SubsetSum Problem S = {4, 2, 5, 6}, k = 7

$$s_0 = 4, \ s_1 = 2, \ s_2 = 5, \ s_3 = 6$$

	0	1	2	3	4	5	6	7
0								
1								
2								
3								$T_{3,7}$

Seeking a subset $T_{3,7}$ of S_3 = {4, 2, 5, 6} whose sum is 7.

Such a subset $T_{3,7}$ can be found if and only if either a subset of S_2 = {4, 2, 5} sums to 7, or a subset of S_2 = {4, 2, 5} sums to 7-6 = 1.

SubsetSum Problem S = {4, 2, 5, 6}, k = 7

$s_0 = 4$, $s_1 = 2$, $s_2 = 5$, $s_3 = 6$

	0	1	2	3	4	5	6	7
0								
1								
2		$T_{2,1}$						$T_{2,7}$
3								$T_{3,7}$

Seeking a subset $T_{2,7}$ of $S_2 = \{4, 2, 5\}$ whose sum is 7 OR
  a subset $T_{2,1}$ of $S_2 = \{4, 2, 5\}$ whose sum is 7-6=1.

Can find $T_{2,7}$ iff a subset of $S_1 = \{4, 2\}$ has sum 7 or a subset of $S_1 = \{4, 2\}$ has sum 7-5=2.

Can find $T_{2,1}$ iff a subset of $S_1 = \{4, 2\}$ has sum 1
 (don't consider the possibility of sum 1-5)

SubsetSum Problem S = {4, 2, 5, 6}, k = 7

$s_0 = 4, s_1 = 2, s_2 = 5, s_3 = 6$

	0	1	2	3	4	5	6	7
0								
1			$T_{1,2}$					$T_{1,7}$
2		$T_{2,1}$						$T_{2,7}$
3								$T_{3,7}$

Starting from $T_{2,7} \subseteq S_2 = \{4, 2, 5\}$ with k = 7, we seek
  - a subset $T_{1,7}$ of $S_1 = \{4, 2\}$ whose sum is 7 OR
  - a subset $T_{1,2}$ of $S_1 = \{4, 2\}$ whose sum is 7-5=2.

Can find $T_{1,7}$ iff a subset of $S_0 = \{4\}$ has sum 7 or a subset of $S_0 = \{4\}$ has sum 7-2=5.

Can find $T_{1,2}$ iff a subset of $S_0 = \{4\}$ has sum 2 or a subset of $S_0 = \{4\}$ has sum 2-2 = 0.

SubsetSum Problem S = {4, 2, 5, 6}, k = 7

$s_0 = 4$, $s_1 = 2$, $s_2 = 5$, $s_3 = 6$

	0	1	2	3	4	5	6	7
0								
1		$T_{1,1}$	$T_{1,2}$					$T_{1,7}$
2		$T_{2,1}$						$T_{2,7}$
3								$T_{3,7}$

Starting from $T_{2,1} \subseteq S_2 = \{4, 2, 5\}$ with k = 1, we seek
  - a subset $T_{1,1}$ of $S_1 = \{4, 2\}$ whose sum is 1

Can find $T_{1,1}$ iff a subset of $S_0 = \{4\}$ has sum 1
  (don't consider the possibility of sum = 1 – 2)

SubsetSum Problem S = {4, 2, 5, 6}, k = 7

$s_0 = 4, s_1 = 2, s_2 = 5, s_3 = 6$

	0	1	2	3	4	5	6	7
0						$T_{0,5}$		$T_{0,7}$
1		$T_{1,1}$	$T_{1,2}$					$T_{1,7}$
2		$T_{2,1}$						$T_{2,7}$
3								$T_{3,7}$

Starting from $T_{1,7} \subseteq S_1 = \{4, 2\}$ with k = 7, we seek
- a subset $T_{0,7}$ of $S_0 = \{4\}$ whose sum is 7 OR
- a subset $T_{0,5}$ of $S_0 = \{4\}$ whose sum is 7-2=5.

SubsetSum Problem S = {4, 2, 5, 6}, k = 7

$s_0 = 4, s_1 = 2, s_2 = 5, s_3 = 6$

	0	1	2	3	4	5	6	7
0	$T_{0,0}$	$T_{0,1}$	$T_{0,2}$			$T_{0,5}$		$T_{0,7}$
1		$T_{1,1}$	$T_{1,2}$					$T_{1,7}$
2		$T_{2,1}$						$T_{2,7}$
3								$T_{3,7}$

Starting from $T_{1,2} \subseteq S_1 = \{4, 2\}$ with k =2, we seek
- a subset $T_{0,2}$ of $S_0 = \{4\}$ whose sum is 2 OR
- a subset $T_{0,0}$ of $S_0 = \{4\}$ whose sum is 2-2=0.

Starting from $T_{1,1} \subseteq S_1 = \{4, 2\}$ with k =1,
we seek a subset $T_{0,1}$ of $S_0 = \{4\}$ whose sum is 1

SubsetSum Problem S = {4, 2, 5, 6}, k = 7

$s_0 = 4, s_1 = 2, s_2 = 5, s_3 = 6$

	0	1	2	3	4	5	6	7
0	$T_{0,0}$ = {}	$T_{0,1}$ = NULL	$T_{0,2}$=NULL			$T_{0,5}$=NULL		$T_{0,7}$=NULL
1		$T_{1,1}$	$T_{1,2}$					$T_{1,7}$
2		$T_{2,1}$						$T_{2,7}$
3								$T_{3,7}$

$T_{0,0}$ = {} is a subset of S_0 = {4} whose sum is 0.

SubsetSum Problem S = {4, 2, 5, 6}, k = 7

$s_0 = 4, s_1 = 2, s_2 = 5, s_3 = 6$

	0	1	2	3	4	5	6	7
0	$T_{0,0}$ = {}	$T_{0,1}$ = NULL	$T_{0,2}$=NULL			$T_{0,5}$=NULL		$T_{0,7}$=NULL
1		$T_{1,1}$ = NULL	$T_{1,2}$={}u{2}					$T_{1,7}$ = NULL
2		$T_{2,1}$						$T_{2,7}$
3								$T_{3,7}$

$T_{1,2}$ = {} u {2} = {2} is a subset of S_1 = {4,2} whose sum is 2

SubsetSum Problem S = {4, 2, 5, 6}, k = 7

$s_0 = 4, s_1 = 2, s_2 = 5, s_3 = 6$

	0	1	2	3	4	5	6	7
0	$T_{0,0}$ = {}	$T_{0,1}$ = NULL	$T_{0,2}$=NULL			$T_{0,5}$=NULL		$T_{0,7}$=NULL
1		$T_{1,1}$ = NULL	$T_{1,2}$={}u{2}					$T_{1,7}$ = NULL
2		$T_{2,1}$ = NULL						$T_{2,7}$={2}u{5}
3								$T_{3,7}$

$T_{2,7}$ = {2}u{5} = {2,5} is a subset of S_2 = {4,2,5} whose sum is 7.

SubsetSum Problem S = {4, 2, 5, 6}, k = 7

$s_0 = 4$, $s_1 = 2$, $s_2 = 5$, $s_3 = 6$

	0	1	2	3	4	5	6	7
0	$T_{0,0}$ = {}	$T_{0,1}$ = NULL	$T_{0,2}$=NULL			$T_{0,5}$=NULL		$T_{0,7}$=NULL
1		$T_{1,1}$ = NULL	$T_{1,2}$={}u{2}					$T_{1,7}$ = NULL
2		$T_{2,1}$ = NULL						$T_{2,7}$={2}u{5}
3								$T_{3,7}$={2, 5}

$T_{3,7}$ = $T_{2,7}$ = {2,5} is a subset of S_3 = {4,2,5, 6} whose sum is 7.