Skillful Saturday
Activity no – 02

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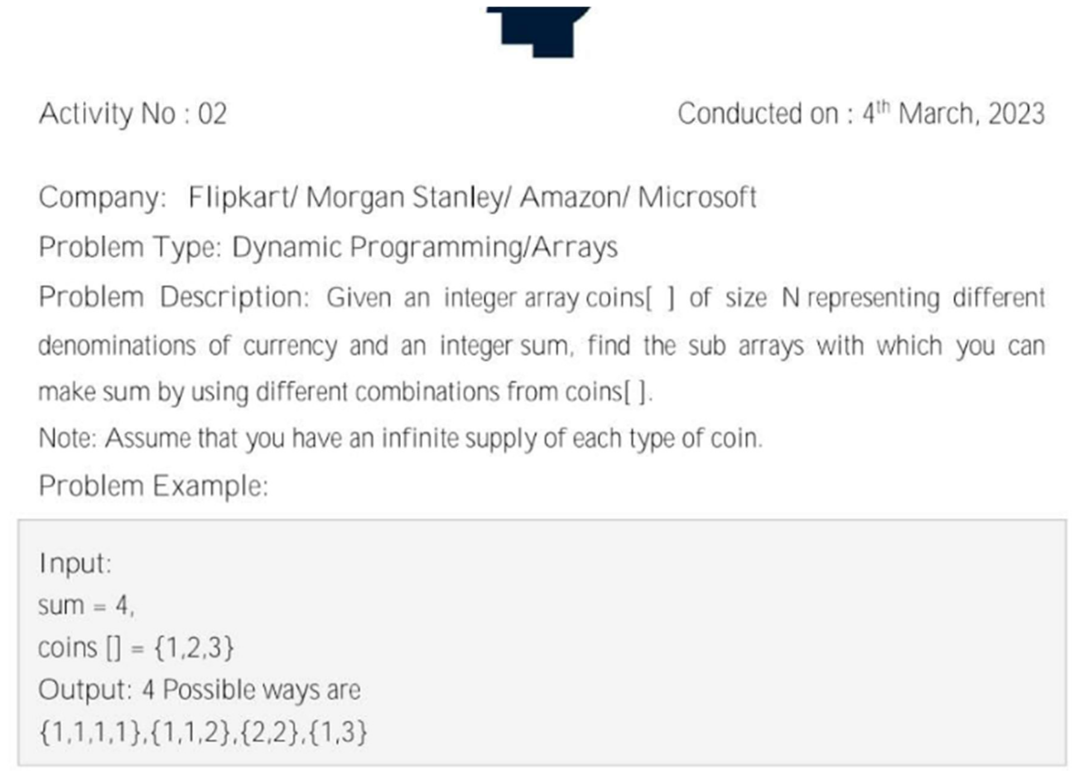
Division: C

Roll no: 23

Problem:



Activity No : 02 Conducted on : 4th March, 2023

Company: Flipkart/ Morgan Stanley/ Amazon/ Microsoft

Problem Type: Dynamic Programming/Arrays

Problem Description: Given an integer array coins[ ] of size N representing different denominations of currency and an integer sum, find the sub arrays with which you can make sum by using different combinations from coins[ ].

Note: Assume that you have an infinite supply of each type of coin.

Problem Example:

Input:
sum = 4,
coins [] = {1,2,3}
Output: 4 Possible ways are
{1,1,1,1},{1,1,2},{2,2},{1,3}

Code :

```
package javaP;

import java.util.*;

public class CoinChange {

public static List<List<Integer>> findCombinations(int[] coins, int sum) {

Arrays.sort(coins);

List<List<Integer>> result = new ArrayList<>();

backtrack(coins, sum, 0, new ArrayList<Integer>(), result);

return result;
```

```
}

private static void backtrack(int[] coins, int remaining, int start,
List<Integer> current, List<List<Integer>> result) {

if (remaining == 0) {

result.add(new ArrayList<>(current));

} else if (remaining < 0) {

return;

} else {

for (int i = start; i < coins.length; i++) {

current.add(coins[i]);

backtrack(coins, remaining - coins[i], i, current, result);

current.remove(current.size() - 1);

}

}

}

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter the number of coins: ");

int n = scanner.nextInt();

int[] coins = new int[n];

System.out.println("Enter the denominations of the coins: ");

for (int i = 0; i < n; i++) {

coins[i] = scanner.nextInt();

}

System.out.print("Enter the target sum: ");

int sum = scanner.nextInt();

scanner.close();

List<List<Integer>> combinations = CoinChange.findCombinations(coins, sum);
```

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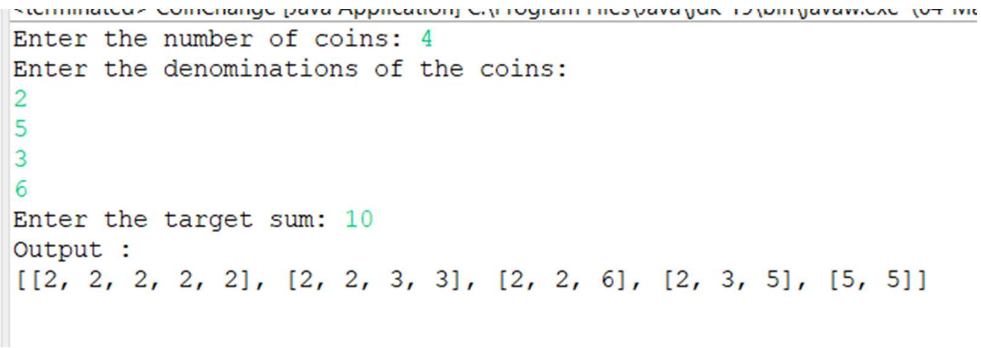
```
System.out.println("Output : ");

System.out.println( combinations);

}

}
```

Output:



```
<terminated> CoinChange [Java Application] C:\Program Files\Java\jdk-19\bin\javaw.exe (04 Ma
Enter the number of coins: 4
Enter the denominations of the coins:
2
5
3
6
Enter the target sum: 10
Output :
[[2, 2, 2, 2, 2], [2, 2, 3, 3], [2, 2, 6], [2, 3, 5], [5, 5]]
```