

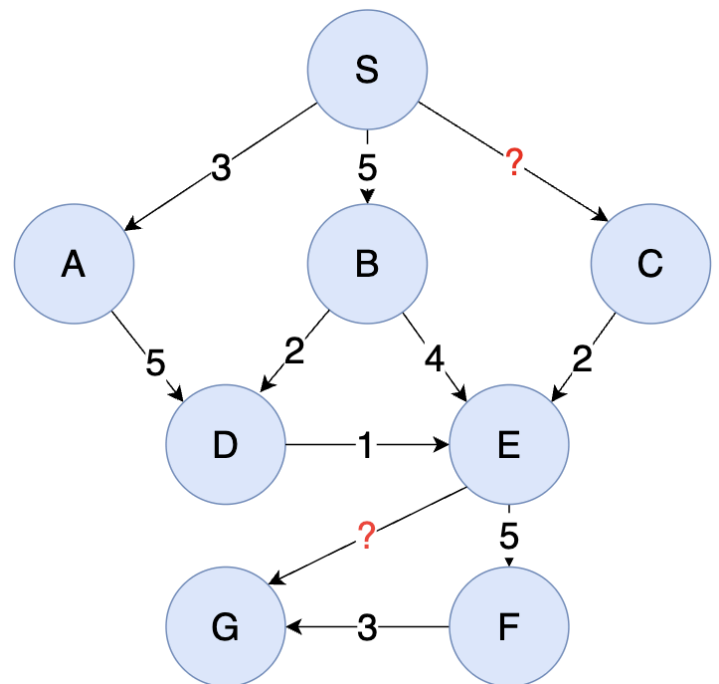
Dijkstra's algorithm missing weights

A cunning computer scientist has discovered that it is cheaper for them to take multiple connecting flights from Spain to Greece than flying directly. The flights available on one day are as follows.

She runs Dijkstra's on the graph to find the cheapest route and finds that it is 4 flights long. Unfortunately, two of the flight costs have been corrupted.

Your task is to find valid price ranges for the flights from Spain to Croatia (S→C) and Estonia to Greece (E→G).

From	To	Cost (in £100s)
Spain	Greece	25
Spain	Austria	3
Spain	Belgium	5
Spain	Croatia	?
Austria	Denmark	5
Belgium	Denmark	2
Belgium	Estonia	4
Croatia	Estonia	2
Denmark	Estonia	1
Estonia	France	5
Estonia	Greece	?
France	Greece	3



Solution

We can either get to E in 3 flights: S → A/B → D → E

- S → B → D → E is clearly shorter than S → A → D → E and S → B → E
- S → B → D → E must also be shorter than S → C → E so S → C must cost >6
- Then we must take the direct route E → G so it must cost < 8

OR we must arrive at E with two flights:

- S → B → E costs more than the 3 flight costs, so S → C → E must be the shorter and therefore S → C must cost less than 6
- Then we must take the indirect route E → F → G which must be cheaper than E → G which must cost greater than 8

So the flight from Spain to Croatia must be >£600 and Estonia to Greece ≤£800

OR

The flight from Spain to Croatia must be ≤£600 and Estonia to Greece >£800.