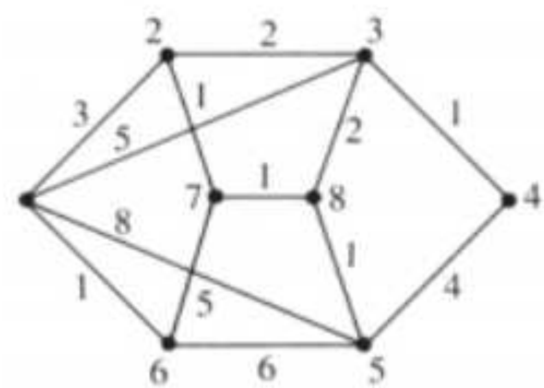
Example: #3, p. 591 : Apply Dijkstra's algorithm for the pairs of nodes 1 and 5; show the values for p and IN and the d values and s values for each pass through the while loop. Write out the nodes in the shortest path and the distance of the path.



$$
\begin{array}{c|c}
 & \begin{array}{cccccccc} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array} \\
\begin{array}{c} \\ +3 \\ +5 \\ \\ \\ \\ +4 \\ +5 \end{array} &
\begin{bmatrix}
0 & 3 & 5 & \infty & 8 & 1 & \infty & \infty \\
3 & 0 & 2 & \infty & \infty & \infty & 1 & \infty \\
5 & 2 & 0 & 1 & \infty & \infty & \infty & 2 \\
\infty & \infty & 1 & 0 & 4 & \infty & \infty & \infty \\
8 & \infty & \infty & 4 & 0 & 6 & \infty & 1 \\
\cancel{1} & \cancel{\infty} & \cancel{\infty} & \cancel{\infty} & \cancel{6} & \cancel{0} & \cancel{5} & \cancel{\infty} \\
\infty & 1 & \infty & \infty & \infty & 5 & 0 & 1 \\
\infty & \infty & 2 & \infty & 1 & \infty & 1 & 0
\end{bmatrix}
\end{array}
$$

	1	2	3	4	5	6	7	8
d	0	3	5	∞	8	1	∞	∞
s	–	1	1	1	1	1	1	1

	1	2	3	4	5	6	7	8
d			5	∞	6			
s			1	1	8			

	1	2	3	4	5	6	7	8
d		3	5	∞	7		6	∞
s		1	1	1	6		6	1

	1	2	3	4	5	6	7	8
d				6	6			
s				3	8			

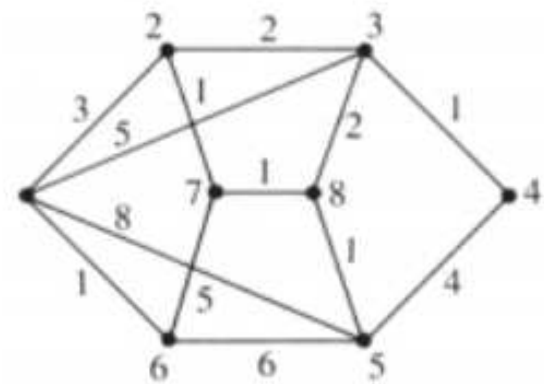
	1	2	3	4	5	6	7	8
d			5	∞	7		4	∞
s			1	1	6		2	1

	1	2	3	4	5	6	7	8
d								
s								

	1	2	3	4	5	6	7	8
d			5	∞	7			5
s			1	1	6			7

	1	2	3	4	5	6	7	8
d								
s								

Example: #12, p. 593 : for the graph of Exercise 3, use the Bellman–Ford algorithm to find the shortest path from the source node (1) to any other node. Show the successive d values and s values. Again, we'll need the adjacency matrix:



$$
\begin{array}{c}
\begin{array}{cccccccc} 0 & 3 & 5 & 6 & 6 & 1 & 4 & 5 \end{array} \\
\begin{bmatrix}
0 & 3 & 5 & \infty & 8 & 1 & \infty & \infty \\
3 & 0 & 2 & \infty & \infty & \infty & 1 & \infty \\
5 & 2 & 0 & 1 & \infty & \infty & \infty & 2 \\
\infty & \infty & 1 & 0 & 4 & \infty & \infty & \infty \\
8 & \infty & \infty & 4 & 0 & 6 & \infty & 1 \\
1 & \infty & \infty & \infty & 6 & 0 & 5 & \infty \\
\infty & 1 & \infty & \infty & \infty & 5 & 0 & 1 \\
\infty & \infty & 2 & \infty & 1 & \infty & 1 & 0
\end{bmatrix}
\end{array}
$$

Paths of length 1

	1	2	3	4	5	6	7	8
d	0	3	5	∞	8	1	∞	∞
s	-	1	1	1	1	1	1	1

	1	2	3	4	5	6	7	8
d								
s								

Paths of length 2

	1	2	3	4	5	6	7	8
d	0	3	5	6	7	1	4	7
s	-	1	1	3	6	1	2	3

	1	2	3	4	5	6	7	8
d								
s								

Paths of Length 3

	1	2	3	4	5	6	7	8
d	0	3	5	6	7	1	4	5
s	-	1	1	3	6	1	2	7

	1	2	3	4	5	6	7	8
d								
s								

Path of length 4

	1	2	3	4	5	6	7	8
d	0	3	5	6	6	1	4	5
s	-	1	1	3	8	1	2	7

	1	2	3	4	5	6	7	8
d								
s								