

Partition Equal Subset Sum

I/p: arr[] = {1, 5, 11, 5} →

o/p: True ✓



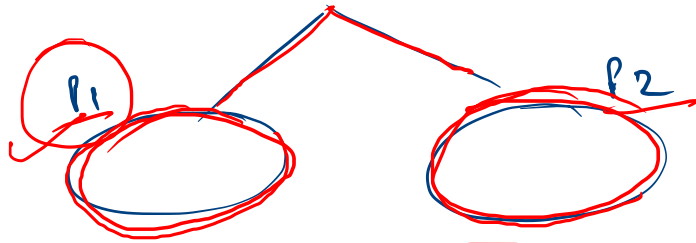
I/p: arr[] = {1, 2, 3, 5}

o/p: False ✓



Concept ⁸⁸

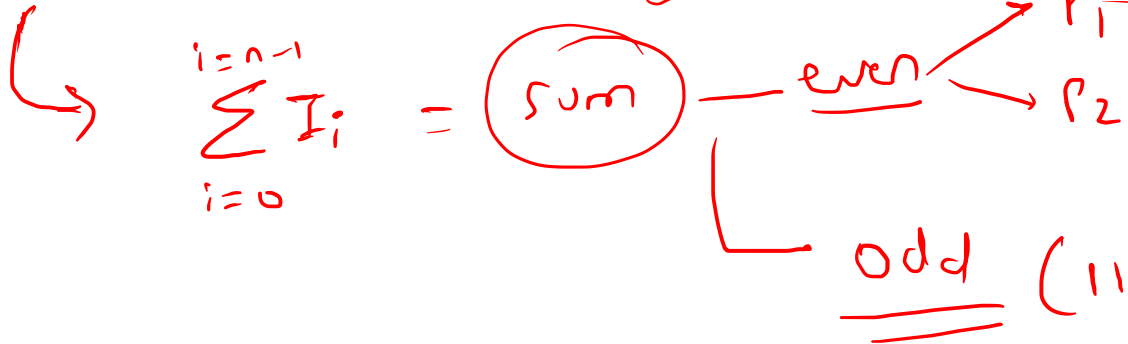
I/b: arr = { 1, 5, 11, 5 }



$$\Rightarrow \underline{P_1} + \underline{P_2} = \underline{\text{Sum}}$$

$$2 P_1 = \text{Sum}$$

$$\boxed{P_1} = \boxed{\text{Sum}/2}$$



⁸⁸ * [This concept is based on 0/1 knapsack]

$P_1 \rightarrow$ Partition 1

$P_2 \rightarrow$ Partition 2

A cloud-like shape labeled P_1 with an arrow pointing to the formula $\sum I_i = \underline{\underline{\text{Sum}/2}}$. The formula is underlined twice.



$\Sigma I = \text{Sum}$ — even $\left\{ \begin{array}{l} p_1 \\ p_2 \end{array} \right\} =$

odd $\left\{ \begin{array}{l} p_1 \\ p_2 \end{array} \right\} \quad \underline{\underline{\times}}$

sum - odd
↳ sch false
Sum → even

15 $\rightarrow p_1 \rightarrow 7$ \times
 $p_2 \rightarrow 8$

$p_1 = \lfloor \text{sum}/2 \rfloor$
Sum/2

1, 5, 11, 5

even

$$\text{Sum} = 22$$

$$\text{Sum}/2 = 11$$

P₁

$$\text{Sum}/2$$

P₂

$$\text{Sum}/2$$

1, 5, 5

11

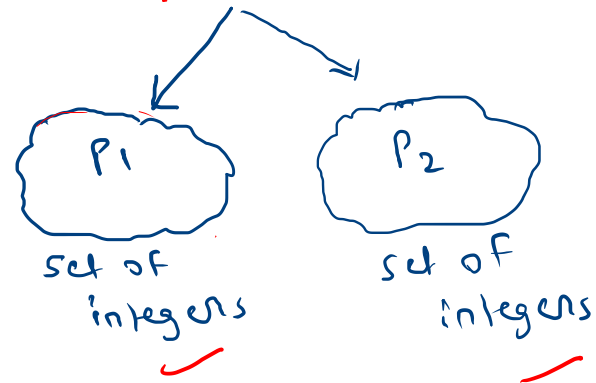
Conclusion

∴ if $\text{sum} == \text{odd}$
then its not possible to divide into 2 Equal Subsets

True

∴ if $\text{sum} == \text{Even}$

then, [1, 5, 11, 5]



$$P_1 = \text{sum}/2$$



$$\text{sum}/2$$

Question, is now reduced to
is it possible to find a subset of
integers having sum = (total sum/2)

∴ It's same as our previous question

→ current question

↳ arr[] = {1, 5, 11, 5}

sum = 11 ✓

is it possible = 2 ✓

✓ arr[] = {1, 5, 11, 5}

sum = ? Total / 2

is it possible = 2 ✓

↓
sum = Total / 1

↓
Total / 2

↓
Total / 2