POLYNOMIAL MULTIPLICATION

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**Algorithm**

Input: Read 2 polynomials from the user(poly1 and poly2)

Output: Multiplied polynomial(polymult)

Steps:

**struct poly**

{

int exp;

int coeff;

struct poly \*next;

};

1. Start
2. Declare pointers poly1,poly2,polymult,temp1,temp2,tempmult
3. Read the 2 polynomials from the user ,i.e, poly1 and poly2
4. temp1 = poly1
5. temp2 = poly
6. polymult = (struct poly\*) malloc(sizeof(struct poly))
7. tempmult = polymult
8. tempmult -> next = NULL
9. while(temp1 != NULL)
10. temp2 = poly2
11. while(temp2 != NULL)
12. tempmult -> coeff = temp1 -> coeff \* temp2 -> coeff;
13. tempmult -> exp = temp1 -> exp + temp2 -> ex
14. tempmult -> next = (struct poly\*) malloc(sizeof(struct poly))
15. tempmult = tempmult -> next
16. tempmult -> next = NULL
17. temp2 = temp2 -> next
18. temp1 = temp1 -> next
19. tempmult = polymult
20. printf("Product of polynomials are - \n")
21. while(tempmult -> next != NULL)
22. if(tempmult -> coeff == 0)
23. tempmult = tempmult -> next
24. else if(tempmult -> exp == 0)
25. printf("%d",tempmult -> coeff)
26. tempmult = tempmult -> next
27. else
28. printf("%dx^%d",tempmult -> coeff,tempmult -> exp)
29. tempmult = tempmult -> next
30. if(tempmult -> next != NULL)
31. printf("+")
32. printf("\n")
33. stop

**Program**

#include <stdio.h>

#include <stdlib.h>

struct poly

{

int exp;

int coeff;

struct poly \*next;

};

int main()

{

struct poly \*poly1 = NULL,\*poly2 = NULL;

struct poly \*polymult = NULL,\*temp1,\*temp2,\*tempmult;

char ch = 'y';

poly1 = (struct poly\*) malloc(sizeof(struct poly));

temp1 = poly1;

printf("Enter polynomial 1\n");

do

{

printf("Enter coefficient - ");

scanf("%d",&temp1 -> coeff);

printf("Enter exponent - ");

scanf("%d",&temp1 -> exp);

printf("Would you like to enter more? (y/n)");

scanf(" %c",&ch);

temp1 -> next = NULL;

if(ch == 'y' || ch == 'Y')

{

temp1 -> next = (struct poly\*) malloc(sizeof(struct poly));

temp1 = temp1 -> next;

temp1 -> next = NULL;

}

}while(ch == 'y' || ch == 'Y');

ch = 'y';

poly2 = (struct poly\*) malloc(sizeof(struct poly));

temp2 = poly2;

printf("Enter polynomial 2\n");

do

{

printf("Enter coefficient - ");

scanf("%d",&temp2 -> coeff);

printf("Enter exponent - ");

scanf("%d",&temp2 -> exp);

printf("Would you like to enter more? (y/n)");

scanf(" %c",&ch);

temp2 -> next = NULL;

if(ch == 'y' || ch == 'Y')

{

temp2 -> next = (struct poly\*) malloc(sizeof(struct poly));

temp2 = temp2 -> next;

temp2 -> next = NULL;

}

}while(ch == 'y' || ch == 'Y');

temp1 = poly1;

temp2 = poly2;

polymult = (struct poly\*) malloc(sizeof(struct poly));

tempmult = polymult;

tempmult -> next = NULL;

while(temp1 != NULL)

{

temp2 = poly2;

while(temp2 != NULL)

{

tempmult -> coeff = temp1 -> coeff \* temp2 -> coeff;

tempmult -> exp = temp1 -> exp + temp2 -> exp;

tempmult -> next = (struct poly\*) malloc(sizeof(struct poly));

tempmult = tempmult -> next;

tempmult -> next = NULL;

temp2 = temp2 -> next;

}

temp1 = temp1 -> next;

}

tempmult = polymult;

printf("Product of polynomials are - \n");

while(tempmult -> next != NULL)

{

if(tempmult -> coeff == 0)

{

tempmult = tempmult -> next;

}

else if(tempmult -> exp == 0)

{

printf("%d",tempmult -> coeff);

tempmult = tempmult -> next;

}

else

{

printf("%dx^%d",tempmult -> coeff,tempmult -> exp);

tempmult = tempmult -> next;

}

if(tempmult -> next != NULL)

{

printf("+");

}

}

printf("\n");

}