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FACULTY OF EGINEERING & TECHNOLOGY

DATA STRUCTURE USING C

LECTURE -8

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OUTLINE

- Stack Notation
- Infix Notation
- Postfix Notation
- Prefix Notation
- Application of Stack
- Expression convertion
- MCQ
- References

NOTATION OF STACK

Stack Notation

1. Infix Notation
2. Prefix (Polish) Notation
3. Postfix () Reverse-Polish Notation

Infix Notation

We write expression in infix notation, e.g. a - b + c, where operators are used in-between operands. It is easy for us humans to read, write, and speak in infix notation but the same does not go well with computing devices. An algorithm to process infix notation could be difficult and costly in terms of time and space consumption.

Prefix Notation

In this notation, operator is prefixed to operands, i.e. operator is written ahead of operands. For example, +ab. This is equivalent to its infix notation a + b. Prefix notation is also known as Polish Notation.

NOTATION OF STACK

Postfix Notation

This notation style is known as Reversed Polish Notation. In this notation style, the operator is post fixed to the operands i.e., the operator is written after the operands. For example, ab+. This is equivalent to its infix notation a + b.

Sr.No.	Infix Notation	Prefix Notation	Postfix Notation
1	a + b	+ a b	a b +
2	(a + b) * c	* + a b c	a b + c *
3	a * (b + c)	* a + b c	a b c + *
4	a / b + c / d	+ / a b / c d	a b / c d / +
5	(a + b) * (c + d)	* + a b + c d	a b + c d + *
6	((a + b) * c) - d	- * + a b c d	a b + c * d -

NOTATION OF STACK

Applications of Stack

- Recursion
- Expression evaluations and conversions
- Parsing
- Browsers
- Editors
- Tree Traversals

MCQ

1. The result of evaluating the postfix expression 5, 4, 6, +, *, 4, 9, 3, /, +, * is?

a) 600

b) 350

c) 650

d) 588

2. Convert the following infix expressions into its equivalent postfix expressions

(A + B ∧D)/(E – F)+G

a) (A B D ∧ + E F – / G +)

b) (A B D +∧ E F – / G +)

c) (A B D ∧ + E F/- G +)

d) (A B D E F + ∧ / – G +)

3. Convert the following Infix expression to Postfix form using a stack

x + y * z + (p * q + r) * s, Follow usual precedence rule and assume that the expression is legal.

a) xyz*+pq*r+s*+

b) xyz*+pq*r+s+*

c) xyz+*pq*r+s*+

d) xyzp+**qr+s*+

4. Which of the following statement(s) about stack data structure is/are NOT correct?

a) Linked List are used for implementing Stacks

b) Top of the Stack always contain the new node

c) Stack is the FIFO data structure

d) Null link is present in the last node at the bottom of the stack

5. Consider the following operation performed on a stack of size 5.

Push(1); Pop(); Push(2); Push(3); Pop(); Push(4); Pop(); Pop(); Push(5);

After the completion of all operation, the number of elements present in stack are

a) 1

b) 2

c) 3

d) 4

MCQ

6. Which data structure is needed to convert infix notation to postfix notation?

a) Branch

b) Tree

c) Queue

d) Stack

7. The prefix form of A-B/ (C * D ^ E) is?

a) -/*^ACBDE

b) -ABCD*^DE

c) -A/B*C^DE

d) -A/BC*^DE

8. What is the result of the following operation?

Top (Push (S, X))

a) X

b) X+S

c) S

d) XS

9. The prefix form of an infix expression (p + q) – (r * t) is?

a) + pq – *rt

b) – +pqr * t

c) – +pq * rt

d) – + * pqrt

10. Which data structure is used for implementing recursion?

a) Queue

b) Stack

c) Array

d) List

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