Final Examination - Summer 2023

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CSI-317 Theory of Computing

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Ans. to the Q.no- 01

(a)

⇒ Algorithm of insertion in queue –

As we know that queue is a FIFO type data structure so we will be using following algorithm for insertion of an element in a queue –

* IF (Rear == Max-1)
* Return queue Full
* Else
* Rear ← Rear + 1
* Queue[Rear] = Data
* IF (Fcont == -1)
* ~~Fcont = 0~~
* Fcont = 0

(b)

⇒ The algorithm for traversing linked list:-

Step-1 :- SET PTR = HEAD

Step-2 :- IF PTR = NULL

Step-3 :- Write "EMPTY LIST"

go to step-7

End of IF

Step-4 :- Repeat step 5 and step-6 until PTR != NULL

Step-5 :- PRINT PTR → Data

Step-6 :- PTR = PTR → NEXT

[End of Loop]

Step-7 :- Exit

Ans. to the Q. no - 02

Step by step output for infix to postfix Conversion:-

~~A+(B×C-(D/E^F)×G)×H~~

Input String	Output Stack	Operator Stack
A+(B×C-(D/E^F)×G)×H		
A+(B×C-(D/E^F)×G)×H	A	
A+(B×C-(D/E^F)×G)×H	A	+
〃	A	+(
〃	AB	+(
〃	AB	+(×
〃	ABC	+(×
〃	ABC×	+(-
〃	ABC×	+(-(
〃	ABC×D	+(-(
〃	ABC×D	+(-(/
〃	ABC×DE	+(-(/
〃	ABC×DE	+(-(/^
〃	ABC×DEF	+(-(/^
〃	ABC×DEF^/	+(-
〃	ABC×DEF^/	+(-×
〃	ABC×DEF^/G	+(-×
〃	ABC×DEF^/G×-	+
〃	ABC×DEF^/G×-	+×
〃	ABC×DEF^/G×-H	+×
〃	ABC×DEF^/G×-H×+	

Ans. to the Q. no - 03

⟹ Algorithm to Convert infix to postfix expression :-

The following are the steps of algorithm to Convert an infix to a postfix expression –

1. Let, 'X' is the arithmatic expression written in infix notation.
2. Push "(" onto stack, and add ")" to the end of "X".
3. Scan X from left to right and repeat step 3 to 6 for each element of X until the stack is empty.
4. If an operand is encountered, add it to Y.
5. If a left a parenthesis is encountered, push it onto stack.
6. If an operator is encountered, then –

   * Repeatedly pop from stack and add to 'Y' each operator (on the top of stack) which has the same precedence as or higher precedence than operator.
   * Add operator to stack.

[End of it]

⑦ If a right Parenthesis is encountered, then—

* Repeatedly pop from stack and add to Y each operator (on the top of the stack) until a left parenthesis is encountered.

* Remove the left parenthesis.

[End of it]

[End of it]

⑧ END.

Ans. to the Q no - 04.

⇒ Algorithm for sere searching a linked list :-

* Step-1 :- Set PTR = HEAD
* Step-2 :- Set I = 0
* Step-3 :- IF PTR = NULL
  write "empty list"
  go to step 8
  End of IF
* Step-4 :- Repeat step 5 to 7 until PTR != NULL
* Step-5 :- IF PTR → Data = ITEM
  write i+1
  End of IF
* Step-6 :- I = I+1
* Step-7 :- PTR = PTR → Next
  [End of Loop]
* Step-8 :- Exit