Subset Sum:

Instance: positive #s $a_1, a_2, \dots, a_r$ and t.

Question: Are there $i_1, i_2, \dots, i_k$ s.t. $\sum_{j=1}^{k} a_{i_j} = t$

Obviously in NP. Also NP-complete by the following reduction:

$3SAT \leq_p SS$

$E = C_1 \wedge \cdots \wedge C_m$

over vars

$x_1, \dots, x_n$

$C_1 = x \vee \bar{x}_2 \vee x_n$

$C_2 = \bar{x}_1 \vee \bar{x}_2 \vee x_3$

$\longrightarrow$

	1	2	3	⋯	n	c_1	c_2	⋯	c_m	
x_1	1	0	0	⋯	0	1				
$\bar{x}_1$	1	0	0	⋯	0	0				
x_2		1	0	⋯	0	0				
$\bar{x}_2$		1	0	⋯	0	1				
⋮			⋮		⋮	⋮				
x_n					1					
$\bar{x}_n$					1					
						1	0	0	0	0
fillers { y_1						1	0	0	0	0
z_1								1	0	0
⋮								1	0	0
y_k, z_k									⋮	
t	1	1	1	⋯	1	3	3	⋯	3	

Partition:

Instance: Positive integers $a_1, a_2, \dots, a_n$.

Question. is there a subsequence $a_{i_1}, a_{i_2}, \dots, a_{i_k}$

s.t. $\sum_{j=1}^{k} a_{i_j} = \frac{1}{2}\sum_{i=1}^{n} a_i$.

Clearly $\in NP$. NP complete

Since Subset Sum $\leq_p$ Partition

Subset sum

$a_1, a_2, \dots\ a_r$ $\Rightarrow$

t