**Unit I- Linear Data Structures**

**Session 1:**

**Time :20 minutes**

**Topic:** Abstract Datatypes

**Activity:** Board activity

**Description:** Abstract datatype concept was highlighted on the board

The points were

1. Mathematical abstractions
2. Set of operations

**Time: 20 minutes**

**Topic:** List ADT

**Activity:** Presentation and Board activity

**Description:**

List concept was explained through PPT slides.

The concepts was highlighted on the board

1. Definition of List
2. List operations- Insert,delete, find,

**Time: 10 minutes**

**Topic:** Conclusion

**Activity:** Question and Answer

1. What is datastructure?
2. What is abstract data type?
3. What is data?
4. What are types of datastructures?
5. What is meant by list?
6. What are types of list?
7. What is difference between linear and non linear datastructures?
8. Give examples of linear datastructures?
9. Give examples of non linear datastructures?
10. What are list operations?

**Website Links:**

1.en.wikipedia.org/wiki/**Abstract**\_**data**\_**type**

2.www.youtube.com/watch?v=HcxqzYsiJ3k

3.cse.iitkgp.ac.in/pds/notes/ADT.html‎

4.https://en.wikipedia.org/wiki/**List**\_(abstract\_data\_type)‎

5. lcm.csa.iisc.ernet.in/dsa/node15.html‎

**Session 2:**

**Time :10 minutes**

Topic: Array implementation of List

**Activity:** Quiz

**Description:** We can conduct quiz to recap what is thought in previous class such as raising questions to two groups of students marked as A and B and questions asked are

1. What is List?
2. What is Array?
3. What are the types of List?
4. What are advantages of Arrays?
5. What are the disadvantages of Arrays?
6. What is List ADT?

**Time: 35minutes**

**Topic:** Linked list implementation of List.

**Activity:** Presentation Videos.

**Description**: Videos were presented.The weblink was

**http://www.youtube.com/watch?v=LOHBGyK3Hbs**

**Time: 05 minutes**

**Topic:** conclusion

**Description:** Show and tell







 **Website Links:**

1. lcm.csa.iisc.ernet.in/dsa/node18.html‎
2. www.cs.sfu.ca/CC/225/jmanuch/lec/2-3.ppt‎

**Applications**

The main Applications of Linked Lists are
\* For representing Polynomials.
\* In Dynamic Memory Management.
\* In Symbol Tables.
\* Representing Sparse Matrix.

**Session 3:**

**Time :10 minutes**

Topic: Recap: List and linked list

**Activity:** Question and answer

**Description:** We can conduct quiz to recap what is thought in previous class such as raising questions to two groups of students marked as A and B and questions asked are

1. What is List?
2. What is Array?
3. What are the types of List?
4. What are advantages of Arrays?
5. What are the disadvantages of Arrays?
6. What is Linked List?
7. What is node?
8. What are the two fields in a node in single Linked list?
9. What are applications of Linked List?

**Time: 30minutes**

**Topic:** Cursor based implementation of list

**Activity:** Presentation Unspoken words

**Description**: PPT was presented.

The points are

1. new structure by a call to cursorspace array.

2. Implementation without using pointers

3. Data stored in collection of structures.

**Time: 10 minutes**

**Topic:** conclusion

**Description:** Show and tell





 **Website Links:**

1. lcm.csa.iisc.ernet.in/dsa/node18.html‎
2. www.cs.sfu.ca/CC/225/jmanuch/lec/2-3.ppt‎

**Session 4:**

**Time :20 minutes**

Topic: Doubly linked lists

**Activity:** Board activity

**Description:** The concept was explained on the board. The points were highlighted.



**Time: 10minutes**

**Topic:** Application of list

**Activity:** Presentation and Discussion

**Description**: PPT was presented.

The points are

The main Applications of Linked Lists are
\* For representing Polynomials.
\* In Dynamic Memory Management.
\* In Symbol Tables.
\* Representing Sparse Matrix and sorting numbers.

**Time: 10 Minutes**

**Topic:** Merge sort(content beyond the syllabus)

**Description:** Presentation videos

http://www.youtube.com/watch?v=XaqR3G\_NVoo

 **Website Links:**

en.wikipedia.org/wiki/**Doubly**\_**linked**\_**list**‎

www.cse.unr.edu/~bebis/CS308/PowerPoint/**LinkedDoublyLists**.ppt‎

www.thelearningpoint.net/.../**data-structures**-**doubly**-**linked**-**list**-with-c-prog...

staff.science.uva.nl/~heck/JAVAcourse/ch4/sss1\_2\_3.html‎

en.wikipedia.org/wiki/**Merge**\_**sort**

www.cse.iitk.ac.in/users/dsrkg/cs210/.../**sort**ingII/**mergeSort**/**merge**.htm

**Session 5:**

**Time :5 minutes**

Topic: Stack ADT

**Activity:** Board activity

**Description:** The concept was explained on the board. The points were highlighted.

**Time: 20minutes**

**Topic:** Stack Model

**Activity:** Demonstration by learners

**Description**: The learners were trained to put bangles. And explained the concept of stack.

**Time: 20 Minutes**

**Topic:** Implementation of stack

**Description:** Presentation videos

<http://www.youtube.com/results?search_query=video+tutorial+on+stack+and+queue&oq=video+tutorial+on+stack+and+queue&gs_l=youtube.3...10790.20526.0.20812.39.32.3.4.5.1.268.4227.5j24j3.32.0...0.0...1ac.1.11.youtube.8aCbFEbWcFg>

**Time: 5 Minutes**

**Topic:** Conclusion

**Description:** Recall by Keywords

* Stack
* LIFO
* Push
* Pop
* Top pointer
* Overflow
* Underflow
* Full
* Empty

 **Website Links:**

[www.youtube.com/watch?v=9ch1mor0NvY](http://www.youtube.com/watch?v=9ch1mor0NvY)

see.stanford.edu/materials/icsppcs107/**stack**-**implementation**.pdf

www.cs.ualberta.ca/~holte/T26/linked-impl-**stacks**.html‎

www.cs.bu.edu/teaching/c/**stack**/array/‎

en.wikipedia.org/wiki/**Stack**\_(abstract\_data\_type)‎

**Session 6:**

**Time :10 minutes**

Topic: Application of Stack

**Activity:** Board activity

**Description:** The concept was explained on the board. The points were highlighted.

**Time: 15minutes**

**Topic:** Balancing Expressions

**Activity:** Board Activity

**Description**: The problems was solved on the board.

**Time: 15Minutes**

**Topic:** Polynomial operations

**Description:** Board Activity

**Time: 10 Minutes**

**Topic:** Infix to postfix

**Description:** Learner led activity

http://www.youtube.com/watch?v=rA0x7b4YiMI



**Website Links:**

[www.youtube.com/watch?v=rA0x7b4YiMI](http://www.youtube.com/watch?v=rA0x7b4YiMI)

www.csd.uwo.ca/courses/CS1037a/notes/topic06\_**Stacks**.pdf‎

www.cse.yorku.ca/course\_archive/2003-04/F/.../DatStr\_03\_**Stacks**.pdf‎

scriptasylum.com/tutorials/**infix**\_**postfix**/algorithms/**infix**-**postfix**/

en.wikipedia.org/wiki/**Stack**\_(abstract\_data\_type)‎

**Session 7:**

**Time :20 minutes**

Topic: Application of Stack

**Activity:** Board activity

**Description:** The concept was explained on the board. The points were highlighted.

Evaluating postfix

Infix to postfix

Tower of Hanoi

**Time: 20minutes**

**Topic:** Postfix Expressions

**Activity:** Presentation videos

**Description**: The Video was shown to the learners.

http://www.youtube.com/watch?v=uh7fD8WiT28

**Time: 10 Minutes**

**Topic:** Conclusion

**Description:** Learner led activity

Sample problems were given to learners to solve on the board.

10 2 8 \* + 3 - Answer: 23

6 2 3 + - 3 8 2 / + \* 2 ^ 3 + Answer: 52

**Website Links:**

<http://www.youtube.com/watch?v=uh7fD8WiT28>

[www.cs.nthu.edu.tw/~wkhon/ds/ds10/tutorial/tutorial2.pdf](http://www.cs.nthu.edu.tw/~wkhon/ds/ds10/tutorial/tutorial2.pdf)

faculty.cs.niu.edu/~hutchins/csci241/eval.htm‎

**Session 8:**

**Time :20 minutes**

Topic: Queue ADT

**Activity:** Presentation Unspoken words

**Description:** The concept was explained on the board. The points were highlighted.

**Time: 10minutes**

**Topic:** Array Implementation of Queue ADT

**Activity: Presentation and** Board Activity

**Description**: The problems was solved on the board.

**Time: 10Minutes**

**Topic:** Linked list implementation of Queue ADT

**Activity:** Board Activity

**Description:**

**Time: 10 Minutes**

**Topic:** Conclusion

**Activity:** Show and tell

**Description:**

**Website Links:**

**Session 9:**

**Time :20 minutes**

Topic: Application of Queues

**Activity:** Board activity

**Description:** The concept was explained on the board. The points were highlighted.

**Time: 15minutes**

**Topic:** Implemenation of Circular Queue

**Activity:** Presentation analogy

**Description**: The problems was solved on the board.

**Time: 10 Minutes**

**Topic:** Conclusion

**Activity:** Recall by Keywords

**Description:**

**Website Links:**