(VI) Subset Sum Problem

Let A be an array or set which contains n non-negative integers. Find a subset 'x' of set 'A' such that sum of all elements of x = w.

A should not contain any repetitive elements.

A = |2, 3, 5, 7, 10| sum(w) = 14.

i \ sum(j)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
3	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0
5	1	0	1	1	0	1	0	1	1	0	1	0	0	0	0
7	1	0	1	1	0	1	0	1	1	1	1	0	1	0	1
10	1	0	1	1	0	1	0	1	1	1	1	0	1	1	1

atleast 1 subset exists whose sum = w.

Time Complexity

- Brute Force ⇒ $O(2^n)$
- DP ⇒ $O(n \times sum)$

m[i][j] = 1 when →
1. A[i] = j
2. A[i-1][j] = 1.
3. A[i-1][j - A[i]] = 1