DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING
Discover. Learn. Empower.

Experiment -2.2

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Branch: BE (CSE) **Section/Group: WM_903/A**
Semester: 5th **Date of Performance: 15/10/2022**
Subject Name: Design and Analysis of Algorithms **Subject Code: 20CSP-312**

1. Aim/Overview of the practical:

To implement subset-sum problem using Dynamic Programming.

2. Algorithm/Flowchart (For programming based labs):

- We create a Boolean subset[][] and fill it in bottom up manner.
- The value of subset[i][j] will be true if there is a subset of set[0..j-1] with sum equal to i., otherwise false.
- Finally, we return subset[n][sum]

3. Steps for experiment/practical/Code:

```
#include <iostream> using
namespace std;
bool isSubsetSum(int set[], int n, int sum)
{
        if (sum == 0)
                return true;
if (n == 0)
                return false;

        if (set[n - 1] > sum)
                return isSubsetSum(set, n - 1, sum);

        return isSubsetSum(set, n - 1, sum)
                || isSubsetSum(set, n - 1, sum - set[n - 1]);
}
```

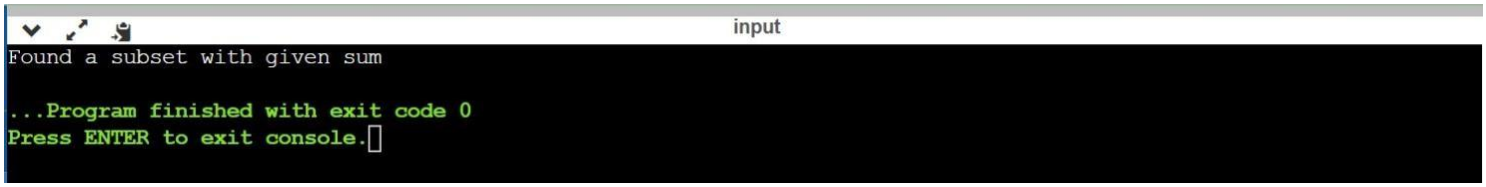
```
int main()
{
        int set[] = { 3, 34, 4, 12, 5, 2 };
        int sum = 9;
        int n = sizeof(set) / sizeof(set[0]);      if
(isSubsetSum(set, n, sum) == true)                 cout
<<"Found a subset with given sum";
        else
                cout <<"No subset with given sum";
        return 0;
}
```

4. Observations/Discussions/ Complexity Analysis:

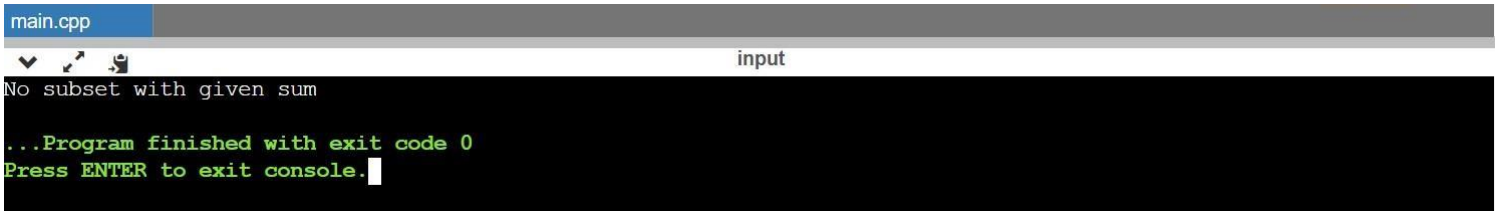
- Worst case time complexity: Θ(n*sum)
- Space complexity: Θ(sum)

5. Result/Output/Writing Summary:

When sum=9



When sum=30



Learning outcomes (What I have learnt):

1. Write a C++ program for subset sum using dynamic programming.

2. Learnt how to write pseudo-code and algorithms.

3. Use of loop.

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.			