**Problem :**[**https://leetcode.com/problems/partition-to-k-equal-sum-subsets/**](https://leetcode.com/problems/partition-to-k-equal-sum-subsets/)

**Approach :**

-> First find sum of the whole array. Call it “total”.

-> target = total / k will be the sum of each of the ‘k’ partitions.

-> if(total%k!=0) then definitely answer is not possible,else it might or might not be possible.

for e.g : 2 3 5 6, and k=2, so target = 16/2=8,and answer is possible (2+6), (3+5)

2 4 5 5 ,and k=2, so target = 16/2=8,but answer is not possible.

-> So now we start trying all permutations recursively.

-> If the sum becomes equal to target, means we have found one group , so now make the sum 0 again by taking modulo, so that we can discover other groups.

**(IMP)**

->**So the answer for some dp[subset] depends on whether there exists a permutation to reach that subset(all 1s for that subset) such that at any moment ,sum doesn’t exceed target .**

-> Now again if dp[subset] is already calculated once, we need not do it again, as if we are able to reach this subset(make all 1s in the bitmask corresponding to this subset), through any valid permutation of the numbers in the subset the modulo sum value will be same, so the further procedure repeats.So no need to do it.

**=> Time =** 2^n valid subsets tried and for all of them we loop from bits 0 to n-1 to see if they are set or not, if not set, we try to set it(include in current subset).

**-> So Time = (2^n (unique states) \* n(Transition time)).**

**-> If really , the answer is possible, then we will be able to reach bitmask = 2^n - 1, and so off course at the end , dp[(2^n)-1] will be 0, (**means all numbers covered and at any point sum did not move beyond target any time **,** and just because we have reached 2^n-1, we know that the sum is =target on reaching here and not <target, as we already know that total is divisible by ‘k’,and so the last group sum also has to be equal to target).

**Code :** [**https://leetcode.com/submissions/detail/555851986/**](https://leetcode.com/submissions/detail/555851986/)