P. V. P. SIDDHARTHA INSTITUTE OFTECHNOLOGY	Regd. No:			5	0		A	0	5		
	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB								Internal Lab Examination		
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describeeach and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET: 1

Program/Task:

Given input {} and a hash function h(x) = x mod 10, Choose appropriate collision resolution technique amongst the following and justify your answer

a. Separate chaining
b. Linear probing.
c. Quadratic probing.
d. Double hashing with second hash function h2 (x) = 7 − (x mod 7).

Viva Questions:

1. Define Binary Tree
2. Define Tree Data Structure
3. Name some characteristics of Array Data Structure
4. What is Hash Table?
5. What is Heap?
6. What is Priority Queue?
7. What is a Graph?
8. Under what circumstances are Linked Lists useful?
9. What are Dynamic Arrays?
10. What is Binary Heap?

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Instructions:

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- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET: 2

Program/Task:

Given input {} and a hash function h(x) = x mod 10, Choose appropriate collision resolution technique amongst the following and justify your answer

a. Separate chaining

b. Linear probing.

c. Quadratic probing.

d. Double hashing with second hash function h2 (x) = 7 − (x mod 7).

Viva Questions:

1. Define Binary Tree
2. Define Tree Data Structure
3. Name some characteristics of Array Data Structure
4. What is Hash Table?
5. What is Heap?
6. What is Priority Queue?
7. What is a Graph?
8. Under what circumstances are Linked Lists useful?
9. What are Dynamic Arrays?
10. What is Binary Heap?

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Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET: 3

Program/Task:

Given input {} and a hash function h(x) = x mod 10, Choose appropriate collision resolution technique amongst the following and justify your answer

a. Separate chaining

b. Linear probing.

c. Quadratic probing.

d. Double hashing with second hash function h2 (x) = 7 − (x mod 7)..

Viva Questions:

1. Define Binary Tree
2. Define Tree Data Structure
3. Name some characteristics of Array Data Structure
4. What is Hash Table?
5. What is Heap?
6. What is Priority Queue?
7. What is a Graph?
8. Under what circumstances are Linked Lists useful?
9. What are Dynamic Arrays?
10. What is Binary Heap?

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Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET: 4

Program/Task:

Given input {} and a hash function h(x) = x mod 10, Assume linear probing collision resolution technique is chosen to avoid collisions. Now Apply Rehash using an appropriate table size N with a hash function of h(x) = x mod N. to decrease number of collisions.

Viva Questions:

1. Define Binary Tree
2. Define Tree Data Structure
3. Name some characteristics of Array Data Structure
4. What is Hash Table?
5. What is Heap?
6. What is Priority Queue?
7. What is a Graph?
8. Under what circumstances are Linked Lists useful?
9. What are Dynamic Arrays?
10. What is Binary Heap?

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DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET: 5

Program/Task:

Given input {} and a hash function h(x) = x mod 10, Assume quadratic probing collision resolution technique is chosen to avoid collisions. Now Apply Rehash using an appropriate table size N with a hash function of h(x) = x mod N. to decrease number of collisions..

Viva Questions:

1. What is Complexity Analysis of Priority Queue operations?
2. What is the space complexity of a Hash Table?
3. What's the difference between the data structure Tree and Graph?
4. Compare Heaps vs Arrays to implement Priority Queue
5. What is AVL Tree?
6. What is Balanced Tree and why is that important?
7. What is an Associative Array?
8. What is complexity of Hash Table?
9. Explain what is B-Tree?
10. How To Choose Between a Hash Table and a Trie (Prefix Tree)?

P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
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DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET: 6

Program/Task:

Given input {} and a hash function h(x) = x mod 10, Assume separate chaining collision resolution technique is chosen to avoid collisions. Now Apply Rehash using an appropriate table size N with a hash function of h(x) = x mod N. to decrease number of collisions.

Viva Questions:

1. What is Complexity Analysis of Priority Queue operations?
2. What is the space complexity of a Hash Table?
3. What's the difference between the data structure Tree and Graph?
4. Compare Heaps vs Arrays to implement Priority Queue
5. What is AVL Tree?
6. What is Balanced Tree and why is that important?
7. What is an Associative Array?
8. What is complexity of Hash Table?
9. Explain what is B-Tree?
10. How To Choose Between a Hash Table and a Trie (Prefix Tree)?

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P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
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Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET: 7

Program/Task:

Implement topological sort and Identify a stack / queue is used for the topological sort in your implementation

Does the ordering result changes from a stack or queue? Why might one data structure give a "better" answer?

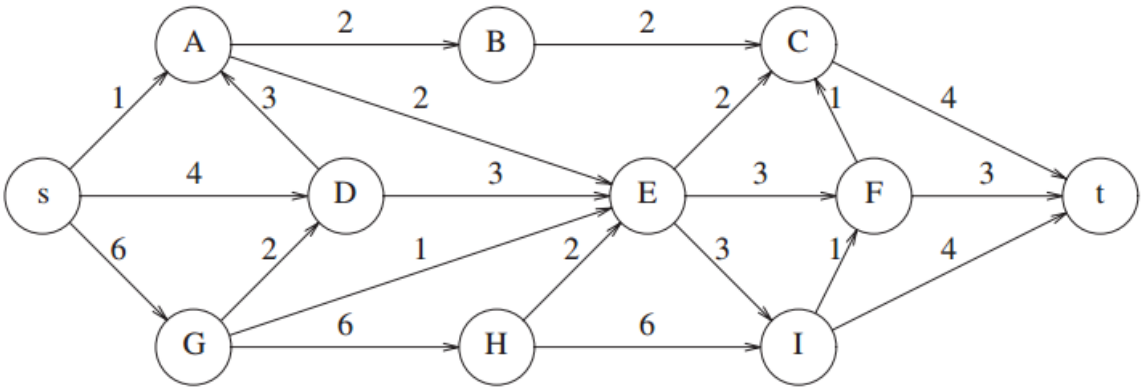

Figure 9.81 Graph used in Exercises 9.1 and 9.11

Viva Questions:

1. What is Complexity Analysis of Priority Queue operations?
2. What is the space complexity of a Hash Table?
3. What's the difference between the data structure Tree and Graph?
4. Compare Heaps vs Arrays to implement Priority Queue
5. What is AVL Tree?
6. What is Balanced Tree and why is that important?
7. What is an Associative Array?
8. What is complexity of Hash Table?
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Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET: 8

Program/Task:

Implement topological sort and Identify justify your answer If a stack / queue is used for the topological sort what is the different ordering result? Why might one data structure give a "better" answer?

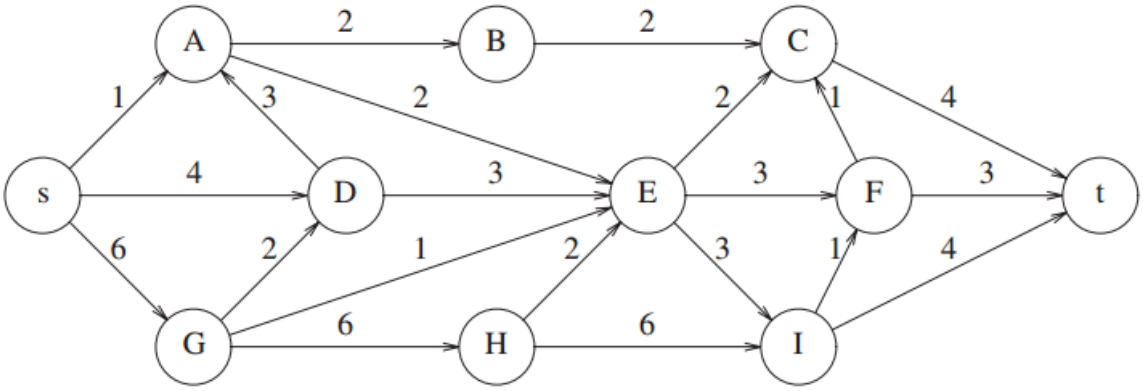

Figure 9.81 Graph used in Exercises 9.1 and 9.11

Viva Questions:

1. What is Complexity Analysis of Priority Queue operations?
2. What is the space complexity of a Hash Table?
3. What's the difference between the data structure Tree and Graph?
4. Compare Heaps vs Arrays to implement Priority Queue
5. What is AVL Tree?
6. What is Balanced Tree and why is that important?
7. What is an Associative Array?
8. What is complexity of Hash Table?
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Instructions:

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- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET: 9

Program/Task:

Choose appropriate data structure if I wanted to have a *quick access to the largest (or smallest) item* in a list of items Justify why that structure is used.

Viva Questions:

1. What are some main advantages of binomial queues
2. Compare lookup operation in Binomial queues
3. How are B-Trees used in practice?
4. What are the various applications of Data structures
5. Explain the difference between file structure and storage structure?
6. What is hashmap in data structure? What is the time complexity of basic operations get() and put() in HashMap class?
7. What is the maximum number of nodes in a binary tree of height k?
8. Write a recursive function to calculate the height of a binary tree?
9. What is topological sorting in a graph?
10. What is the difference between backtracking and a brute force one?

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Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB								Internal Lab Examination		
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Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

10

Program/Task:

Choose appropriate data structure if I wanted to have a *quick access to the largest (or smallest) item* in a list of items Justify why that structure is used.

Viva Questions:

1. What are some main advantages of binomial queues
2. Compare lookup operation in Binomial queues
3. How are B-Trees used in practice?
4. What are the various applications of Data structures
5. Explain the difference between file structure and storage structure?
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Instructions:

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- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

11

Program/Task:

Choose an appropriate data structure to access a min or max element in constant time from a list of elements

Viva Questions:

1. What are some main advantages of binomial queues
2. Compare lookup operation in Binomial queues
3. How are B-Trees used in practice?
4. What are the various applications of Data structures
5. Explain the difference between file structure and storage structure?
6. What is hashmap in data structure? What is the time complexity of basic operations get() and put() in HashMap class?
7. What is the maximum number of nodes in a binary tree of height k?
8. Write a recursive function to calculate the height of a binary tree?
9. What is topological sorting in a graph?
10. What is the difference between backtracking and a brute force one?

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DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		

Instructions:

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- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

12

Program/Task:

Choose an appropriate data structure that maintains data in a *semiordered and which is* a good tradeoff between the cost of maintaining a complete order ant the cost of seaching through random chaos.

Viva Questions:

1. What are some main advantages of binomial queues
2. Compare lookup operation in Binomial queues
3. How are B-Trees used in practice?
4. What are the various applications of Data structures
5. Explain the difference between file structure and storage structure?
6. What is hashmap in data structure? What is the time complexity of basic operations get() and put() in HashMap class?
7. What is the maximum number of nodes in a binary tree of height k?
8. Write a recursive function to calculate the height of a binary tree?
9. What is topological sorting in a graph?
10. What is the difference between backtracking and a brute force one?

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- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

13

Program/Task:

Choose an appropriate data structure for efficient implementation of an abstract data type called a priority queue,.

Viva Questions:

1. What is the advantage of using Bellman-Ford over Dijkstra?
2. What is the minimum number of queues needed when implementing a priority queue?
3. How do you find the duplicate number on a given integer array?
4. Can you store a duplicate key in Hashmap?
5. What are the differences between B tree and B+ tree?
6. Compare lookup operation in AVL tree vs Red Black tree
7. What is the difference between Hashing and Hash Tables?
8. When would you want to use a Heap data structure?
9. Why is a Hash Table not used instead of a B-Tree in order to access data inside a database?
10. Difference between Hashmap and Hashtable

P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
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DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		

Instructions:

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- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

14

Program/Task:

Choose an appropriate data structure to access a min or max element in constant time from a list of elements

Viva Questions:

1. What is the advantage of using Bellman-Ford over Dijkstra?
2. What is the minimum number of queues needed when implementing a priority queue?
3. How do you find the duplicate number on a given integer array?
4. Can you store a duplicate key in Hashmap?
5. What are the differences between B tree and B+ tree?
6. Compare lookup operation in AVL tree vs Red Black tree
7. What is the difference between Hashing and Hash Tables?
8. When would you want to use a Heap data structure?
9. Why is a Hash Table not used instead of a B-Tree in order to access data inside a database?
10. Difference between Hashmap and Hashtable

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DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		

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- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

15

Program/Task:

Choose an appropriate data structure to access a min or max element in constant time from a list of elements

Viva Questions:

1. What is the advantage of using Bellman-Ford over Dijkstra?
2. What is the minimum number of queues needed when implementing a priority queue?
3. How do you find the duplicate number on a given integer array?
4. Can you store a duplicate key in Hashmap?
5. What are the differences between B tree and B+ tree?
6. Compare lookup operation in AVL tree vs Red Black tree
7. What is the difference between Hashing and Hash Tables?
8. When would you want to use a Heap data structure?
9. Why is a Hash Table not used instead of a B-Tree in order to access data inside a database?
10. Difference between Hashmap and Hashtable

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- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

16

Program/Task:

Choose an appropriate data structure for efficient implementation of an abstract data type called a priority queue

Viva Questions:

1. can Min heap can be used to implement selection sort?
2. What is hashmap in data structure?
3. What is the requirement for an object to be used as key or value in HashMap?
4. What is the complexity of Insertion operations in Binomial queues and Priority queues
5. Whn does Binomial queues preferred over priority queus
6. What is a priority queue? What are the applications for priority queue?
7. Compare different implementations of priority queue
8. What is AVL tree data structure, its operations, and its rotations? What are the applications for AVL trees?
9. What is a B-tree data structure? What are the applications?

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DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		

Instructions:

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- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

17

Program/Task:

Choose an appropriate data structure for efficient implementation of an abstract data type called a priority queue

Viva Questions:

1. can Min heap can be used to implement selection sort?
2. What is hashmap in data structure?
3. What is the requirement for an object to be used as key or value in HashMap?
4. What is the complexity of Insertion operations in Binomial queues and Priority queues
5. Whn does Binomial queues preferred over priority queus
6. What is a priority queue? What are the applications for priority queue?
7. Compare different implementations of priority queue
8. What is AVL tree data structure, its operations, and its rotations? What are the applications for AVL trees?
9. What is a B-tree data structure? What are the applications.
10. Define Red-Black Tree and its applications

P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB								Internal Lab Examination		
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

18

Program/Task:

Choose an appropriate data structure when you need to remove the object with the highest (or lowest) priority.

Viva Questions:

1. Which data structures are used for implementing LRU cache?
2. Write a program to remove duplicates from a sorted array in place?
3. Write a function to merge two sorted binary search tree
4. Write a recursive function to calculate the height of a binary tree \
5. What is topological sorting in a graph?
6. How can memory be saved when storing color information in a Red-Black tree?
7. which of the data structures is best for searching words in dictionaries?
8. How do you check if a given binary tree is a subtree of another binary tree?
9. How do you find if two trees are identical?
10. How are binary trees used for data compression?

P. V. P. SIDDHARTHA INSTITUTE OF	Regd. No:			5	0		A	0	5		

TECHNOLOGY	YEAR	SEMESTER	Programme	DURATION
Degree: B. TECH (PVP20)	II	II	B.Tech - CSE	3 HOURS
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB			Internal Lab Examination
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023			AC Year: 2022-23

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
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- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

19

Program/Task:

Choose an appropriate data structure when you need to remove the object with the highest (or lowest) priority.

Viva Questions:

- Which data structures are used for implementing LRU cache?
- Write a program to remove duplicates from a sorted array in place?
- Write a function to merge two sorted binary search tree
- Write a recursive function to calculate the height of a binary tree \
- What is topological sorting in a graph?
- How can memory be saved when storing color information in a Red-Black tree?
- which of the data structures is best for searching words in dictionaries?
- How do you check if a given binary tree is a subtree of another binary tree?
- How do you find if two trees are identical?
- How are binary trees used for data compression?

P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
	YEAR	SEMESTER				Programme				DURATION	

Degree: B. TECH (PVP20)	II	II	B.Tech - CSE	3 HOURS
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB			Internal Lab Examination
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023			AC Year: 2022-23

Instructions:

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- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

20

Program/Task:

Choose an appropriate data structure to sort the following number with worst case time complexity of O(n log n).

Viva Questions:

- Which data structures are used for implementing LRU cache?
- Write a program to remove duplicates from a sorted array in place?
- Write a function to merge two sorted binary search tree
- Write a recursive function to calculate the height of a binary tree \
- What is topological sorting in a graph?
- How can memory be saved when storing color information in a Red-Black tree?
- which of the data structures is best for searching words in dictionaries?
- How do you check if a given binary tree is a subtree of another binary tree?
- How do you find if two trees are identical?
- How are binary trees used for data compression?

P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		

Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB	Internal Lab Examination
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023	AC Year: 2022-23

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

21

Program/Task:

Choose an appropriate data structure to sort the following number with worst case time complexity of O(n log n).

Viva Questions:

- Which data structures are used for implementing LRU cache?
- Write a program to remove duplicates from a sorted array in place?
- Write a function to merge two sorted binary search tree
- Write a recursive function to calculate the height of a binary tree \
- What is topological sorting in a graph?
- How can memory be saved when storing color information in a Red-Black tree?
- which of the data structures is best for searching words in dictionaries?
- How do you check if a given binary tree is a subtree of another binary tree?
- How do you find if two trees are identical?
- How are binary trees used for data compression?

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	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB								Internal Lab Examination		
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

22

Program/Task:

Sometimes a binary search tree, may be skewed tree, so in worst case BST searching, insertion and deletion complexity = O(n). In the above scenario Choose an appropriate data structure with a time complexity of searching, insertion and deletion = O(logn).

Viva Questions:

- Which data structures are used for implementing LRU cache?
- Write a program to remove duplicates from a sorted array in place?
- Write a function to merge two sorted binary search tree
- Write a recursive function to calculate the height of a binary tree \
- What is topological sorting in a graph?
- How can memory be saved when storing color information in a Red-Black tree?
- which of the data structures is best for searching words in dictionaries?
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P. V. P. SIDDHARTHA INSTITUTE OF	Regd. No:			5	0		A	0	5		

TECHNOLOGY	YEAR	SEMESTER	Programme	DURATION
Degree: B. TECH (PVP20)	II	II	B.Tech - CSE	3 HOURS
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB			Internal Lab Examination
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023			AC Year: 2022-23

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

23

Program/Task:

Sometimes a binary search tree, may be skewed tree, so in worst case BST searching, insertion and deletion complexity = O(n). In the above scenario Choose an appropriate data structure with a time complexity of searching, insertion and deletion = O(logn).

Viva Questions:

- Which data structures are used for implementing LRU cache?
- Write a program to remove duplicates from a sorted array in place?
- Write a function to merge two sorted binary search tree
- Write a recursive function to calculate the height of a binary tree \
- What is topological sorting in a graph?
- How can memory be saved when storing color information in a Red-Black tree?
- which of the data structures is best for searching words in dictionaries?
- How do you check if a given binary tree is a subtree of another binary tree?
- How do you find if two trees are identical?
- How are binary trees used for data compression?

P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		

	YEAR	SEMESTER	Programme	DURATION
Degree: B. TECH (PVP20)	**II**	**II**	**B.Tech - CSE**	**3 HOURS**
Course Code: 20CS3552	**SUBJECT: ADVANCED DATA STRUCTURES LAB**			**Internal Lab Examination**
DEPARTMENT: CSE	**DATE OF EXAM: 09-05-2023**			**AC Year: 2022-23**

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

24

Program/Task:

Given a skew tree . what will be the time complexity to balance the tree? What will be the algorithm for this?

Viva Questions:

- How to handle duplicate nodes in a binary search tree?
- Can binary search be used for the linked list?
- What is rehashing
- Compare Naïve patters searching with Robin krap pattern searching algorithms
- What is the time complexity of Kunth morris pratt pattern searching algorithm
- What are various collision handling methods in hashing
- What is the disadvantage of separate chaining hashing method
- What is the complexity of Floyd warhalls algorithm
- What is the best method to join two disjoint sets
- Give an example for an equivalence relation

P. V. P. SIDDHARTHA INSTITUTE OF	Regd. No:			5	0		A	0	5		

TECHNOLOGY	YEAR	SEMESTER	Programme	DURATION
Degree: B. TECH (PVP20)	II	II	B.Tech - CSE	3 HOURS
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB			Internal Lab Examination
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023			AC Year: 2022-23

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

25

Program/Task:

Consider a situation with a number of persons and the following tasks to be performed on them:

- Add a new friendship relation, i.e. a person x becomes the friend of another person y i.e adding new element to a set.
- Find whether individual x is a friend of individual y (direct or indirect friend)
- Find whether x and y belong to the same group or not, i.e. to find if x and y are direct/indirect friends.

Viva Questions:

- How to handle duplicate nodes in a binary search tree?
- Can binary search be used for the linked list?
- What is rehashing
- Compare Naïve patters searching with Robin krap pattern searching algorithms
- What is the time complexity of Kunth morris pratt pattern searching algorithm
- What are various collision handling methods in hashing
- What is the disadvantage of separate chaining hashing method
- What is the complexity of Floyd warhalls algorithm
- What is the best method to join two disjoint sets
- Give an example for an equivalence relation.

P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
	YEAR	SEMESTER				Programme				DURATION	

Degree: B. TECH (PVP20)	II	II	B.Tech - CSE	3 HOURS
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB			Internal Lab Examination
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023			AC Year: 2022-23

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

26

Program/Task:

We are given 10 individuals say, a, b, c, d, e, f, g, h, i, j

Following are relationships to be added:

a <-> b
b <-> d
c <-> f
c <-> i
j <-> e
g <-> j

Given queries like whether a is a friend of d or not.

Viva Questions:

- How to handle duplicate nodes in a binary search tree?
- Can binary search be used for the linked list?
- What is rehashing
- Compare Naïve patters searching with Robin krap pattern searching algorithms
- What is the time complexity of Kunth morris pratt pattern searching algorithm
- What are various collision handling methods in hashing
- What is the disadvantage of separate chaining hashing method
- What is the complexity of Floyd warhalls algorithm
- What is the best method to join two disjoint sets
- Give an example for an equivalence relation

P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
	YEAR	SEMESTER				Programme			DURATION		

Degree: B. TECH (PVP20)	II	II	B.Tech - CSE	3 HOURS
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB			Internal Lab Examination
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023			AC Year: 2022-23

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

27

Program/Task:

Consider a situation with a number of persons and the following tasks to be performed on them:

- Add a new friendship relation, i.e. a person x becomes the friend of another person y i.e adding new element to a set.
- Find whether individual x is a friend of individual y (direct or indirect friend)
- Find whether x and y belong to the same group or not, i.e. to find if x and y are direct/indirect friends.

Viva Questions:

- How to handle duplicate nodes in a binary search tree?
- Can binary search be used for the linked list?
- What is rehashing
- Compare Naïve patters searching with Robin krap pattern searching algorithms
- What is the time complexity of Kunth morris pratt pattern searching algorithm
- What are various collision handling methods in hashing
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- What is the complexity of Floyd warhalls algorithm
- What is the best method to join two disjoint sets
- Give an example for an equivalence relation

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	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		

Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB	Internal Lab Examination
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023	AC Year: 2022-23

Instructions:

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- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

28

Program/Task:

We are given 10 individuals say, a, b, c, d, e, f, g, h, i, j

Following are relationships to be added:

a <-> b
b <-> d
c <-> f
c <-> i
j <-> e
g <-> j

Given queries like whether a is a friend of d or not.

Viva Questions:

- How to handle duplicate nodes in a binary search tree?
- Can binary search be used for the linked list?
- What is rehashing
- Compare Naïve patters searching with Robin krap pattern searching algorithms
- What is the time complexity of Kunth morris pratt pattern searching algorithm
- What are various collision handling methods in hashing
- What is the disadvantage of separate chaining hashing method
- What is the complexity of Floyd warhalls algorithm
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	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		

Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB	Internal Lab Examination
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023	AC Year: 2022-23

Instructions:

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- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

29

Program/Task:

Let's say there are 5 people A, B, C, D E. A is a friend of B, B is a friend of C and D is a friend of E. As we can see:

1) A, B and C are connected to each other.
2) D and E are connected to each other.

use appropriate Data Structure to check whether one friend is connected to another in a direct or indirect way or not.

Viva Questions:

- How to handle duplicate nodes in a binary search tree?
- Can binary search be used for the linked list?
- What is rehashing
- Compare Naïve patters searching with Robin krap pattern searching algorithms
- What is the time complexity of Kunth morris pratt pattern searching algorithm
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P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		
									Internal Lab		

Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB	Examination
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023	AC Year: 2022-23
Instructions: • Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question. • Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters. • There shall be no change in program. • Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)		SET: **30**

Program/Task:

Let's say there are 5 people A, B, C, D E. A is a friend of B, B is a friend of C and D is a friend of E. As we can see:

1) A, B and C are connected to each other.
2) D and E are connected to each other.

use appropriate Data Structure to check whether one friend is connected to another in a direct or indirect way or not.

Viva Questions:

1. can Min heap can be used to implement selection sort?
2. What is hashmap in data structure?
3. What is the requirement for an object to be used as key or value in HashMap?
4. What is the complexity of Insertion operations in Binomial queues and Priority queues
5. Whn does Binomial queues preferred over priority queus
6. What is a priority queue? What are the applications for priority queue?
7. Compare different implementations of priority queue
8. What is AVL tree data structure, its operations, and its rotations? What are the applications for AVL trees?
9. What is a B-tree data structure? What are the applications.
10. Define Red-Black Tree and its applications

P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB								Internal Lab Examination		

DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023	AC Year: 2022-23

Instructions:

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- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

31

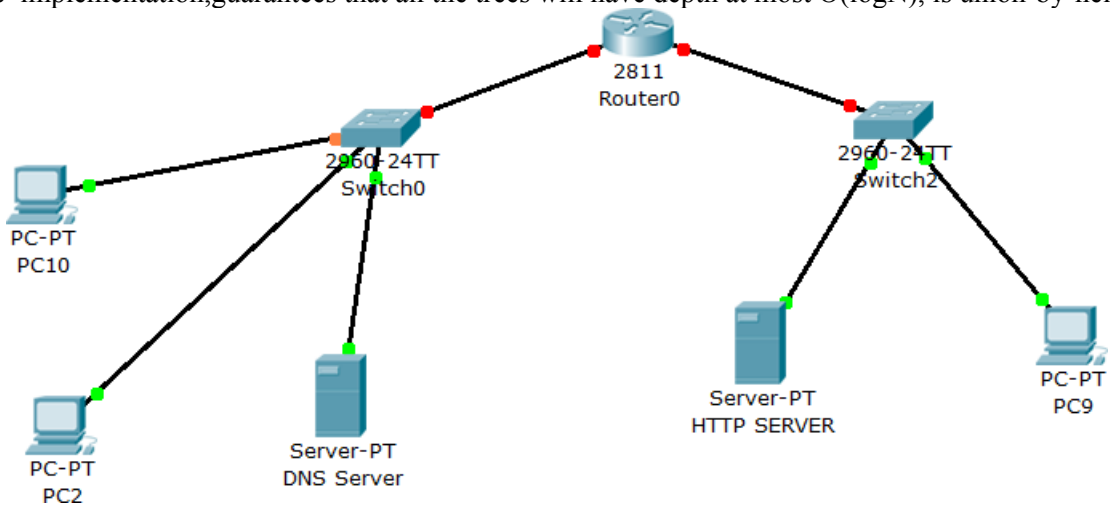
Program/Task:

Let's say there are 5 people A, B, C, D E. A is a friend of B, B is a friend of C and D is a friend of E. As we can see:

1) A, B and C are connected to each other.
2) D and E are connected to each other.

use appropriate Data Structure to check whether one friend is connected to another in a direct or indirect way or not.

And the implementation,guarantees that all the trees will have depth at most O(logN), is union-by-height



Viva Questions:

- can Min heap can be used to implement selection sort?
- What is hashmap in data structure?
- What is the requirement for an object to be used as key or value in HashMap?
- What is the complexity of Insertion operations in Binomial queues and Priority queues
- Whn does Binomial queues preferred over priority queus
- What is a priority queue? What are the applications for priority queue?
- Compare different implementations of priority queue
- What is AVL tree data structure, its operations, and its rotations? What are the applications for AVL trees?
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- Define Red-Black Tree and its applications

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	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES								Internal Lab Examination		

	LAB	
DEPARTMENT: CSE	**DATE OF EXAM: 09-05-2023**	**AC Year: 2022-23**

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
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- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

32

Program/Task:

Let's say there are 5 people A, B, C, D E. A is a friend of B, B is a friend of C and D is a friend of E. As we can see:

1) A, B and C are connected to each other.
2) D and E are connected to each other.

use appropriate Data Structure to check whether one friend is connected to another in a direct or indirect way or not.

And the implementation,guarantees that all the trees will have depth at most O(logN), is union-by-height

Viva Questions:

- can Min heap can be used to implement selection sort?
- What is hashmap in data structure?
- What is the requirement for an object to be used as key or value in HashMap?
- What is the complexity of Insertion operations in Binomial queues and Priority queues
- Whn does Binomial queues preferred over priority queus
- What is a priority queue? What are the applications for priority queue?
- Compare different implementations of priority queue
- What is AVL tree data structure, its operations, and its rotations? What are the applications for AVL trees?
- What is a B-tree data structure? What are the applications.
- Define Red-Black Tree and its applications

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	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB								Internal Lab Examination		

DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023	AC Year: 2022-23

Instructions:

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- Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters.
- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

33

Program/Task:

Let's say there are 5 people A, B, C, D E. A is a friend of B, B is a friend of C and D is a friend of E. As we can see:

1) A, B and C are connected to each other.
2) D and E are connected to each other.

use appropriate Data Structure to check whether one friend is connected to another in a direct or indirect way or not and that a sequence of M operations requires O(M) average time if union-by-size is used

Viva Questions:

- can Min heap can be used to implement selection sort?
- What is hashmap in data structure?
- What is the requirement for an object to be used as key or value in HashMap?
- What is the complexity of Insertion operations in Binomial queues and Priority queues
- Whn does Binomial queues preferred over priority queus
- What is a priority queue? What are the applications for priority queue?
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	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB								Internal Lab Examination		

DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023	AC Year: 2022-23

Instructions:

- Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question.
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- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

34

Program/Task:

Choose an appropriate algorithm which can be used to **efficiently to** calculate single source shortest paths in a Directed Acyclic Graph?

Viva Questions:

- What is a B-tree data structure? What are the applications for B-trees?
- Define Red-Black Tree and its applications
- Which data structures are used for implementing LRU cache?
- Write a program to remove duplicates from a sorted array in place?
- Write a function to merge two sorted binary search tree
- Write a recursive function to calculate the height of a binary tree \
- What is topological sorting in a graph?
- How can memory be saved when storing color information in a Red-Black tree?
- which of the data structures is best for searching words in dictionaries?
- How do you check if a given binary tree is a subtree of another binary tree?
- How do you find if two trees are identical?

P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB								Internal Lab Examination		
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		

Instructions: • Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question. • Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters. • There shall be no change in program. • Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)	**SET:** **35**

Program/Task:

Choose an appropriate algorithm which can be used to **efficiently to** calculate single source shortest paths in a Directed Acyclic Graph?

Viva Questions:

- What is a B-tree data structure? What are the applications for B-trees?
- Define Red-Black Tree and its applications
- Which data structures are used for implementing LRU cache?
- Write a program to remove duplicates from a sorted array in place?
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Course Code: 20CS3552	**SUBJECT: ADVANCED DATA STRUCTURES LAB**								**Internal Lab Examination**		
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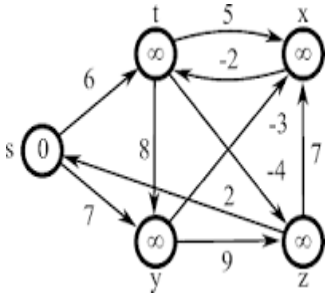
Program/Task:

Choose an appropriate algorithm which can be used to **efficiently to** calculate single source shortest paths in a Directed Acyclic Graph?



Viva Questions:

- What is a B-tree data structure? What are the applications for B-trees?
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- Write a program to remove duplicates from a sorted array in place?
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- , and its rotations? What are the applications for AVL trees?
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- Define Red-Black Tree and its applications

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Degree: B. TECH (PVP20)	**II**	**II**				**B.Tech - CSE**			**3 HOURS**		
Course Code: 20CS3552	**SUBJECT: ADVANCED DATA STRUCTURES LAB**								**Internal Lab Examination**		
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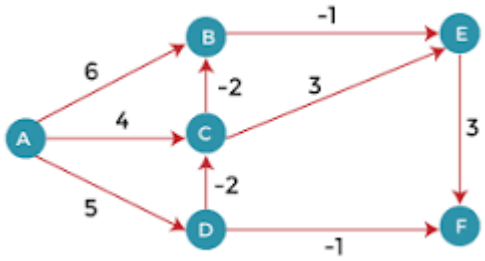
Program/Task:

Choose an appropriate algorithm which can be used to **efficiently to** calculate single source shortest paths in a Directed Acyclic Graph?



Viva Questions:

- can Min heap can be used to implement selection sort?
- What is hashmap in data structure?
- What is the requirement for an object to be used as key or value in HashMap?
- What is the complexity of Insertion operations in Binomial queues and Priority queues
- Whn does Binomial queues preferred over priority queus
- What is a priority queue? What are the applications for priority queue?
- Compare different implementations of priority queue
- What is AVL tree data structure, its operations, and its rotations? What are the applications for AVL trees?
- What is a B-tree data structure? What are the applications.
- Define Red-Black Tree and its applications

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Course Code: 20CS3552	**SUBJECT: ADVANCED DATA STRUCTURES LAB**								**Internal Lab Examination**		
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- There shall be no change in program.
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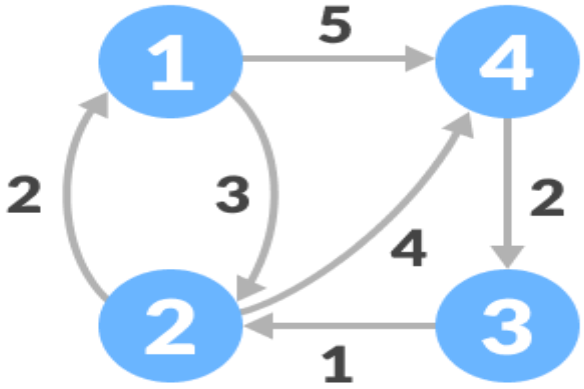
38

Program/Task:

The problem is to find the shortest distances between every pair of vertices in a given edge-weighted directed Graph. Choose an appropriate algorithm to find the solution



Viva Questions:

- What is a B-tree data structure? What are the applications for B-trees?
- Define Red-Black Tree and its applications
- Which data structures are used for implementing LRU cache?
- Write a program to remove duplicates from a sorted array in place?
- Write a function to merge two sorted binary search tree
- Write a recursive function to calculate the height of a binary tree \
- What is topological sorting in a graph?
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- which of the data structures is best for searching words in dictionaries?
- How do you check if a given binary tree is a subtree of another binary tree?
- How do you find if two trees are identical?
- , and its rotations? What are the applications for AVL trees?
- What is a B-tree data structure? What are the applications.

DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023	AC Year: 2022-23

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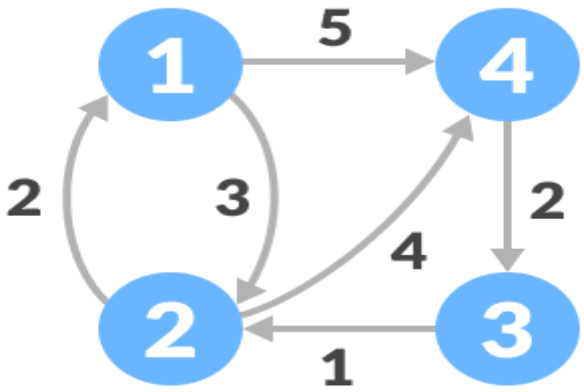
SET:

39

Program/Task:

The problem is to find the shortest distances between every pair of vertices in a given edge-weighted directed Graph. Choose an appropriate algorithm to find the solution



Viva Questions:

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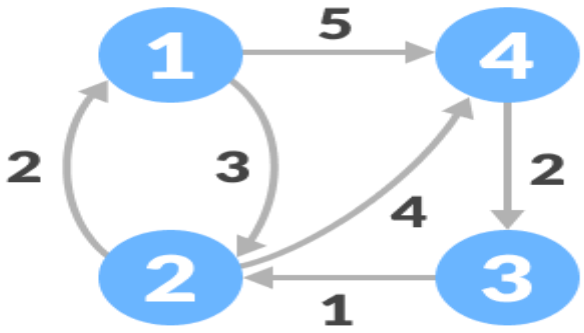
SET:

40

Program/Task:

The problem is to find the shortest distances between every pair of vertices in a given edge-weighted directed Graph. Choose an appropriate algorithm to find the solution



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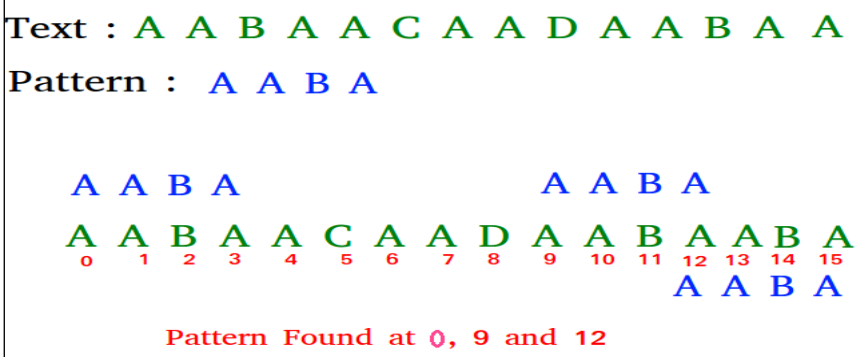
Program/Task:

Develop a solution to search for a pattern string using String Search Techniques.



Viva Questions:

- What is a B-tree data structure? What are the applications for B-trees?
- Define Red-Black Tree and its applications
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- Write a program to remove duplicates from a sorted array in place?
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DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023	AC Year: 2022-23

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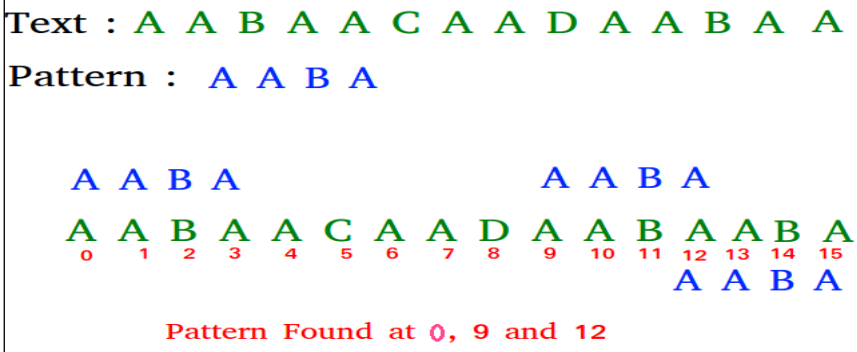
SET:

42

Program/Task:

Develop a solution to search for a pattern string using String Search Techniques.



Viva Questions:

- What is a B-tree data structure? What are the applications for B-trees?
- Define Red-Black Tree and its applications
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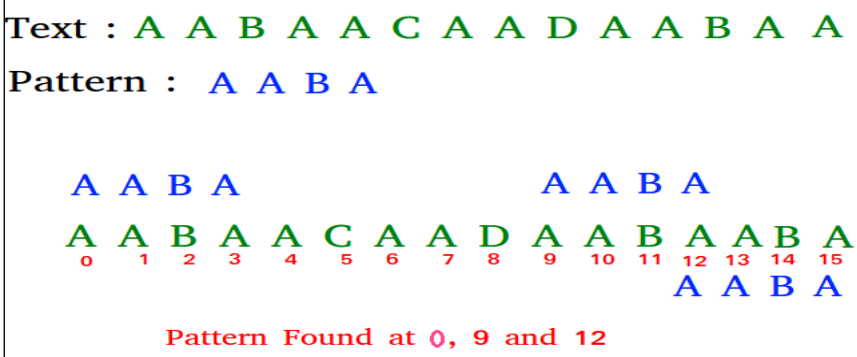
SET:

43

Program/Task:

Develop a solution to search for a pattern string using String Search Techniques.



Viva Questions:

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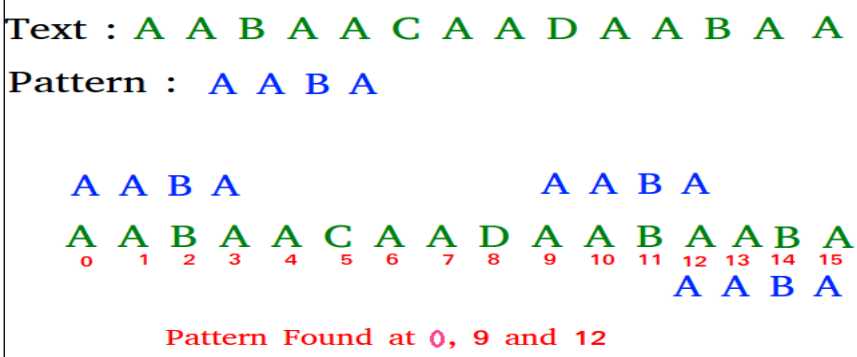
Program/Task:

Develop a solution to search for a pattern string using String Search Techniques.



Viva Questions:

- What is a B-tree data structure? What are the applications for B-trees?
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	YEAR	**SEMESTER**				**Programme**			**DURATION**		
Degree: B. TECH (PVP20)	**II**	**II**				**B.Tech - CSE**			**3 HOURS**		
Course Code: 20CS3552	**SUBJECT: ADVANCED DATA STRUCTURES LAB**								**Internal Lab Examination**		
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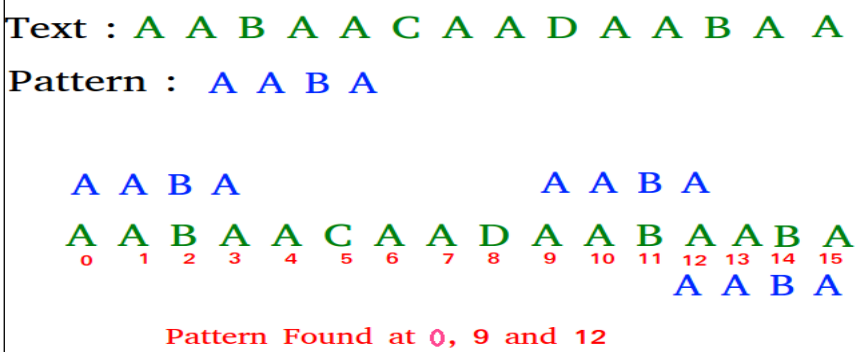
Program/Task:

Develop a solution to search for a pattern string using String Search Techniques.



Viva Questions:

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	YEAR	**SEMESTER**				**Programme**			**DURATION**		
Degree: B. TECH (PVP20)	**II**	**II**				**B.Tech - CSE**			**3 HOURS**		
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- There shall be no change in program.
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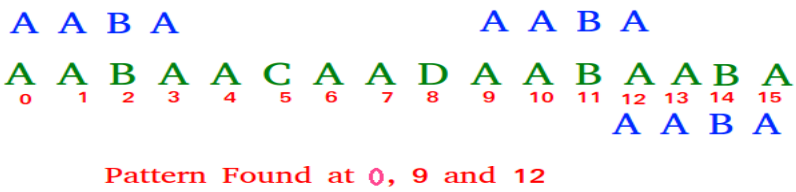
46

Program/Task:

Develop a solution to search for a pattern string using String Search Techniques. With its Time Complexity = O(m* (n-m))

Text : A A B A A C A A D A A B A A B A

Pattern : A A B A



Viva Questions:

- What is a B-tree data structure? What are the applications for B-trees?
- Define Red-Black Tree and its applications
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47

Program/Task:

Develop a solution to search for a pattern string using String Search Techniques. The average and best-case running time is O(n+m), and with its worst-case time is O(nm)

Input: *txt[] = "THIS IS A TEST TEXT", pat[] = "TEST"*

Viva Questions:

- What is a B-tree data structure? What are the applications for B-trees?
- Define Red-Black Tree and its applications
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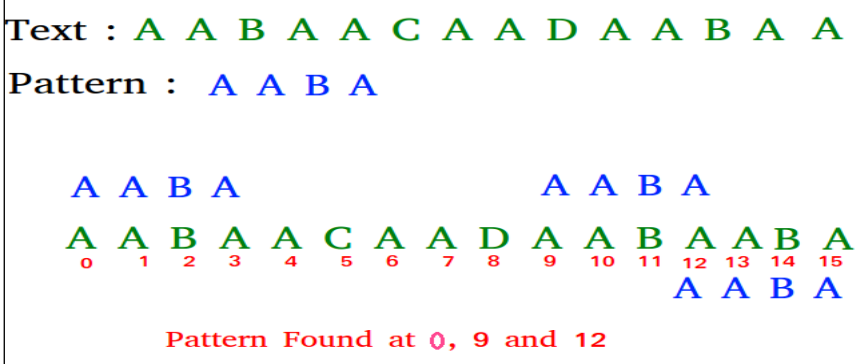
P. V. P. SIDDHARTHA INSTITUTE OF TECHNOLOGY	Regd. No:			5	0		A	0	5		
	YEAR	SEMESTER				Programme			DURATION		
Degree: B. TECH (PVP20)	II	II				B.Tech - CSE			3 HOURS		
Course Code: 20CS3552	SUBJECT: ADVANCED DATA STRUCTURES LAB								Internal Lab Examination		
DEPARTMENT: CSE	DATE OF EXAM: 09-05-2023								AC Year: 2022-23		
Instructions:									SET:		

• Aim, Short Description/Procedure (1.5 Marks), Program/Task Steps and Result (1.5 Marks) statement has to be written for the below question. • Write the Program legibly with comments describing each section of it. If scenario, describe each and every step with configuration parameters. • There shall be no change in program. • Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)	**48**

Program/Task:

Develop a solution to search for a pattern string using String Search Techniques. with the total time complexity of the approach is O(N + M).



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- There shall be no change in program.
- Kindly Answer the Viva Voce Questions in the script for evaluation. (2 Marks)

SET:

49

Program/Task:

Given a string 'str' and a pattern 'pat', you have to find all occurrences of the pattern in the string. You have to print the starting positions of all occurrences of the pattern in the string.Develop an algorithm with the total time complexity of the approach is O(N + M).

Example -

Input:

'str' = "heyhihey"
'pat' = "hey"

Viva Questions:

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