Consider the following polynomials

$$4x^3 + 3x^2 + 1 \quad \text{——} \quad (1)$$

$$5x^3 + 7x + 5 \quad \text{——} \quad (2)$$

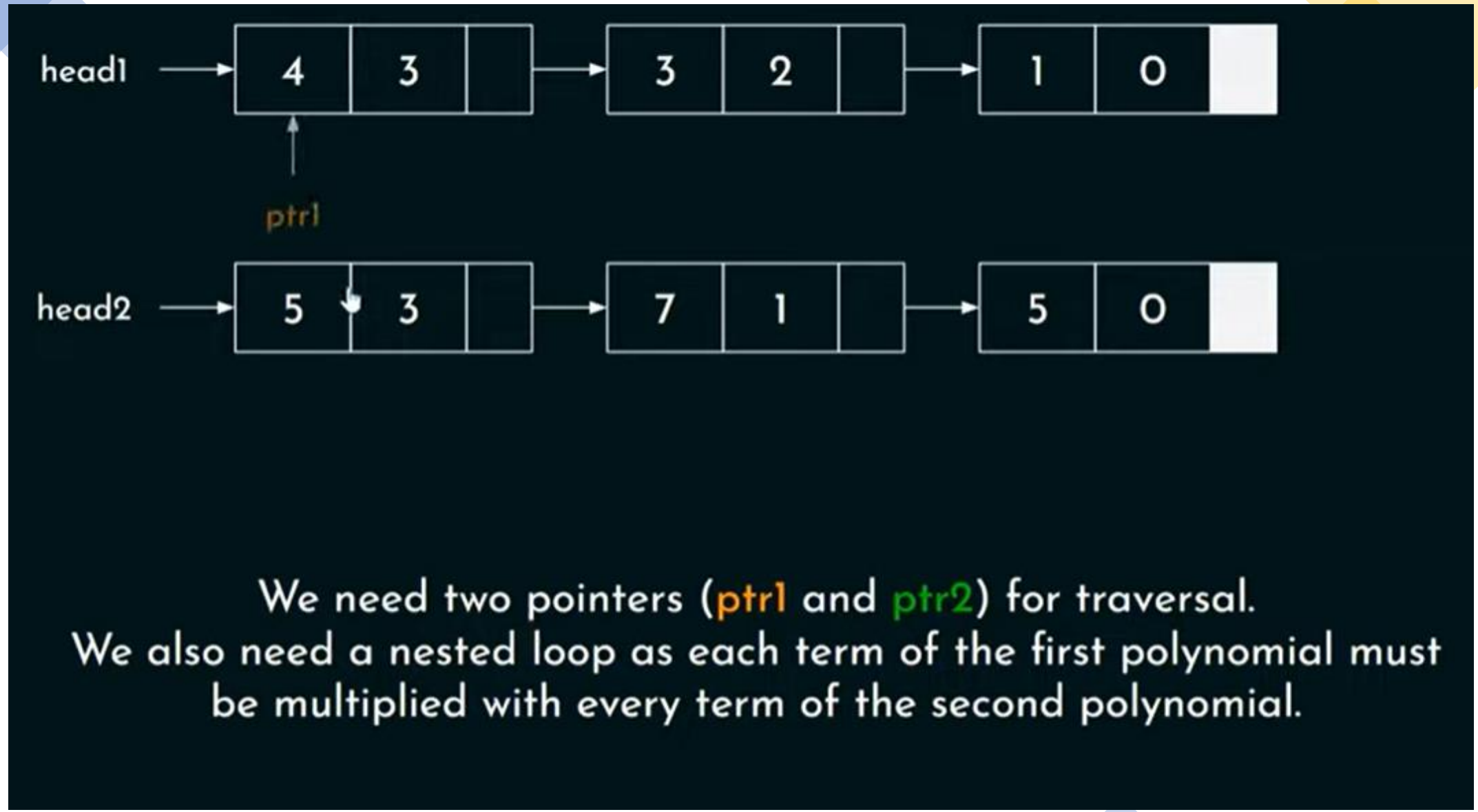
Each term of the polynomial (1) must be multiplied with each term of the polynomial (2)

Multiplying each term means multiplying their coefficients and adding their exponents.

$$(4x5)x^{3+3} + (4x7)x^{3+1} + (4x5)x^{3+0} + (3x5)x^{2+3} + (3x7)x^{2+1} + (3x5)x^{2+0} + (1x5)x^{0+3} + (1x7)x^{0+1} + (1x5)x^{0+0}$$

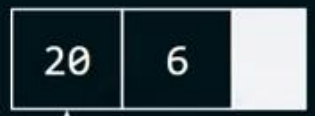
$$20x^6 + 28x^4 + 20x^3 + 15x^5 + 21x^3 + 15x^2 + 5x^3 + 7x + 5$$

Resultant Polynomial


head1
4
3
3
2
1
0
ptr1
head2
5
3
7
1
5
0
We need two pointers (ptr1 and ptr2) for traversal.
We also need a nested loop as each term of the first polynomial must be multiplied with every term of the second polynomial.

ptr1

ptr2

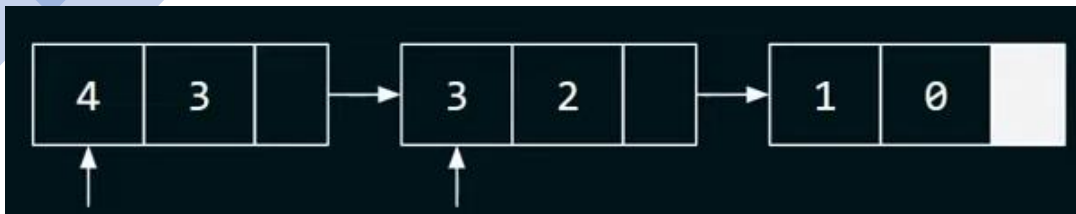


head3

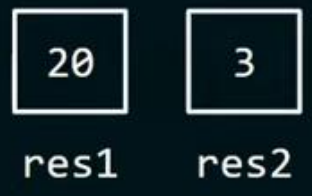
```
int res1, res2;
struct node* head3 = NULL;
while(ptr1 != NULL)
{
     while(ptr2 != NULL)
     {
          res1 = ptr1->coeff * ptr2->coeff;
          res2 = ptr1->expo + ptr2->expo;
          head3 =insert(head3, res1, res2);
          ptr2 = ptr2->link;
     }

}
```

res1 res2




```
int res1, res2;
struct node* head3 = NULL;
while(ptr1 != NULL)
{
      ptr2 = head2;
      while(ptr2 != NULL)
      {
            res1 = ptr1->coeff * ptr2->coeff;
            res2 = ptr1->expo + ptr2->expo;
            head3 =insert(head3, res1, res2);
            ptr2 = ptr2->link;
      }
      ptr1 = ptr1->link;
}
```



$4x^3 + 3x^2 + 1$ —— (1)

$5x^3 + 7x + 5$ —— (2)

$(4x5)x^{3+3} + (4x7)x^{3+1} + (4x5)x^{3+0} + (3x5)x^{2+3} + (3x7)x^{2+1} + (3x5)x^{2+0} + (1x5)x^{0+3} + (1x7)x^{0+1} + (1x5)x^{0+0}$

$20x^6 + 28x^4 + 20x^3 + 15x^5 + 21x^3 + 15x^2 + 5x^3 + 7x + 5$

$20x^6 + 15x^5 + 28x^4 + 20x^3 + 21x^3 + 5x^3 + 15x^2 + 7x + 5$

We will get this polynomial after executing the code because of insert function.