



Experiment-2.5

Design, Develop and Implement a Program for the following operations on Singly Circular Linked List (SCLL) with header nodes

1. Represent and Evaluate a Polynomial P (x,y,z)

2. Find the sum of two polynomialsPOLY1 (x,y,z) and POLY2 (x,y,z) and store the result in POLYSUM (x,y,z)

3. Support the program with appropriate functions for each of the above operations

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6. Semester: 3rd Date of Performance:05.10.21

7. Subject Name: DATA STRUCTURES LAB Subject Code: 210-20CSP-236_20BIT-1_B

1. Aim/Overview of the practical:

A C Program for operations on Singly Circular Linked List (SCLL)

2. Task to be done:

We have to do different operation on Singly Circular Linked List (SCLL) with header nodes

3. Algorithm/Flowchart:

Step 1: Start.

Step 2: Perform the given operations on SCLL as done in program

Step 3: Stop.

4. Code for experiment/practical:

```
#include<stdio.h>
#include<stdib.h>
#include<math.h>
#define COMPARE(x, y) ((x == y)?0:(x > y)?1:-1)
struct node
{
int coef;
int xexp, yexp, zexp;
```







```
struct node *link;
};
typedef struct node *NODE;
NODE getnode()
NODE x;
x = (NODE) malloc(sizeof(struct node));
if(x == NULL)
printf("Running out of memory \n");
return NULL;
return x;
}
NODE attach(int coef, int xexp, int yexp, int zexp, NODE head)
NODE temp, cur;
temp = getnode();
temp->coef = coef;
temp->xexp = xexp;
temp->yexp = yexp;
temp->zexp = zexp;
cur = head->link;
while(cur->link != head)
cur = cur->link;
cur->link = temp;
temp->link = head;
return head;
}
NODE read_poly(NODE head)
int i, j, coef, xexp, yexp, zexp, n;
printf("\nEnter the no of terms in the polynomial: ");
scanf("%d", &n);
```







```
for(i=1; i<=n; i++)
printf("\n\tEnter the %d term: ",i);
printf("\n\t\tCoef = ");
scanf("%d", &coef);
printf("\n\t\tEnter Pow(x) Pow(y) and Pow(z): ");
scanf("%d", &xexp);
scanf("%d", &yexp);
scanf("%d", &zexp);
head = attach(coef, xexp, yexp, zexp, head);
return head;
void display(NODE head)
NODE temp;
if(head->link == head)
printf("\nPolynomial does not exist.");
return;
temp = head->link;
while(temp != head)
printf("%dx^%dy^%dz^%d", temp->coef, temp->xexp, temp->yexp, temp->zexp);
temp = temp->link;
if(temp != head)
printf(" + ");
}
int poly_evaluate(NODE head)
int x, y, z, sum = 0;
NODE poly;
printf("\nEnter the value of x,y and z: ");
```







```
scanf("%d %d %d", &x, &y, &z);
poly = head->link;
while(poly != head)
{
sum += poly->coef * pow(x,poly->xexp)* pow(y,poly->yexp) * pow(z,poly->zexp);
poly = poly->link;
return sum;
NODE poly_sum(NODE head1, NODE head2, NODE head3)
NODE a, b;
int coef:
a = head1->link;
b = head2->link;
while(a!=head1 && b!=head2)
while(1)
if(a-xexp == b-xexp && a-yexp == b-yexp && a-zexp == b-zexp)
coef = a->coef + b->coef;
head3 = attach(coef, a->xexp, a->yexp, a->zexp, head3);
a = a - \sinh;
b = b - \sinh;
break;
} //if ends here
if(a->xexp!=0 || b->xexp!=0)
switch(COMPARE(a->xexp, b->xexp))
case -1 : head3 = attach(b->coef, b->xexp, b->yexp, b->zexp, head3);
b = b > link;
break;
case 0: if(a-yexp > b-yexp)
```







```
head3 = attach(a->coef, a->xexp, a->yexp, a->zexp, head3);
a = a - \sinh;
break;
else if(a->yexp < b->yexp)
head3 = attach(b->coef, b->xexp, b->yexp, b->zexp, head3);
b = b > link;
break:
else if(a->zexp > b->zexp)
head3 = attach(a->coef, a->xexp, a->yexp, a->zexp, head3);
a = a - \sinh x
break;
else if(a->zexp < b->zexp)
head3 = attach(b->coef, b->xexp, b->yexp, b->zexp, head3);
b = b > link:
break;
case 1 : head3 = attach(a->coef,a->xexp,a->yexp,a->zexp,head3);
a = a - \sinh;
break:
} //switch ends here
break:
} //if ends here
if(a->yexp!=0 || b->yexp!=0)
switch(COMPARE(a->yexp, b->yexp))
case -1: head3 = attach(b->coef, b->xexp, b->yexp, b->zexp, head3);
b = b - \sinh;
break:
case 0: if(a->zexp > b->zexp)
```







```
head3 = attach(a->coef, a->xexp, a->yexp, a->zexp, head3);
a = a - \sinh;
break;
else if(a->zexp < b->zexp)
head3 = attach(b->coef, b->xexp, b->yexp, b->zexp, head3);
b = b > link;
break;
}
case 1: head3 = attach(a->coef, a->xexp, a->yexp, a->zexp, head3);
a = a - \sinh;
break;
break;
if(a->zexp!=0 || b->zexp!=0)
switch(COMPARE(a->zexp,b->zexp))
case -1: head3 = attach(b->coef,b->xexp,b->yexp,b->zexp,head3);
b = b - \sinh;
break:
case 1: head3 = attach(a->coef, a->xexp, a->yexp, a->zexp, head3);
a = a - \sinh x
break;
break;
while(a!= head1)
head3 = attach(a->coef,a->xexp,a->yexp,a->zexp,head3);
a = a - \sinh;
while(b!= head2)
```







```
head3 = attach(b->coef,b->xexp,b->yexp,b->zexp,head3);
b = b > link:
return head3;
void main()
NODE head, head1, head2, head3;
int res, ch;
head = getnode(); /* For polynomial evaluation */
head1 = getnode(); /* To hold POLY1 */
head2 = getnode(); /* To hold POLY2 */
head3 = getnode(); /* To hold POLYSUM */
head->link=head;
head1->link=head1:
head2->link=head2:
head3->link= head3;
while(1)
printf("\n~~~Menu~~~");
printf("\n1.Represent and Evaluate a Polynomial P(x,y,z)");
printf("\n2.Find the sum of two polynomials POLY1(x,y,z)");
printf("\nEnter your choice:");
scanf("%d",&ch);
switch(ch)
{
             printf("\n\sim \sim \sim Polynomial evaluation P(x,y,z) \sim \sim \n");
case 1:
head = read_poly(head);
printf("\nRepresentation of Polynomial for evaluation: \n");
display(head);
res = poly_evaluate(head);
printf("\nResult of polynomial evaluation is : %d \n", res);
```





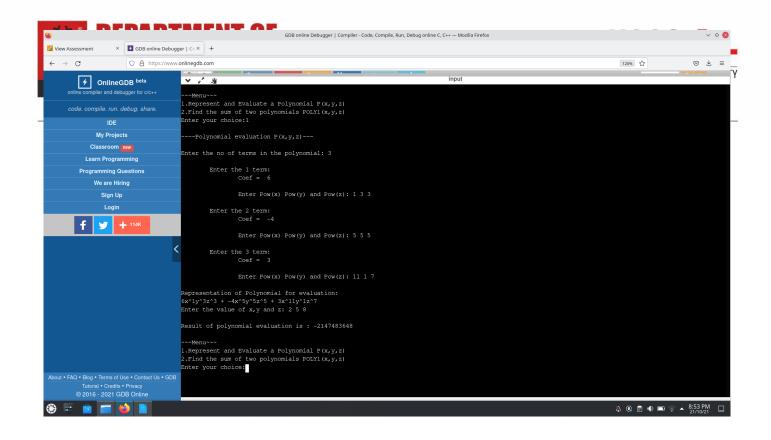


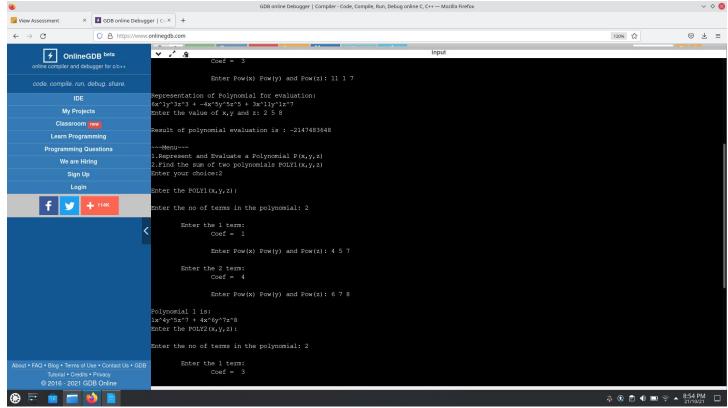
```
break;
case 2:
             printf("\nEnter the POLY1(x,y,z): \n");
head1 = read_poly(head1);
printf("\nPolynomial 1 is: \n");
display(head1);
printf("\nEnter the POLY2(x,y,z): \n");
head2 = read_poly(head2);
printf("\nPolynomial 2 is: \n");
display(head2);
printf("\nPolynomial addition result: \n");
head3 = poly_sum(head1,head2,head3);
display(head3);
break:
case 3:
           exit(0);
}
}
```

5. Output: Image of sample output to be attached here



}





Learning outcomes (What I have learnt):







- Add item to the different position of the Linked list.
- Remove an item from the different position of the Linked list.
- Evaluation of expressions.
- Backtracking.
- Runtime memory management.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			

