21X31A0549	28
50	21X31A0550	73
51	21X31A0552	16
52	21X31A0554	44
53	21X31A0555	69
54	21X31A0556	37
55	21X31A0557	26
56	21X31A0559	26
57	21X31A0560	41
58	21X31A0561	26
59	21X31A0562	26
60	21X31A0563	74
61	21X31A0564	32
62	21X31A0565	28
63	22X35A0501	30
64	22X35A0502	31
65	22X35A0503	26
66	22X35A0504	10
67	22X35A0505	26
68	22X35A0506	10
69	22X35A0507	2
70	22X35A0508	70

Max Marks	75
Class Average mark	32
Number of students performed above the target	33
Number of successful students	70
Percentage of students scored more than target	47%
<b>Attainment level</b>	<b>1</b>

Attainment Level	% students
1	40%
2	50%
3	60%



# SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Computer science and Engineering

## Course Outcome Attainment

Name of the faculty Mrs. Rajeshwari D

Academic Year: 2022-23

Branch & Section: CSE -A

Examination: I Internal

Course Name: Data Structures

Year: II

Semester: I

Course Outcomes	1st Internal Exam	2nd Internal Exam	Internal Exam	University Exam	Attainment Level
CO1	3.00		3.00	1.00	1.50
CO2	3.00		3.00	1.00	1.50
CO3	3.00		3.00	1.00	1.50
CO4	3.00	3.00	3.00	1.00	1.50
CO5		3.00	3.00	1.00	1.50
CO6		3.00	3.00	1.00	1.50
<b>Internal &amp; University Attainment:</b>			3.00	1.00	
<b>Weightage</b>			25%	0.75	
<b>CO Attainment for the course (Internal, University</b>			0.75	0.75	
<b>CO Attainment for the course (Direct Method)</b>			1.50		

**Overall course attainment level**

**1.50**



# SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Electronics and Communication Engineering

## Program Outcome Attainment (from Course)

Name of Faculty:	Rajeshwari D	Academic Year:	2022-23
Branch & Section:	CSE -A	Year:	II
Course Name:	Data Structures	Semester:	I

### CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	1	-	-	-	-	-	-	-	-	1	-
CO2	1	3	2	-	-	-	-	-	-	-	-	-	1	-
CO3	1	2	3	-	1	-	-	-	-	-	-	2	-	2
CO4	1	3	2	1	2	-	-	-	-	-	-	2	-	-
CO5	1	2	1	-	-	-	-	-	-	-	-	2	-	-
CO6	1	2	2	-	2	-	-	-	-	-	-	2	-	2
<b>Course</b>	1.1	2.5	1.6	1	0.8	-	-	-	-	-	-	2	1	1

CO	Course Outcome Attainment
CO1	1.50
CO2	1.50
CO3	1.50
CO4	1.50
CO5	1.50
CO6	1.50
<b>Overall course attainment level</b>	<b>1.50</b>

### PO-ATTAINMENT

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO Attainment</b>	<b>0.55</b>	<b>1.25</b>	<b>0.80</b>	<b>0.50</b>	<b>0.40</b>							<b>1.00</b>	<b>0.50</b>	<b>0.50</b>

CO contribution to PO - 33%, 67%, 100% (Level 1/2/3)



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Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501 510

Website: <https://siiet.ac.in/>

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## **Attendance Register Link:**

[https://drive.google.com/file/d/1kGJY8IghF5pGZ-7OaTE\\_MvbXTe3aWC7/view?usp=sharing](https://drive.google.com/file/d/1kGJY8IghF5pGZ-7OaTE_MvbXTe3aWC7/view?usp=sharing)