Q. 5. Dynamic Programming for Subset-Sum

Algorithm

Row 0:

$A[i,0] = \phi$ and $A[0,s_0] = \{s_0\}$

$A[0,e] = NULL$, if $e \neq 0$ and $e \neq s_0$

Row i

$$A[i,j] = \begin{cases} A[i-1,j] & , j - s_i < 0 \\ A[i-1, j-s_i] \cup \{s_i\} & , j - s_i \geq 0 \end{cases}$$

We have, $S = \{3, 2, 1, 5\}$ and $k = 4$

We can show the steps in tabular form as follows:

	0	1	2	3	4
$s_0 = 3$	ϕ	NULL	NULL	$\{3\}$	NULL
$s_1 = 2$	ϕ	NULL	$\{2\}$	$\{3\}$	NULL
$s_2 = 1$	ϕ	$\{1\}$	$\{2\}$	$\{3\}$	$\{3,1\}$
$s_3 = 5$	ϕ	$\{1\}$	$\{2\}$	$\{3\}$	$\{3,1\}$

So, it completes the steps and we finally get $\{3,1\}$ as the solution for $k = 4$.