



MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)

Rasipuram - 637 408, Namakkal Dist., Tamil Nadu.

Department of Information Technology Question Bank - Academic Year (2021-22)

Course Code & Course Name : 19GES32-Data Structures using Python

Year/Sem/Sec : II / IV / A,B & C

Unit-I: Linear Data Structures

Part-A (2 Marks)

1. Define ADT
2. What are preconditions and post conditions?
3. What are bags?
4. Define Iterator.
5. Differentiate array and list in python.
6. Define non-linear data structures.
7. Explain the structure of a Linked list and the operations carried out in a Linked list
8. State the difference between singly linked list and doubly linked list
9. What are the applications of Circular Linked List
10. List out the advantages and disadvantages of using a linked list

Part-B (16 Marks)

1. Explain the operations performed on singly linked list with example. (16)
2. Explain the operations performed on doubly linked list with neat diagram (16)
3. Explain the operations performed on Circular linked list. (16)
4. Discuss about the Application of Linked Lists in detail. (16)
5. Explain polynomial manipulation (addition and multiplication) using linked list. (16)

Unit-II : Stacks

Part-A (2 Marks)

1. Define a stack.
2. List out the basic operations that can be performed on a stack
3. State the different ways of representing expressions with examples
4. State the rules to be followed when converting infix expression to postfix expression.
5. State the difference between stack and linked list.
6. Mention the advantages of representing stacks using linked lists than array.

7. Write the routine for push operation.
8. Write the routine for pop operation.
9. What is the purpose of top and pop?
10. State the applications of stack.

Part-B (16 Marks)

1. What is Stack ADT?. Explain the operations performed in a stack with examples. (16)
2. Explain implementation of Stack ADT using Python List with examples. (16)
3. Given an expression string exp, write a program to examine whether the pairs and the orders of “{”, “}”, “(”, “)”, “[”, “]” are correct in expression. (16)
4. Convert the infix to postfix for $a-(b+c)*(d/e)$ (16)
5. Evaluate postfix expression from given infix expression. $a + b * (c + d) / f + d * e$ (16)

Unit-III : Queues

Part-A (2 Marks)

1. Define a queue
2. Define priority queue with diagram and give the operations.
3. State the difference between queues and linked lists
4. Define a Deque
5. What is the need for Priority queue?
6. List the operations of queue.
7. List the Applications of queue?
8. Give the applications of priority queues.
9. Write the routines for dequeue operation in queue.
10. How do you test for an empty queue?

Part-B (16 Marks)

1. What is queue ADT?. Explain the operations performed in a queue with examples (16)
2. Explain implementation of Queue ADT using Python List with examples (16)
3. With a neat diagram explain the structure of Priority Queue with examples (16)
4. Explain the applications of Priority Queue and state its advantages. (16)
5. Explain the process of computer simulation using Queue (16)

Unit-IV : Trees

Part-A (2 Marks)

1. Define a tree.
2. Define the height of a Tree.

3. Define a path in a tree.
4. Define terminal nodes in a tree.
5. Define non-terminal nodes in a tree.
6. What is inorder traversal?
7. Define preorder and postorder traversal
8. Define heaps.
9. State the merits and demerits of linked representation of a binary tree.
10. Define a binary search tree.

Part-B (16 Marks)

1. Explain three standard ways of traversing a binary tree T with a recursive algorithm. (16)
2. Write an algorithm for inserting and deleting a node in a binary search tree (BST). (16)
3. Enumerate the algorithm for Max heap. Show the result of inserting 15,17,6,19,11,10,13,20,8,14,12 one at a time into an initially empty binary max heap. Also show the result of performing three delete max operations in the final binary max heap obtained. (16)
4. Explain in detail about the creation of binary search tree with example. (16)
5. Write the algorithm and transform the given expression to expression tree.
 $((a+b)+c*(d+e)+f)*(g+h)$ (16)

Unit-V : Searching And Sorting

Part-A (2 Marks)

1. Define Hashing.
2. What do you mean by hash table?
3. What do you mean by hash function?
4. What do you mean by collision in hashing?
5. What do you mean by separate chaining?
6. What are the types of collision resolution strategies in open addressing?
7. What do you mean by Probing?
8. Define searching and List out the types of searching method.
9. Define linear search.
10. Write algorithm for insertion sort

Part-B (16 Marks)

1. Briefly describe hashing techniques with its collision resolution strategies. (16)
2. Write an algorithm to sort 'n' number using heap sort. Show how the following numbers are sorted using Heap sort 45, 28, 90, 1, 46, 39, 33, 87. (16)

3. Describe in detail about Quick sort with example. (16)
4. Describe in detail about Merge sort with example. (16)
5. Describe in detail about Radix sort with example (16)

Course Faculty

HoD