PROGRAM 17

Implement “Sum of Subsets” using Backtracking. “Sum of Subsets” problem: Find a subset of a given set S = {s1,s2,.....,sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S = {1,2,5,6,8} and d = 9 there are two solutions {1,2,6} and {1,8}. A suitable message is to be displayed if the given problem instance doesn’t have a solution.

//Code

```
#include<stdio.h>
int count,w[10],d,x[10];
void subset(int cs, int k, int r)
{
int i;
x[k]=1;
if(cs+w[k]==d)
{
printf("\nSubset solution = %d\n", ++count);
for(i=0;i<=k;i++)
{
if(x[i]==1)

printf("%d\t", w[i]);

}
}
else
if(cs+w[k]+w[k+1]<=d)
subset(cs+w[k], k+1, r-w[k]);
if((cs+r-w[k]>=d) && (cs+w[k+1])<=d)
{
x[k]=0;
subset(cs,k+1,r-w[k]);
}
```

```
   }

int  main()
  {
int sum=0,i,n;
printf("Enter the number of elements\n");
scanf("%d", &n);
printf("Enter the elements in ascending order\n");
for(i=0;i<n;i++)
scanf("%d", &w[i]);

printf("Enter the required sum\n");
scanf("%d", &d);
for(i=0;i<n;i++)
sum+=w[i];
if(sum<d)
{
printf("No solution exists\n");
return 0;
}
printf("The solution is\n");
count=0;
subset(0,0,sum);
}
```

//Output

```
clang++-7 -pthread -std=c++17 -o main main.cpp
./main
Enter the number of elements
5
Enter the elements in ascending order
1
2
5
6
8
Enter the required sum
9
The solution is

Subset solution = 1
1   2   6
Subset solution = 2
1   8
```