Q1 Write the best algorithm to solve the following equation:-

$F(x) = x^{12} + 7x^8 + 5x^5 + 12x^2 + 9$

Ans:- sparse

$a = 9, 12, 5, 7, 1$

$e = 0, 2, 5, 8, 12$

sum = 0 m = 5

$e_0 = 0$

term = 1

```
for(i=1; i<=m; i++){
    r= x^(e_i - e_i-1);
    term = term * r_i
    sum = sum + a_i * term
end for
```

r	term	sum
x^{0-0}	1	$0+9=9$
x^{2-0}	x^2	$9+12x^2$
x^{5-2}	x^5	$9+12x^2+5x^5$
x^{8-5}	x^8	$9+12x^2+5x^5+7x^8$
x^{12-8}	x^{12}	$9+12x^2+5x^5+7x^8+x^{12}$

Bitonic :-

V = 0 1 0 1 0 1 0 1

M = 0 1 0 1 0 1 0 1

- Stage 1 :-

M_1 = 0 1 0 1

index		input	P	P	P	E	
0	0	3	3	3	3	3	0
1	1	9	1	2	9	9	
0	2	2	9	1	2	6	1
1	3	6	0	4	6	2	
0	4	1	2	9	1	0	0
1	5	0	4	6	0	1	
0	6	4	6	0	4	8	
1	7	8	8	8	8	4	1

-Stage 2 :- M = 0101

index		input	P	P	E	P	E
0	0	3	0 3	0 3	0 3	0 3	2 0
1	1	9	0 0	0 6	0 6	0 2	3
0	2	6	1 9	0 0	1 8	0 6	6 0
1	3	2	1 1	0 8	0 0	9 1	9
0	4	0	0 6	1 9	0 2	8 1	8 1
1	5	1	0 8	1 2	9	4 1	4
0	6	8	1 2	1 1	1 4	0 0	1 1
1	7	4	1 4	1 4	1 1	1 1	0