CE205 Data Structures Week-3

Stacks, Queue Structures and Related Algorithms and Problems.

Author: Asst. Prof. Dr. Uğur CORUH

Contents

List of Figures

List of Tables

1 CE205 Data Structures

1.0.1 Week-3

1.0.1.1 Stacks, Queue Structures, and Related Algorithms and Problems.

Download DOC[1], SLIDE[2], PPTX[3]

1.0.2 Outline-1

- Stack ADT
  - Stack Using Array
  - Stack Using Linked List

[1] ce205-week-3-stack.md_doc.pdf
[2] ce205-week-3-stack.md_slide.pdf
[3] ce205-week-3-stack.md_slide.pptx

- Expressions
  - Infix
  - Postfix
  - Prefix
  - Infix to Postfix Conversion
  - Postfix Expression Evaluation

1.0.3 Outline-2

- Queue ADT
  - First Come First Serve, FCFS, FIFO
  - Queue Data structure Using Array
  - Queue Using Linked List
  - Circular Queue Data structure
  - Double Ended Queue Data structure
  - Multilevel Queue (MLQ)
- Hanoi Tower

1.0.4 Stack ADT

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/stack-adt.html

---

1.0.5 Stack Using Array

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/stack-using-array.html

---

1.0.6 Stack Using Linked List

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/stack-using-linked-list.html

---

1.0.7 Expressions

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/expressions.html
    - Infix
    - Postfix
    - Prefix

1.0.8 Infix to Postfix Conversion

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/infix-to-postfix.html

---

1.0.9 Postfix Expression Evaluation

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/postfix-evaluation.html

---

1.0.10 Queue ADT

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/queue-adt.html

---

1.0.11 First Come First Serve, FCFS, FIFO

- BTech Smart Class
  - http://www.btechsmartclass.com/downloads/lab-manuals/Operating-System-Lab-Manual-R18-JNTUH.pdf

---

1.0.12 Queue Data structure Using Array

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/queue-using-array.html

---

1.0.13 Queue Using Linked List

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/queue-using-linked-list.html

---

1.0.14 Circular Queue Data structure

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/circular-queue.html

---

1.0.15 Double Ended Queue Data structure

- BTech Smart Class
  - http://www.btechsmartclass.com/data_structures/double-ended-queue.html

---

1.0.16 Multilevel Queue (MLQ)

- Geeks for Geeks
  - https://www.geeksforgeeks.org/multilevel-queue-mlq-cpu-scheduling/

1.0.17 Hanoi Tower

- Geeks for Geeks
  - Recursive Version
    - Program for Tower of Hanoi - GeeksforGeeks[4]

[4] https://www.geeksforgeeks.org/c-program-for-tower-of-hanoi/

  - Iterative Version
    * Iterative Tower of Hanoi - GeeksforGeeks[5]

1.0.18 Hanoi Tower Iterative Algorithm:

S = Source

A = Aux

D = Dest

Calculate the total number of moves required i.e.

$pow(2, n) - 1$ here n is number of disks.

1.0.19 Hanoi Tower Iterative Algorithm:

- If number of disks (i.e. n) is even then interchange destination pole and auxiliary pole.
- for i = 1 to total number of moves:
  - if i%3 == 1:
    * legal movement of top disk between source pole and destination pole
  - if i%3 == 2:
    * legal movement top disk between source pole and auxiliary pole
  - if i%3 == 0:
    * legal movement top disk between auxiliary pole and destination pole

---

$$End - Of - Week - 3$$

[5] https://www.geeksforgeeks.org/iterative-tower-of-hanoi/