Dijkstra's Shortest Path Algorithm

Find shortest path from s to t.
Dijkstra's Shortest Path Algorithm

\[
S = \{ \} \\
PQ = \{ s, 2, 3, 4, 5, 6, 7, t \}
\]
Dijkstra's Shortest Path Algorithm

\[ S = \{ \} \]

\[ PQ = \{ s, 2, 3, 4, 5, 6, 7, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s \} \]
\[ PQ = \{ 2, 3, 4, 5, 6, 7, t \} \]

distance label \[ \rightarrow \] \[ 15 \]

decrease key \[ \rightarrow \] \[ 9 \]

\[ S = \{ s \} \]
\[ PQ = \{ 2, 3, 4, 5, 6, 7, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s \} \]
\[ PQ = \{ 2, 3, 4, 5, 6, 7, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2 \} \]
\[ PQ = \{ 3, 4, 5, 6, 7, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2 \} \]
\[ PQ = \{ 3, 4, 5, 6, 7, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2 \} \]
\[ PQ = \{ 3, 4, 5, 6, 7, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2, 6 \} \]
\[ PQ = \{ 3, 4, 5, 7, t \} \]
Dijkstra's Shortest Path Algorithm

S = \{ s, 2, 6 \}
PQ = \{ 3, 4, 5, 7, t \}
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2, 6, 7 \} \]
\[ PQ = \{ 3, 4, 5, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2, 6, 7 \} \]
\[ PQ = \{ 3, 4, 5, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2, 3, 6, 7 \} \]
\[ PQ = \{ 4, 5, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2, 3, 6, 7 \} \]
\[ PQ = \{ 4, 5, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2, 3, 5, 6, 7 \} \]
\[ PQ = \{ 4, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2, 3, 5, 6, 7 \} \]

\[ PQ = \{ 4, t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2, 3, 4, 5, 6, 7 \} \]
\[ PQ = \{ t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2, 3, 4, 5, 6, 7 \} \]
\[ PQ = \{ t \} \]
Dijkstra's Shortest Path Algorithm

\[ S = \{ s, 2, 3, 4, 5, 6, 7, t \} \]
\[ PQ = \{ \} \]