

Bangladesh Sweden Polytechnic Institute

Kaptai, Rangamati Hill Tracts.

Teacher: Patha Sarathi Suman Dutta (Instructor)
Sub: DATA STRUCTURE & ALGORITHM
Code: 6631

Theory:

1st Week:

Lecture 1:

DATA TYPES, DATA STRUCTURE AND ALGORITHM

1 Understand the idea of the data structure.

- 1.1 Define data & information.
- 1.2 State data types.
- 1.3 Define Memory Location, array, & list.

Lecture 2:

- 1.4 State the types of array, & list.
- 1.5 Define String.
- 1.6 Define data structure.

Lecture 3:

- 1.7 State the meaning of field, record and files.
- 1.8 Define stack & queue with example
- 1.9 Define trees, heaps, hashing function table & hashing table.

2nd Week:

Lecture 4:

2 Understand the basic concept of Algorithm

- 2.1 State the characteristics of Algorithm
- 2.2 Define the pseudo code & algorithmic notations.
- 2.3 Describe the structured programming and flowcharts.

Lecture 5:

- 2.4 Describe the Complexity of Algorithm
- 2.5 Define Time-space Trade off.

ARRAYS, RECORDS, POINTERS AND LINKED LISTS.

3 Understand the concept of arrays, records and pointers.

- 3.1 Define linear array.
- 3.2 Write the algorithm for traversing linear arrays.

Lecture 6:

- 3.3 State the represent of linear array in Memory.
- 3.4 Write the algorithm for inserting and deleting elements into/from linear arrays.
- 3.5 Write the algorithm of matrix multiplication.
- 3.6 State the use of pointer arrays, jagged array and records.

3rd Week:

Lecture 7:

4 Understand the properties of the linked lists.

- 4.1 Define linked lists.
- 4.2 Describe the representation of linked lists in memory.
- 4.3 Write the algorithms to traverse a linked list.

Lecture 8:

- 4.4 Write the algorithms for searching a linked list.
- 4.5 Write the algorithms for inserting/deleting nodes into/from a linked list.

Lecture 9:

Quiz Test-1(Ch 1&2).

4th Week:

Lecture 10:

STACKS, QUEUES & RECURSION

5. Understand the Operation of Stack

- 5.1 State the meaning of the terms PUSH & POP.
- 5.2 Write the algorithm for adding or removing data into / from a Stack.
- 5.3 Describe the Polish and Reverse Polish Notation of arithmetic expression.

Lecture 11:

- 5.4 Describe the operation of Infix, Postfix & Prefix transformation.
- 5.5 Write the algorithms to transform Prefix expression into Prefix expression and vice versa.

6. Understand the Operation of Queue

- 6.1 Define Deques.
- 6.2 Describe Priority queues.
- 6.3 Write the algorithms for inserting/deleting data into/from queues.

Lecture 12:

7. Understand the Operation of Recursion.

- 7.1 Define Recursion
- 7.2 Explain the use of recursive subroutines.
- 7.3 Write the algorithms to compute N! and Fibonacci numbers by recursive subroutines.

5th Week:

Lecture 13:

Class Test-1(Content of QT-1 & Ch 3&4).

Lecture 14:

SEARCHING & SORTING

8 Understand the Operation of searching.

- 8.1 State the different techniques of searching.
- 8.2 Describe the linear and binary search algorithm.
- 8.3 Write the algorithms for linear & binary search.
- 8.4 Compare the complexity of linear & binary search algorithms.

Lecture 15:

9 Understand the Operation of sorting.

- 9.1 State the different techniques of Sorting.
- 9.2 Describe the technique of bubble sort, quick sort, heap sort, insertion sort, selection sort and merge sort.
- 9.3 Write the algorithms for bubble sort, quick sort, heap sort, insertion sort, selection sort and merge sort.
- 9.4 Compare the complexity of different sorting algorithms.

6th Week:

Lecture 16:

Quiz Test-2(Ch 5, 6&7).

Lecture 17:

10. Understand the basics of Storing string

- 10.1 Define String
- 10.2 State the types of structures for storing strings.
- 10.3 Describe the Record – oriented , Fixed-Length storage procedure of strings.

Lecture 18:

- 10.4 State the advantages and disadvantages of record oriented, fixed-length storage .
- 10.5 Describe the process of variable length storage with fixed maximums.
- 10.6 Describe the process of linked storage structure.

7th Week:

Lecture 19:

Class Test-2(Content of QT-2 & Ch 8&9).

Lecture 20:

REVIEW Of QT 1&2

Lecture 21:

Quiz Test-3(Ch 10).

8th Week:

Lecture 22:

REVIEW Of CT 1&2

Lecture 23:

REVIEW Of QT 3

Reference book:

Data Structure & Algorithm

Schams Out line.

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Practical class

1'st Week:

Lecture 1:

1. Write and Test a program for data insertion & Deletion in a Linear Array.

2'nd Week:

Lecture 2:

2. Write and Test a program for Multiplication of two Matrices

3'rd Week:

Lecture 3:

Job 1: Insertion & Deletion in Linear Array & Multiplication of 2 Matrices

4'Th Week:

Lecture 4:

3. Write and Test a program for inserting/Deleting nodes into/from a Linked List.

5'Th Week:

Lecture 5:

Job 2: Write and Test a program for inserting/Deleting nodes into/from a Linked List.

6'Th Week:

Lecture 6:

4. Write and Test a program using PUSH and POP Operation in Stack.

7'Th Week:

Lecture 7:

Job3: Write and Test a program using PUSH and POP Operation in Stack.

8'Th Week:

Lecture 8:

5. Write and Test a program to convert an infix expression to postfix expression.

9'Th Week:

Lecture 9:

Job 4: Write and Test a program to convert an infix expression to postfix expression.

10'Th Week:

Lecture 10:

6. Write and Test a program for Data insertion and Deletion from a Queue.

11'Th Week:

Lecture 11:

Job 5: Write and Test a program for Data insertion and Deletion from a Queue.

12'Th Week:

Lecture 12:

7. Write and Test a program for N! And Fibonacci number using Recursion.

13'Th Week:

Lecture 13:

Job 6: Write and Test a program for N! And Fibonacci number using Recursion.

14'Th Week:

Lecture 14:

8. Write and Test a program to find out data using linear search and binary search.
9. Write and Test a program to arrange Data Ascending and Descending using Bubble Sort and Quick Sort.