Vidyavardhaka College of Engineering

Gokulam III stage, Mysuru – 570 002
Autonomous Institute under Visvesvaraya Technological University (VTU)
Accredited by NBA (2020- 2023) & NAAC with 'A' Grade (2018 - 2023)

```
/* Program 8
```
Implement a subset concept for a given set S = {s_1, s_2,....., s_n} 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.
```
*/
```

```java
import java.util.Scanner;
public class SumOfsubset {
        final static int MAX = 10;
        static int n;
        static int S[];
        static int soln[];
        static int d;

        public static void main(String args[]) {
                S = new int[MAX];
                soln = new int[MAX];
                int sum = 0;
                Scanner scanner = new Scanner(System.in);
                System.out.println("*****SUBSET SUM PROBLEM USING BACKTRACKING*****");
                System.out.println("Enter number of elements: ");
                n = scanner.nextInt();

                System.out.println("Enter the set in increasing order: ");
                for (int i = 1; i <= n; i++)
                        S[i] = scanner.nextInt();
                System.out.println("Enter the max. subset value(d): ");
                d = scanner.nextInt();
                for (int i = 1; i <= n; i++)
                        sum = sum + S[i];
                if (sum < d || S[1] > d)
                        System.out.println("No Subset possible");
                else{
                        System.out.println("The subsets are: ");
                        SumofSub(0, 0, sum);
                }
                scanner.close();
        }
        static void SumofSub(int i, int weight, int total) {

                if (promising(i, weight, total) == true)
                        if (weight == d) {
                                for (int j = 1; j <= i; j++) {
                                        if (soln[j] == 1)
```
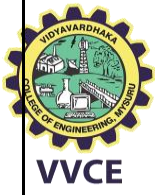
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```java
                                        System.out.print(S[j] + " ");
                                }
                                System.out.println();
                        }
                        else {
                                soln[i + 1] = 1;
                                SumofSub(i + 1, weight + S[i + 1], total - S[i + 1]);
                                soln[i + 1] = 0;
                                SumofSub(i + 1, weight, total - S[i + 1]);
                        }
                }
        }

        static boolean promising(int i, int weight, int total) {
                return ((weight + total >= d) && (weight == d || weight + S[i + 1] <= d));
        }
}
```

OUTPUT:

```
*****SUBSET SUM PROBLEM USING BACKTRACKING*****
Enter number of elements:
5
Enter the set in increasing order:
1 2 5 6 8
Enter the max. subset value(d):
9
The subsets are:
1  2  6
1  8
```