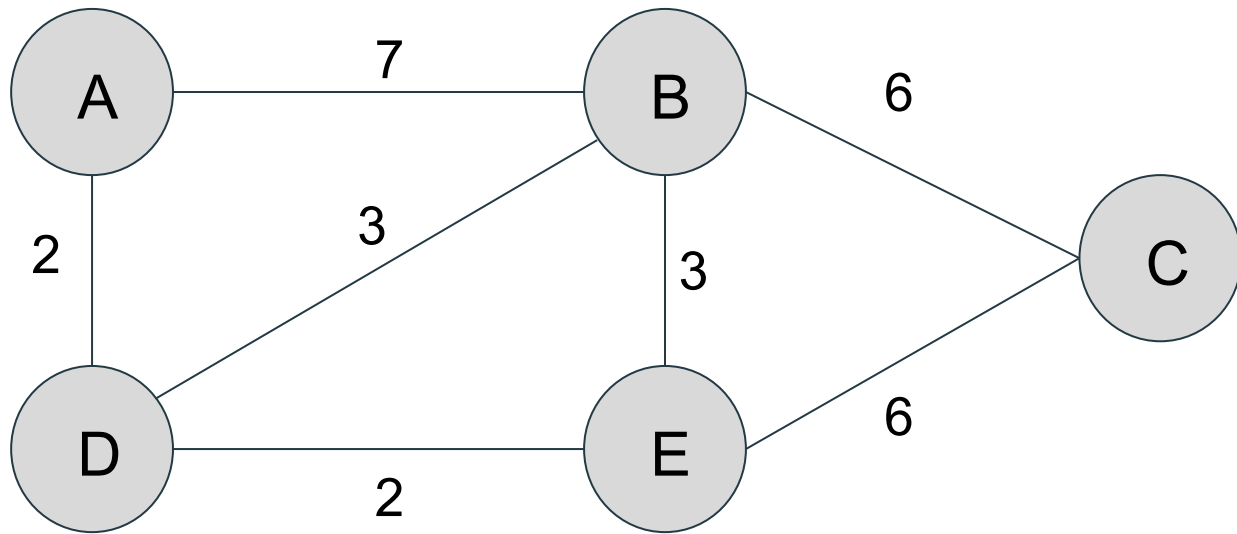


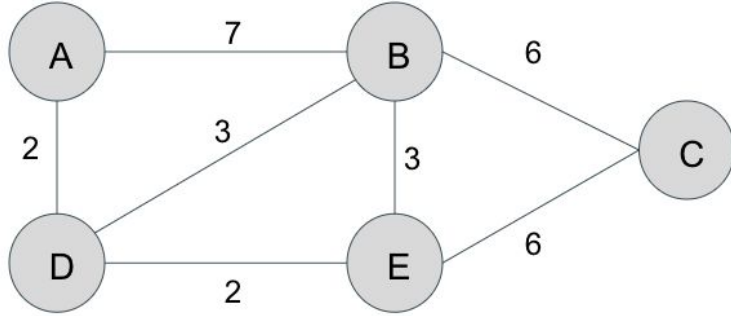
# Dijkstra's Algorithm

By Paul Marten

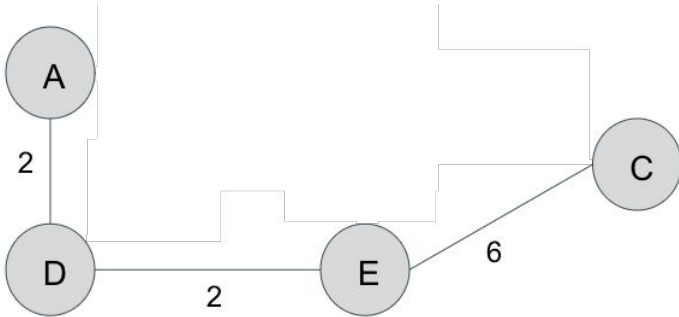
## Overview

- Created by Edsger Dijkstra, a Dutch computer scientist.
- The objective of this algorithm is to find the shortest path between two vertices or nodes. This can apply to an endless amount of nodes, but is typically used for the start and end of a graph.





**Shortest path from A to C**



Node	Shortest distance from A	Previous Node
A	0	
B	<del><math>\infty</math></del> 7 5	A D
C	<del><math>\infty</math></del> 10	E
D	<del><math>\infty</math></del> 2	A
E	<del><math>\infty</math></del> 4	D

# Pseudocode

```
Distance (start, start) = 0;  
Distance (start, other nodes) =  $\infty$ ;  
Start node = current node;
```

```
While (nodes are unvisited){
```

```
    For (every unvisited adjacent node from current node){  
        Calculate distance from current node;
```

```
        If (calculated distance < known distance){  
            Update shortest distance to this node;
```

```
        }
```

```
    }
```

```
    Visit node with the smallest distance from current node;  
    Update current node;  
    Node previously visited = previous node;  
    Add current node to list of visited vertices;
```

```
}
```

## Time Complexity

The size of the graph is  $|V|=n$ . Since the goal is to find the shortest path from all vertices to all others, the time complexity is expressed as  $n*n$  or  $n^2$ .

# Drawbacks

This is a greedy algorithm. This means that there are locally optimal choices made at each step in the hopes of finding the global optimum.

