VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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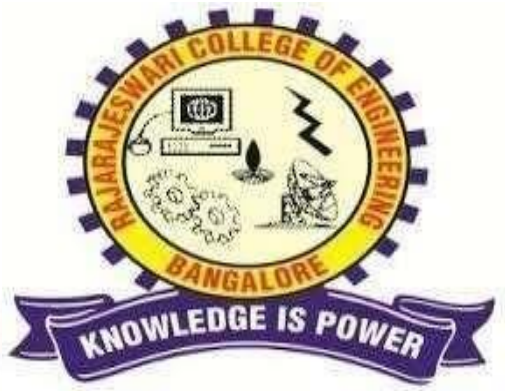
RAJARAJESWARI COLLEGE OF ENGINEERING, BENGALURU

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS



DATA STRUCTURES LABORATORY (22MCA13)

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Data structure Lab Programs

1 Implement a Program in C for converting an Infix Expression to Postfix Expression.

2 Design, develop, and execute a program in C to evaluate a valid postfix expression using stack. Assume that the postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators are + (add), - (subtract), * (multiply) and / (divide).

3 Design, develop, and execute a program in C to simulate the working of a queue of integers using an array. Provide the following operations: a. Insert b. Delete c. Display

4 Write a C program to simulate the working of a singly linked list providing the following operations: a. Display & Insert b. Delete from the beginning/end c. Delete a given element

5 Write a C program to Implement the following searching techniques a. Linear Search b. Binary Search.

6 Write a C program to implement the following sorting algorithms using user defined functions: a. Bubble sort (Ascending order) b. Selection sort (Descending order).

7 Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm (C programming)

8 From a given vertex in a weighted connected graph, find shortest paths to other vertices Using Dijkstra's algorithm (C programming)

Demonstration Experiments (For CIE) if any

9 Using circular representation for a polynomial, design, develop, and execute a program in C to accept two polynomials, add them, and then print the resulting polynomial.

10 Design, develop, and execute a program in C to evaluate a valid postfix expression using stack. Assume that the postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators are + (add), - (subtract), * (multiply) and / (divide).

PROGRAM 1

Implement a Program in C for converting an Infix Expression to Postfix Expression.

```
#include<stdio.h>
#include<stdlib.h>
#include<math.h>  #include
<string.h>
```

```
char infix_string[20], postfix_string[20];
int top;  int stack[20];  int pop(); int
precedence(char symbol);
 int        isEmpty();        void
infix_to_postfix();              int
check_space(char symbol);
void push(long int symbol);

int  main()  {  int
count,     length;
char temp;
top = -1;
printf("\nINPUT THE INFIX EXPRESSION : ");
scanf("%s", infix_string);
infix_to_postfix();
printf("\nEQUIVALENT POSTFIX EXPRESSION :%s\n",postfix_string);
return 0;
}

void infix_to_postfix()
{
unsigned  int  count,  temp  =  0;   char  next;  char
symbol; for(count = 0; count < strlen(infix_string);
count++)
{
symbol = infix_string[count]; // Scanning the input expression
if(!check_space(symbol))
{ switch(symbol)
{
case '(': push(symbol);
break; case ')':
while((next = pop()) != '(')         // pop until '(' is encountered
{
postfix_string[temp++] = next;
} break;
case '+':
case '-':
case '*':
case '/':
case '%':
case '^':
while(!isEmpty() && precedence(stack[top]) >=precedence(symbol))
```

```
            // Check precedence and push the higher one
   postfix_string[temp++] = pop();
   push(symbol); break;  default:
   postfix_string[temp++] = symbol;
}
} }
while(!isEmpty())
{
postfix_string[temp++] = pop();
}
postfix_string[temp] = '\0';
}

int precedence(char symbol)
{
switch(symbol)
{ case '(': return
0;  case '+':
case '-': return 1;
case '*': case '/':
case '%': return 2;
case '^': return 3;
default: return 0; }
}

int check_space(char symbol)
{
if(symbol == '\t' || symbol == ' ' )
{ return
1; } else
{ return
0;
}
}

void push(long int symbol)
{ if(top > 20) { printf("Stack Overflow\n");  exit(1); } top =
top + 1; stack[top] = symbol; // Push the symbol and make it
as TOP
}
```

```
int isEmpty()
{ if(top == -
1) { return 1;
} else {
return 0;
}
}

int pop() {
if(isEmpty())
{
printf("Stack is Empty\n");
 exit(1);
}
return(stack[top--]); // Pop the symbol and decrement TOP
}
```

OUTPUT :

INPUT THE INFIX EXPRESSION: A+B*(C-D)/E

EQUIVALENT POSTFIX EXPRESSION: ABCD-*E/+

PROGRAM 2

Design, develop, and execute a program in C to evaluate a valid postfix expression using stack. Assume that the postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators are + (add), - (subtract), * (multiply) and / (divide).

```
#include<stdio.h>
#define MAX 20  typedef
struct stack
{
 int data[MAX];
int top;
}stack;

void init(stack *);  int empty(stack
*);  int full(stack *);  int pop(stack
*); void push(stack *,int); int
evaluate(char x,int op1,int op2);
int main()
{ stack s;  char x; int op1,op2,val;  init(&s); printf("Enter the expression(eg:
59+3*)\nSingle digit operand and operators only:");  while((x=getchar())!='\n')
{ if(isdigit(x)) push(&s,x-48);  //x-48 for removing the
effect of ASCI else { op2=pop(&s);  op1=pop(&s);
val=evaluate(x,op1,op2);  push(&s,val);
}
} val=pop(&s); printf("\nValue of
expression=%d",val);
return 0; }

int evaluate(char x,int op1,int op2)
{ if(x=='+')
return(op1+op2);
if(x=='-')
return(op1-op2);
if(x=='*')
return(op1*op2);
if(x=='/')
```

```
return(op1/op2);
if(x=='%')
return(op1%op2);
}

void init(stack *s)
{ s->top=-1;
}

int empty(stack *s)
{ if(s->top==-1)
return(1);

return(0);
}

int full(stack *s)
{
if(s->top==MAX-1) return(1);

return(0);
}

void push(stack *s,int x)
{ s->top=s->top+1;
s->data[s->top]=x;
}

int pop(stack *s)
{       int x; x=s-
>data[s->top];  s-
>top=s->top-1;
return(x);
}
```

OUTPUT :

Enter the expression(eg: 59+3*)

Single digit operand and operators only: 45+3*25+/

Value of expression = 3

PROGRAM 3

Design, develop, and execute a program in C to simulate the working of a queue of integers using an array. Provide the following operations: a. Insert b. Delete c. Display

```
#include<stdio.h>
#include<stdlib.h>
void insert();   void
delete1();   void
display();
int front = -1, rear = -1 ,maxsize;
int queue[100];   int main ()
{
   int choice;
   printf("\n Enter the size of QUEUE : ");
scanf("%d",&maxsize);
   printf("\n QUEUE OPERATIONS USING ARRAY");
   printf("\n1.insert an element\n2.Delete an element\n3.Display the queue\n 4.Exit");
while(choice != 4)
   {
      printf("\nEnter your choice : ");
scanf("%d",&choice);          switch(choice)
      {
         case 1: insert();
break;
         case 2:  delete1();
break;              case 3:
display();              break;
```

```
case 4:  exit(0);
break;
          default:  printf("\nEnter valid choice??\n");
       }
}     return
0;
}

void insert()
{             int
item;
   printf("\nEnter the element\n");
scanf("\n%d",&item);         if(rear
== maxsize-1)
   {
      printf("\nOVERFLOW\n");
return;
   }
   if(front == -1 && rear == -1)
   {
front = 0;
rear = 0;       }
else       {
      rear = rear+1;
   }
   queue[rear] = item;
printf("\nValue inserted ");

}
```

```
void delete1()
{      int item;       if (front ==
-1 || front > rear)
   {
      printf("\nUNDERFLOW\n");
return;          }       else
   {          item =
queue[front];
if(front == rear)
      {              front = -
1;             rear = -1 ;
}          else          {
front = front + 1;
      }
      printf("\nvalue deleted ");
   }
}

void display()
{              int  i;
if(rear == -1)
   {
      printf("\nEmpty queue\n");
   }
else
   {   printf("\n Elements in the queue are\n");
for(i=front;i<=rear;i++)
      {
         printf("\n%d",queue[i]);
      }
```

```
    }
}
```

OUTPUT :

```
Enter the size of QUEUE : 5

 QUEUE OPERATIONS USING ARRAY
1.insert an element
2.Delete an element
3.Display the queue
4.Exit
Enter your choice : 1
Enter the element
6
Value inserted
Enter your choice : 1
Enter the element
7
Value inserted
Enter your choice : 1
Enter the element
8
Value inserted
Enter your choice : 1
Enter the element
9
Value inserted
Enter your choice : 3
 Elements in the queue are
6
7
8
9 Enter your choice :
2 value deleted
Enter your choice : 3
 Elements in the queue are
7
8
```

9 Enter your choice :
2 value deleted
Enter your choice : 3
Elements in the queue are
8
9
Enter your choice : 4

PROGRAM 4

Write a C program to simulate the working of a singly linked list providing the following operations: a. Display & Insert b. Delete from the beginning/end c. Delete a given element

```
#include<stdio.h>
#include<conio.h>
#include<process.h>
struct node { int
data; struct node
*next;
}*start=NULL,*q,*t;
int main() { int ch;
void insert_beg();
void insert_end();
int insert_pos();
void display();  void
delete_beg();  void
delete_end();  int
delete_pos();
while(1) {
printf("\n\n---- Singly Linked List(SLL) Menu---- ");
printf("\n1.Insert\n2.Display\n3.Delete\n4.Exit\n\n");
printf("Enter your choice(1-4):");
```

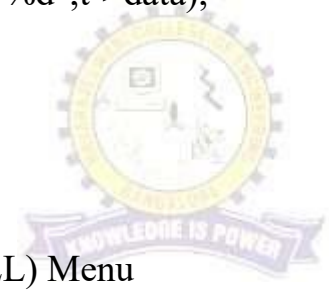
```
scanf("%d",&ch);
switch(ch) { case
1:
printf("\n---- Insert MenU---");
printf("\n1.Insert at beginning\n2.Insert at end\n3.Insert at specified position\n4.Exit");
 printf("\n\nEnter your choice(1-4):"); scanf("%d",&ch);

switch(ch) {
case 1: insert_beg(); break; case
2: insert_end(); break; case 3:
insert_pos(); break; case 4:
exit(0);
default: printf("Wrong Choice!!");
} break;
case 2: display(); break; case 3:
printf("\n---- Delete Menu --");
printf("\n1.Delete from beginning\n2.Delete from end\n3.Delete from
specified position\n4.Exit"); printf("\n\nEnter your choice(1-4):");
scanf("%d",&ch); switch(ch) {
case 1: delete_beg(); break; case
2: delete_end(); break; case 3:
delete_pos(); break; case 4:
exit(0); default: printf("Wrong
Choice!!");
} break;
} return
0;
}
```

```
void insert_beg()
{ int num;
t= (struct node*)malloc(sizeof(struct node));
printf("Enter data:"); scanf("%d",&num);  t-
>data=num; if(start==NULL) //If list is
empty
{ t-
>next=NULL;
start=t; } else {
t->next=start;
start=t; }
}

void insert_end()
{ int
num;
t=(struct node*)malloc(sizeof(struct node));
printf("Enter data:"); scanf("%d",&num); t-
>data=num; t->next=NULL;
if(start==NULL) //If list is empty
{ start=t; } else {
q=start; while(q-
>next!=NULL)  q=q-
>next; q->next=t;
}
}

int insert_pos() {
int pos,i,num;
if(start==NULL)
```

```
{
printf("List is empty!!");  return
0;
}

t=(struct node*)malloc(sizeof(struct node));
printf("Enter data:"); scanf("%d",&num);
printf("Enter position to insert:");
scanf("%d",&pos); t->data=num;
q=start; for(i=1;i<pos-1;i++)
{
if(q->next==NULL)
{
printf("There are less elements!!");
return 0; } q=q->next; } t-
>next=q->next; q->next=t;  return
0; } void display() {
if(start==NULL)
{ printf("List is
empty!!");
} else { q=start; printf("The
linked list is:\n");
while(q!=NULL)
{ printf("%d->",q->data);
q=q->next;
}
} } void
delete_beg() {
if(start==NULL)
```

```
{
printf("The list is empty!!");
} else { q=start;  start=start->next;
printf("Deleted element is %d",q->data);
free(q); } } void delete_end() {
if(start==NULL)
{
printf("The list is empty!!");
} else
{
q=sta
rt;
while
(q-
>next
-
>next
!=N
ULL)
q=q-
>next
; t=q-
>next
; q-
>next
=NU
LL;
printf("Deleted element is %d",t->data);
free(t); } } int delete_pos() { int pos,i;
if(start==NULL)
```

```
{
printf("List is empty!!"); return 0;
}
printf("Enter position to delete:");
scanf("%d",&pos); q=start;
for(i=1;i<pos-1;i++)
{
if(q->next==NULL)
{
printf("There are less elements!!");
return 0; } q=q->next; } t=q-
>next; q->next=t->next;
printf("Deleted element is %d",t->data);
free(t); return 0; }
```



OUTPUT :

```
---- Singly Linked List(SLL) Menu
1.Insert
2.Display
3.Delete
4.Exit
Enter your choice(1-4): 1
---- Insert Menu
1.Insert at beginning
2.Insert at end
3.Insert at specified position 4.Exit
Enter your choice(1-4):1
Enter data : 10
---- Singly Linked List(SLL) Menu
1.Insert
2.Display
3.Delete
4.Exit
Enter your choice(1-4): 2
```

The liked list is
10->
---- Singly Linked List(SLL) Menu
1.Insert
2.Display
3.Delete
4.Exit
Enter your choice(1-4): 3
---- Delete Menu
1.Delete from beginning
2.Delete from end
3.Delete from specified position
4.Exit
Enter your choice(1-4):1
Deleted element is 10

PROGRAM 5

Write a C program to implement the following searching techniques a. Linear Search b. Binary Search.

```
#include<stdio.h>
void main() {
int a[25], beg, item, last, n, num, i, ch, mid, f=0;
printf ("menu\n"); printf ("\n 1.linear search");
printf ("\n 2.binary search");  printf ("\n enter
the choice");  scanf ("%d", &ch); if (ch==1) {
printf ("\n enter the number of elements in the array");  scanf
("%d",&n);
printf ("\n enter the sorted array");
for(i=0;i<n;i++) scanf ("%d",
&a[i]);
printf ("\n enter the item to be searched");
scanf ("%d", &item); for(i=0; i<n; i++)
{ if(a[i]==item)
```

```
{
printf ("\n item found at position %d", i+1); break;
} } if (i==n) printf ("\n item
not found");
} if (ch
==2) {
printf ("\n enter the number of elements in the array");
scanf ("%d", &n); printf ("enter the sorted array");
for(i=0; i<n; i++)  scanf ("%d", &a[i]); printf ("item
to be searched"); scanf ("%d", &item); last=n-1;
mid=(beg +last)/2;  while (beg<=last)
{ if (item ==
a[mid])
{
printf ("\n item found at position %d", mid+1);
break; } else if(a[mid]>item)  last =mid-1; else
beg=mid+1;  mid
=(beg + last)/2;
}
}
}
```

OUTPUT :

```
MENU
 1.linear search  2.binary search  enter the
choice 1  enter the number of elements in
the array 5  enter the sorted array 10 20 30
40 50  enter the item to be searched  40
 item found at position 4

MENU
```

1.linear search 2.binary search enter the choice 2 enter the number of elements in the array 5 enter the sorted array 10 20 30 40 50 enter the item to be searched 30
item found at position 3

PROGRAM 6

Write a C Program to Implement the following sorting algorithm using user defined functions: a. bubble Sort (Ascending Order) b. Selection Sort (Descending Order).

```
#include<stdio.h>
#include<stdlib.h> void
display(int a[],int n); void
bubble_sort(int a[],int n);  void
selection_sort(int a[],int n);
//-----------------Main Function----------------------
int main() {
int n,choice,i,arr[10];  char
ch[20];
printf("Enter no. of elements u want to sort : ");
scanf("%d",&n); int arr[n];  for(i=0;i<n;i++)
{
printf("Enter %d Element : ",i+1);  scanf("%d",&arr[i]);
}
printf("Please select any option Given Below for Sorting : \n");
while(1) {
printf("\n1. Bubble Sort\n2. Selection Sort\n3. Display Array.\n 4. Exit the Program.\n");
printf("\nEnter your Choice : ");
scanf("%d",&choice); switch(choice)
```

```
{
case 1: bubble_sort(arr,n); break;
case 2: selection_sort(arr,n);
break; case 3:
display(arr,n);  break; case
4: return 0;
default: printf("\nPlease Select only 1-4 option      \n");
return 0;
}
}
}
//      End of main function
//      Display Function
void display(int arr[],int n)
{
Int i;
for(i=0;i<n;i++)
{
printf(" %d ",arr[i]);
}
}
// Bubble Sort Function   void
bubble_sort(int arr[],int n)
{
int i,j,temp;
for(i=0;i<n;i++) {
for(j=0;j<n-i-1;j++)
{ if(arr[j]>arr[j+1])
```

```
{ temp=arr[j];
arr[j]=arr[j+1];
arr[j+1]=temp;
}
} }
printf("After Bubble sort Elements are : "); display(arr,n);
}
//------------------Selection Sort Function--------- void
selection_sort(int arr[],int n)
{
int i,j,temp; for(i=0;i<n-1;i++)
{ for(j=i+1;j<n;j++)
{
if(arr[i]<arr[j])
{ temp=arr[i];
arr[i]=arr[j];
arr[j]=temp;
}
} }
printf("After Selection sort Elements are : ");  display(arr,n);
}
```


OUTPUT :

```
Enter no. of elements u want to sort : 5
Enter 1 Element : 45
Enter 2 Element : 12
Enter 3 Element : 78
Enter 4 Element : 3
Enter 5 Element : 56
Please select any option Given Below for Sorting :
```

1. Bubble Sort
2. Selection Sort
3. Display Array.
4. Exit the Program.

Enter your Choice : 1

After Bubble sort Elements are : 3 12 45 56 78

1. Bubble Sort
2. Selection Sort
3. Display Array.
4. Exit the Program.

Enter your Choice : 2

After Selection sort Elements are : 78 56 45 12 3

1. Bubble Sort
2. Selection Sort
3. Display Array.
4. Exit the Program.

Enter your Choice : 3

3 12 45 56 78

1. Bubble Sort
2. Selection Sort
3. Display Array.
4. Exit the Program.

Enter your Choice : 4

PROGRAM 7

Find Minimum Cost Spanning tree of a given undirected graph using kruskal's algorithm (C programming).

```
#include<stdio.h>
#include<stdlib.h>  #define
VAL 999
int i,j,k,a,b,u,v,n,ne=1; int
min,mincost=0,cost[9][9],parent[9]; int
find(int i)
{
while(parent[i])
i=parent[i];
return i; }
int uni(int i,int j)
{ if(i!=j) {
parent[j]=i;
return 1; }
return 0; }
int main()
{
printf("Implementation of Kruskal's algorithm\n");
printf("Enter the no. of vertices:");  scanf("%d",&n);
printf("Enter the cost adjacency matrix:\n");
for(i=1;i<=n;i++)
{ for(j=1;j<=n;j++)
{
scanf("%d",&cost[i][j]);
if(cost[i][j]==0) cost[i][j]=VAL;
```

```
} }
printf("The edges of Minimum Cost Spanning Tree are\n");
while(ne < n)
{
for(i=1,min=VAL;i<=n;i++)
{ for(j=1;j <=
n;j++)
{
if(cost[i][j] < min)
{
min=cost[i][j];
a=u=i; b=v=j;
}
} }
u=find(u);
v=find(v);
if(uni(u,v))
{
printf("%d edge (%d,%d) =%d\n",ne++,a,b,min);  mincost
+=min;
}
cost[a][b]=cost[b][a]=999;
}
printf("\n\tMinimum cost = %d\n",mincost);  return
0;
}
```


OUTPUT :

Implementation of Kruskal's algorithm

Enter the no. of vertices: 5

Enter the cost adjacency matrix:

0 2 0 6 0

2 0 3 8 5

0 3 0 0 7

6 8 0 0 9

0 5 7 9 0

The edges of Minimum Cost Spanning Tree are

1 edge (1,2) =2

2 edge (2,3) =3

3 edge (1,4) =6

4 edge (2,5) =5

Minimum cost = 16

PROGRAM 8

From a given vertex in a weighted connected graph find shortest paths to other vertices using Dijkstra's algorithm(C programming).

```
#include<stdio.h>
#include<conio.h>  #define
infinity 999
void dij(int n,int v,int cost[10][10],int dist[100])
{
int i,u,count,w,flag[10],min;
for(i=1;i<=n;i++)
flag[i]=0,dist[i]=cost[v][i];
count=2; while(count<=n)
{ min=99;
for(w=1;w<=n;w++)
if(dist[w]<min && !flag[w])
min=dist[w],u=w;
```

```
flag[u]=1; count++;
for(w=1;w<=n;w++)
if((dist[u]+cost[u][w]<dist[w]) && !flag[w])
dist[w]=dist[u]+cost[u][w];
} } void
main()
{
int n,v,i,j,cost[10][10],dist[10];
clrscr();
printf("\n Enter the number of nodes:");
scanf("%d",&n); printf("\n Enter the
cost matrix:\n");  for(i=1;i<=n;i++)
for(j=1;j<=n;j++) {
scanf("%d",&cost[i][j]);
if(cost[i][j]==0)  cost[i][j]=infinity; }
printf("\n Enter the source matrix:");
scanf("%d",&v); dij(n,v,cost,dist);
printf("\n Shortest path:\n");
for(i=1;i<=n;i++) if(i!=v)
printf("%d->%d,cost=%d\n",v,i,dist[i]);
getch(); }
```

OUTPUT

```
Enter the number of nodes: 5 Enter
the cost matrix:
0 10 3 0 0
0 0 1 2 0
0 4 0 8 2
0 0 0 0 7
0 0 0 9 0
```

Enter the source node: 1 Shortest

path:

1->2, cost=7

1->3, cost=3

1->4, cost=9

1->5, cost=5

PROGRAM 9

Using circular representation for a polynomial, design, develop, and execute a program in C to accept two polynomials, add them, and then print the resulting polynomial.

```
#include<stdio.h>
#include<stdio.h>
```

```
struct node { float
coeff; int expo;
struct node* link;
};

struct node * insert(struct node* head, float co, int ex)
{
struct node* temp; struct node* newp
=malloc(sizeof(struct node));
newp->coeff =co; newp->expo=ex;
newp->link=NULL;

if(head==NULL||ex>head->expo)
{
newp->link= head;
head=newp;
} else
{ temp=head; while(temp->link!=NULL && temp-
>link->expo >=ex) temp=temp->link; newp-
>link=temp->link;
temp->link= newp;
} return
head;
}
struct node* create(struct node * head)
{ int n
,i;
float
coeff;
int
expo;
printf(
"Enter
the
numbe
r of
terms:
");
scanf("%d",&n); for(i=0;i<n;i++)
{
```

```
printf("Enter the coefficient for term %d:",i+1);
scanf("%f",&coeff); printf("Enter the exponent
for term %d:",i+1);
scanf("%d",&expo); head=insert(head,coeff,expo);
} return
head; }
void print(struct node* head)
{
if(head==NULL)
printf("No Polynomials");
else{ struct node*
temp=head;
while(temp!=NULL)
{
printf("(%.lfx^%d)", temp-> coeff,temp->expo);
temp=temp->link;
if(temp!=NULL)
printf("+"); else
printf("\n");
}
} }
void polyadd(struct node* head1,struct node* head2)
{ struct node* ptr1=head1;
struct node* ptr2=head2;
struct node* head3=NULL;
while(ptr1!=NULL && ptr2!=NULL)
{
if(ptr1->expo==ptr2->expo)
{
head3=insert(head3,ptr1->coeff+ptr2->coeff,ptr1->expo);
ptr1=ptr1->link; ptr2=ptr2->link;
}
else if(ptr1->expo > ptr2->expo)
{
head3=insert(head3,ptr1->coeff,ptr1->expo);
ptr1=ptr1->link; }
else if(ptr1->expo < ptr2->expo)
{
head3=insert(head3,ptr2->coeff,ptr2->expo); ptr2=ptr2-
>link;
}
```

```
}
while(ptr1!=NULL)
{
head3=insert(head3,ptr1->coeff,ptr1->expo); ptr1=ptr1-
>link;
}
while(ptr2!=NULL)
{
head3=insert(head3,ptr2->coeff,ptr2->expo);
ptr2=ptr2->link; }
printf("Added Polynomial is:"); print(head3);
}

int main()
{

struct node* head1=NULL; struct
node* head2=NULL;
clrscr(); printf("Enter the first
Polynomial\n"); head1=create(head1);
printf("Enter the Second Polynomial\n");
head2=create(head2);

polyadd(head1,head2);
return 0; getch();
}
```

OUTPUT

Enter the First Polynomial

Enter the number of terms : 2

Enter the coefficient for term 1 : 2

Enter the Exponent for term 1 : 2

Enter the coefficient for term 2: 3

Enter the Exponent for term 2 : 1

Enter the Second Polynomial

Enter the number of terms : 3

Enter the coefficient for term 1 : 4

Enter the Exponent for term 1 : 2

Enter the coefficient for term 2: 3

Enter the Exponent for term 2 : 1

Enter the coefficient for term 3: 2

Enter the Exponent for term 3 : 0

Added Polynomial is : (6x^2)+(6x^1)+(2x^0)

PROGRAM 10

Design, develop, and execute a program in C to evaluate a valid postfix expression using stack. Assume that the postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators are + (add), - (subtract), * (multiply) and / (divide).

```
#include<stdio.h>
```

```
#include<conio.h>  #include<math.h>
float oper(char sym, float op1, float op2)
{ switch(sym)
{ case '+': return op1 +
op2;  case '-': return op1 -
op2;  case '*': return op1
* op2;  case '/': if(op2==
0)
                                                {
printf("Can't evalueate");
exit(0); } return
op1 / op2;  case
'^':
case '$': return pow(op1,op2);
}
}

void push(float item, int *top, float s[ ])
{    s[++(*top)]    =
item;
 }

float pop(int *top, float s[ ])
{ return s[(*top)--
];
}

void main()
{
float s[20], result, op1, op2, x;
int top = -1, i;
char postfix[20], sym;

printf("Enter valid postfix expression\n");  scanf("%s",postfix);

for(i=0;i<strlen(postfix);i++)
{
sym = postfix[i];

if(isdigit(sym)) push(sym-'0', &top, s) // character to digit
          conversion
else if (isalpha(sym)
{ printf("Enter the value of %c: ", sym);
         scanf("%f",&x); push(x,&top,s);
} else { op2 = pop(&top,s);
op1 = pop(&top,s); result =
oper(sym,op1,op2);
push(result,&top,s);
```

```
}
}   result   =   pop(&top,s);
printf("Result =%.4f",result);
}
```

Sample Output 1:

Enter valid postfix expression: 941-3*/

Result = 1.0000