Shortest Path Problem
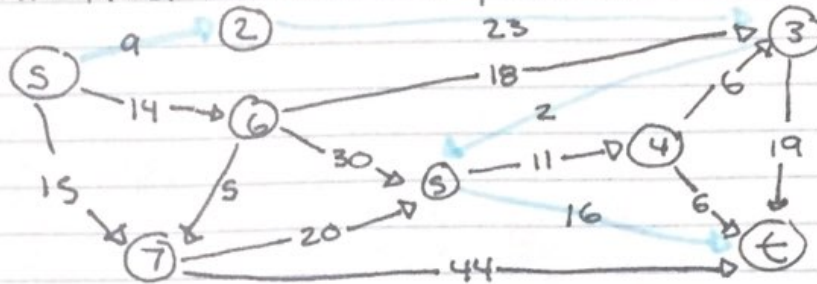
ex. find the shortest path from s to t

cost of path:
$9+23+2+16 = 48$

Dijkstra's algorithm
- maintain a set of explored nodes S for which we have determined the shortest path distance $d(u)$ from s to u
- Initialize $S = \{s\}$, $d\{s\} = 0$
- repeatedly choose unexplored node v which minimizes
$$\Pi(v) = \min_{e = (u,v): u \in S} d(u) + \ell$$
  'shortest path to u in explored part
- add v to S, and set $d(v) = \Pi(v)$

run times:

Operation	Dijkstra	Array	Binary Heap	d-way Heap	Fib Heap
insert	n	n	log n	d log$_d$ n	1
extract Min	n	n	log n	d log$_d$ n	log n
Change key	m	1	log n	log$_d$ n	1
Is Empty	n	1	1	1	1
Total		n^2	m log n	m log$_d$ n	m+n log n