Experiment No. 4

Aim: Implement Sum of Subset Problem using Backtracking

Program -:

```
#include<stdio.h>
 #include<conio.h>
 #define TRUE 1
 #define FALSE 0
 int inc[50],w[50],sum,n;
 void sumset(int ,int ,int);
 int promising(int i,int wt,int total) {
return (((wt+total)>=sum)&&((wt==sum)||(wt+w[i+1]<=sum)));
 }
void main ()
{
int i,j,n,temp,total=0;
clrscr();
printf("\n Enter how many numbers: ");
scanf("%d",&n);
printf("\n Enter %d numbers : ",n);
for (i=0;i<n;i++) {
scanf("%d",&w[i]);
total+=w[i];
}
printf("\n Input the sum value to create sub set: ");
scanf("%d",&sum);
for (i=0;i<=n;i++)
for (j=0;j<n-1;j++)
if(w[j]>w[j+1]) {
temp=w[j];
w[j]=w[j+1];
w[j+1]=temp;
}
printf("\n The given %d numbers in ascending order: ",n);
for (i=0;i<n;i++)
printf("%3d",w[i]);
if((total<sum))
printf("\n Subset construction is not possible");
else{
for (i=0;i<n;i++)
inc[i]=0;
printf("\n The solution using backtracking is:\n");
sumset(-1,0,total);
```

```
}
getch();
}
void sumset(int i,int wt,int total){
int j;
if(promising(i,wt,total)) {
if(wt==sum){
printf("\n{");
for (j=0;j<=i;j++)
if(inc[j])
printf("%3d",w[j]);
printf(" }\n");
} else

{

inc[i+1]=TRUE;

sumset(i+1,wt+w[i+1],total-w[i+1]);

inc[i+1]=FALSE;

sumset(i+1,wt,total-w[i+1]);

 } } }
```

Output -:

```
/tmp/BUHW8prEMx.o
Enter how many numbers: 6
Enter 6 numbers : 12
55
48
26
34
85
Input the sum value to create sub set: 48
The given 6 numbers in ascending order:  12 26 34 48 55 85
 The solution using backtracking is:

{ 48 }
```