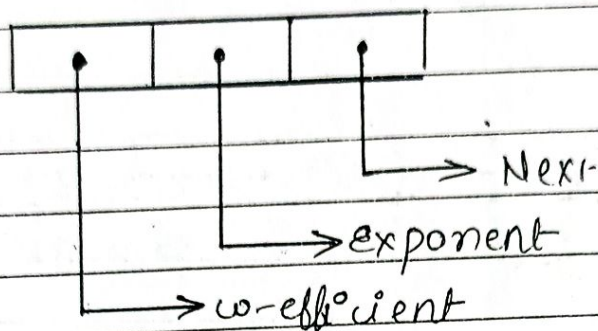


gmp 2014
June



● Polynomial Representation:-

In case of a polynomial representation a node is divided in 3 parts:-



first part represent co-efficient, second represent the exponent and third represent the next.

There are 2 methods to represent a polynomial:-

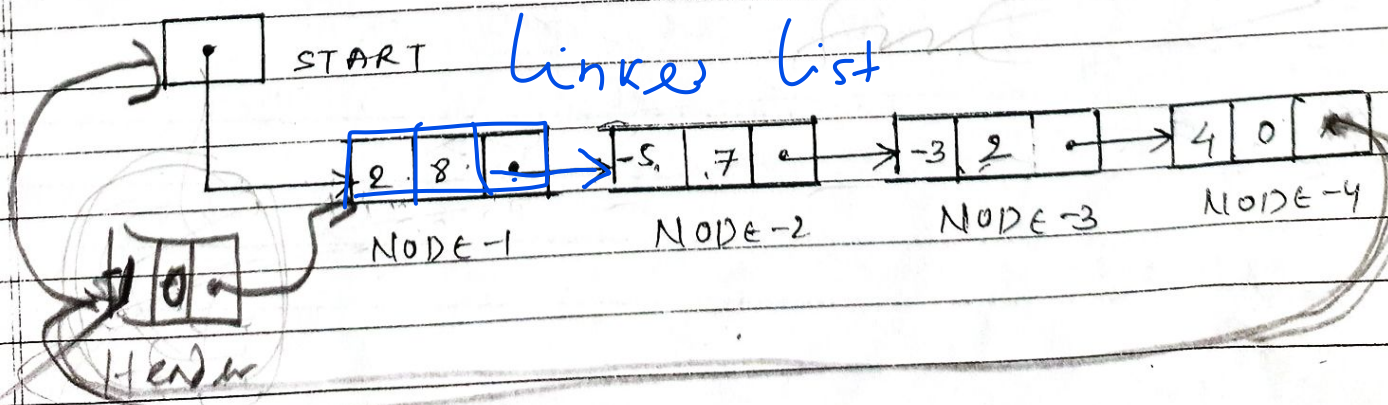
- (i) linked list polynomial representation
- (ii) array representation.

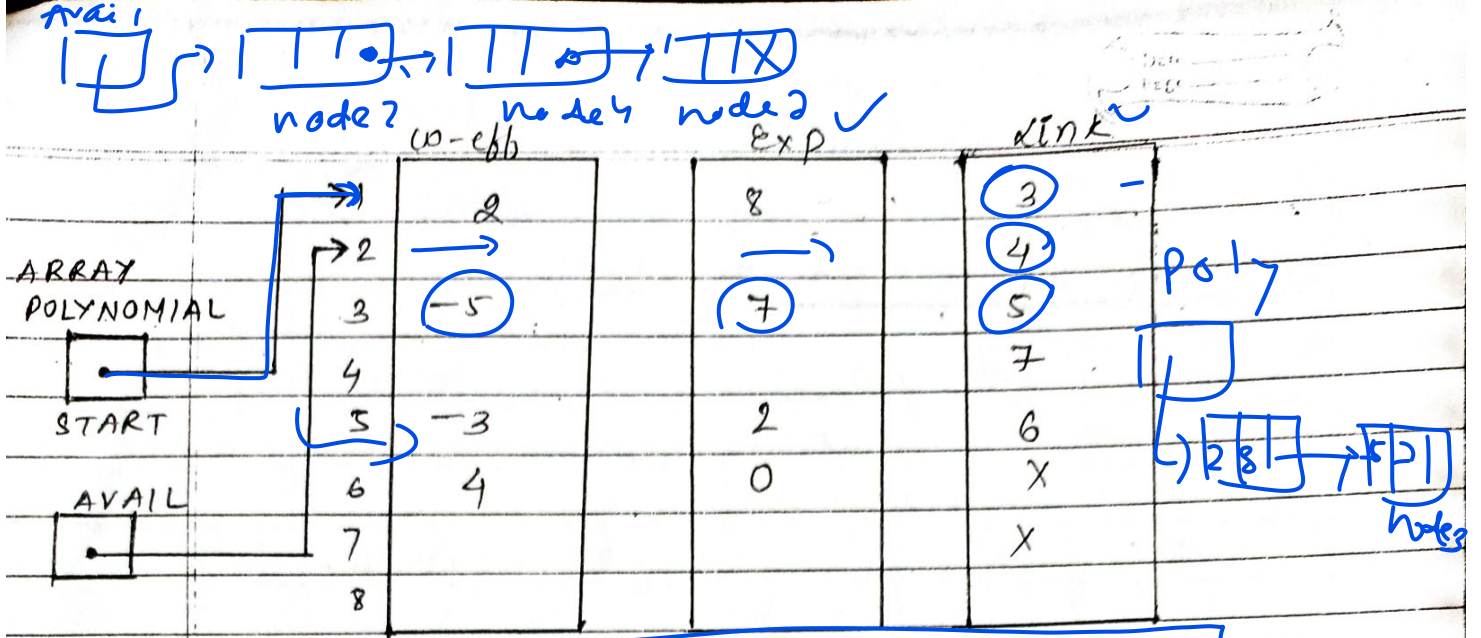
$$2x^8 - 5x^7 - 3x^2 + 4$$

(i) linked list representation:-

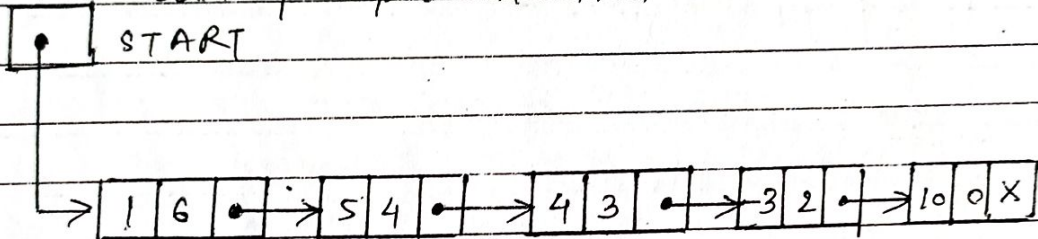
① Let $P(x) = 2x^8 - 5x^7 - 3x^2 + 4$

By using linked list representation represent the given polynomial. Also make array representing

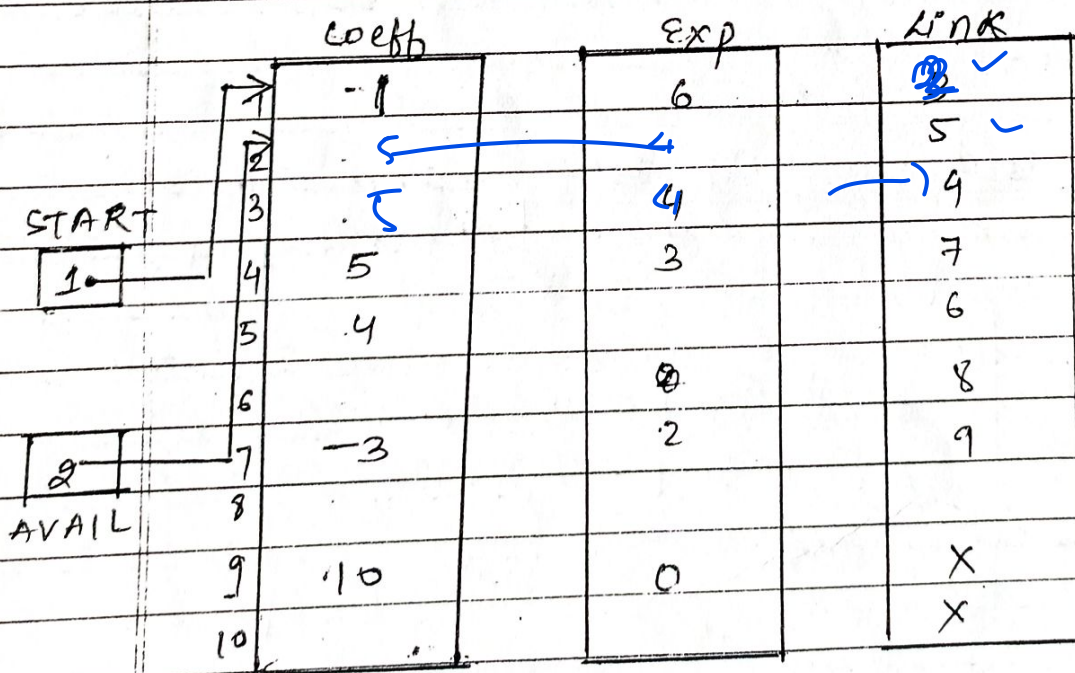




(2) Let $P(x) = x^6 + 5x^4 + 4x^3 - 3x^2 + 10$
 Represent in linked list representation and array representation.



ARRAY REPRESENTATION



• Polynomial addition :-

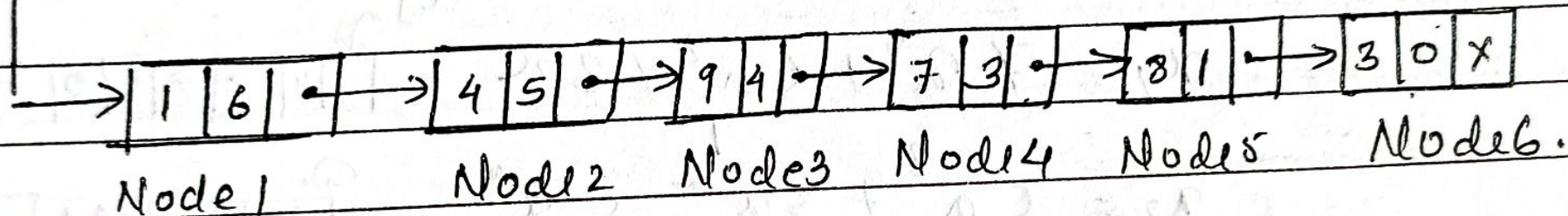
$$P(x) = A(x) + B(x)$$

$$A(x) = x^5 + 9x^4 + 7x^3 + 2x$$

$$B(x) = x^6 + 3x^5 + 6x + 3$$

$$P(x) = x^6 + 4x^5 + 9x^4 + 7x^3 + 8x + 3$$

START



SPARSE MATRIX :-

→ sparse matrix is defined as the maximum no. of elements having zero value.

→ The example of sparse matrix :-

	R ₀	R ₁	R ₂	R ₃	R ₄	R ₅
C ₀	7	0	0	1	0	2
C ₁	0	1	9	0	0	0
C ₂	0	0	0	7	0	0
C ₃	0	0	0	0	0	0
C ₄	8	0	0	0	0	0
C ₅	0	0	3	0	0	0

$BAR(i) + W$
 $(E_3 L_2 + E_2) L_2 + E_3$
 $(L_2 + E_2) L_1 + E_1$

6x6

Base add :-

$$2W + (33) + 20$$

$$800 + 4$$

$$A[5...15] [-8...5]$$

$$A[11] [12]$$

$$8W + 4 [17(8-1) + (5-1)]$$

→ In the above matrix total no. of non-zero elements is 8 that means maximum number of elements is having zero values ✓

→ for this reason the above matrix is a sparse matrix.

① Representation of sparse Matrix:-

→ To avoid the wastage of memory space we require for an alternative representation to store the non-zero elements.

→ To represent a sparse matrix we require 3 types $\langle i, j, \text{value} \rangle$,
 where i represent number of rows,
 j represent number of columns
 and value indicates the value of non-zero element that is present in the i th row and j th column.

→ Example:-

	0 ✓	1 ✓	2 ✓
B[0]	6	6	8
B[1]	0	0	7
B[2]	0	3	1
B[3]	0	5	2
B[4]	1	1	1
B[5]	1	2	9
B[6]	2	3	7
B[7]	4	0	8
B[8]	5	2	3

0 1 2 3 4 5 → non zero

① Transpose of a matrix:-

The transpose of a given matrix can be defined as:

$$B^T = C$$

$$C[0] = \text{---}$$

$$C[1] = \text{---}$$

	0	1	2
C[0][	6	6	8
C[1][	0	0	7
C[2][	0	4	8
C[3][	1	1	1
C[4][	2	1	9
C[5][	2	5	3
C[6][	3	0	1
C[7][	3	2	7
C[8][	5	0	2

$$\Rightarrow \text{base}(C) + 1 + W((E_1 L_2 + E_2) L_3 + E_3) L_4 -$$

$$+ E_2) L_3 + E_3)$$

$$\leq 200 + N((E_1 L_2) + E_2 L_3) + E_3$$