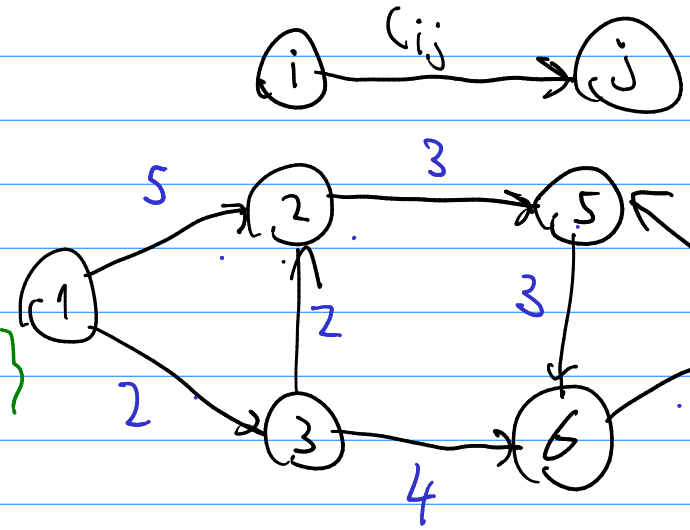
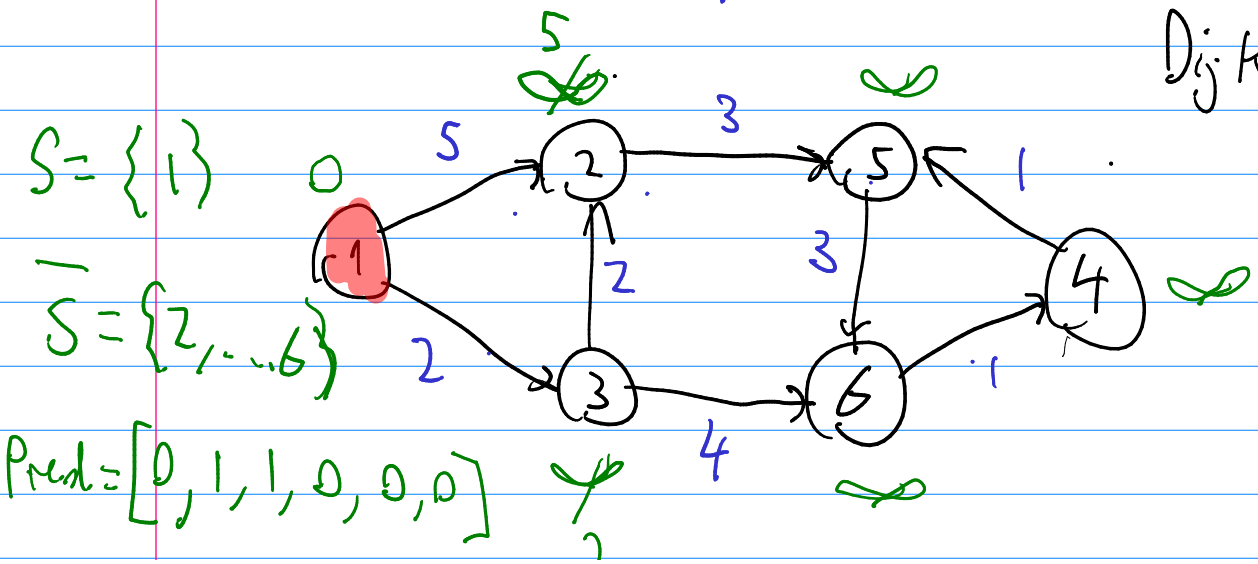
Shortest Paths

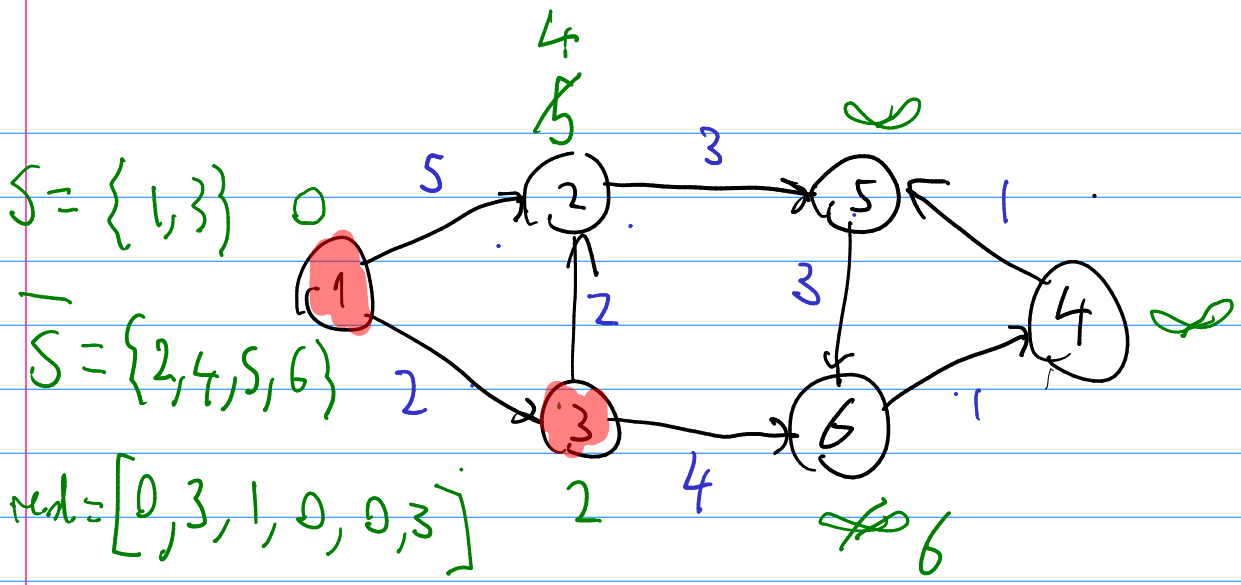


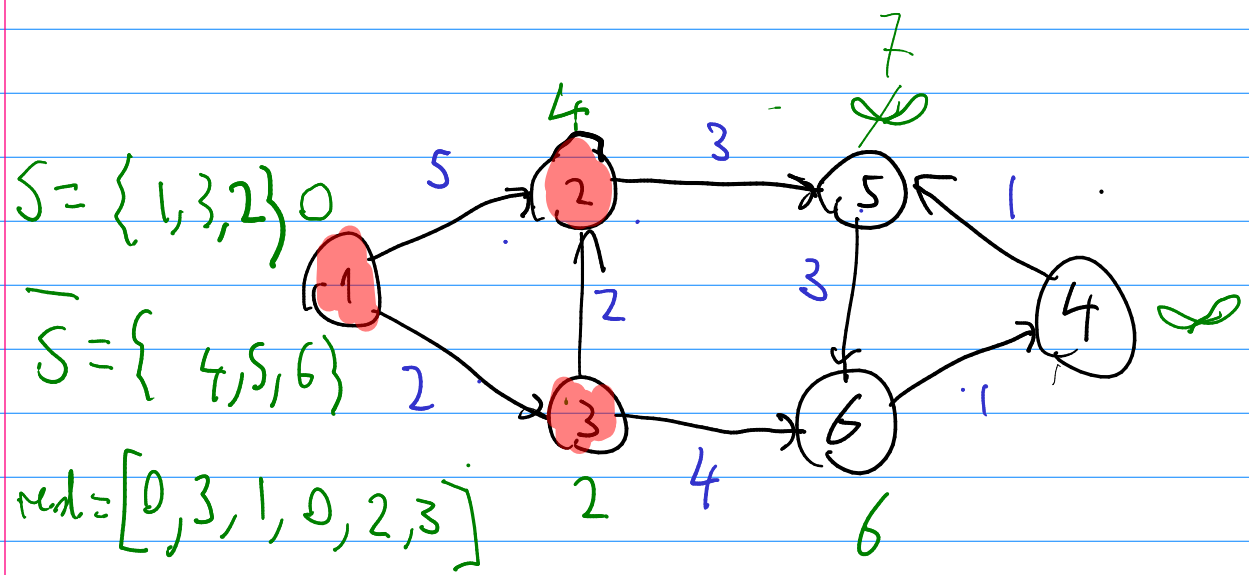
Label Setting algorithm

Dijkstra's Algorithm



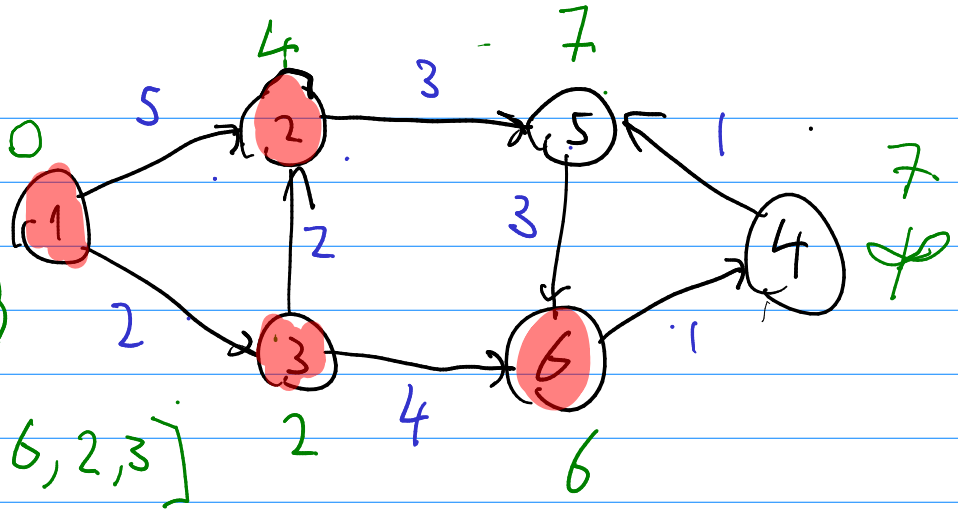

```
algorithm Dijkstra;
begin
    S := ∅; S̄ := N;
    d(i) := ∞ for each node i ∈ N;
    d(s) := 0 and pred(s) := 0;
    while |S| < n do
    begin
        let i ∈ S̄ be a node for which d(i) = min{d(j) : j ∈ S̄};
        S := S ∪ {i};
        S̄ := S̄ − {i};
        for each (i, j) ∈ A(i) do
            if d(j) > d(i) + c_ij then d(j) := d(i) + c_ij and pred(j) := i;
    end;
end;
```


S = {1,3}
S̄ = {2,4,5,6}
red = [0,3,1,0,0,3]
4
5
0
5
3
1
2
3
2
3
1
2
4
6


S = {1,3,2}
S̄ = {4,5,6}
red = [0,3,1,0,2,3]
7
4
0
5
3
1
2
3
2
3
1
2
4
6

$S = \{1,3,2,6\}$

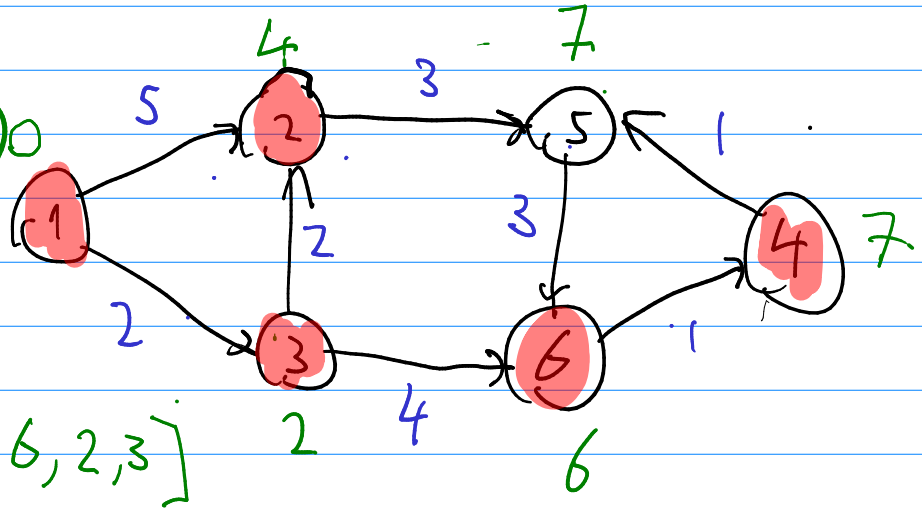
$\overline{S} = \{4,5\}$



red = [0, 3, 1, 6, 2, 3]

$S = \{1,3,2,6,4\}$

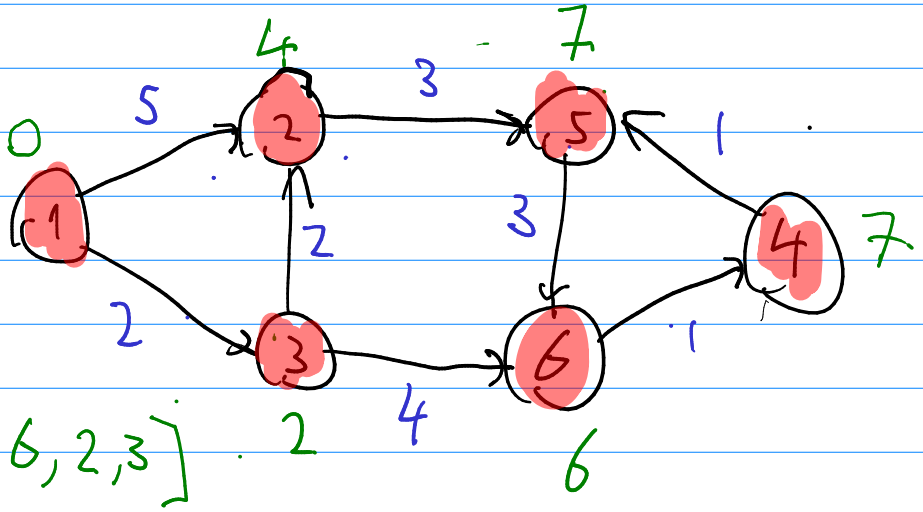
$\overline{S} = \{5\}$



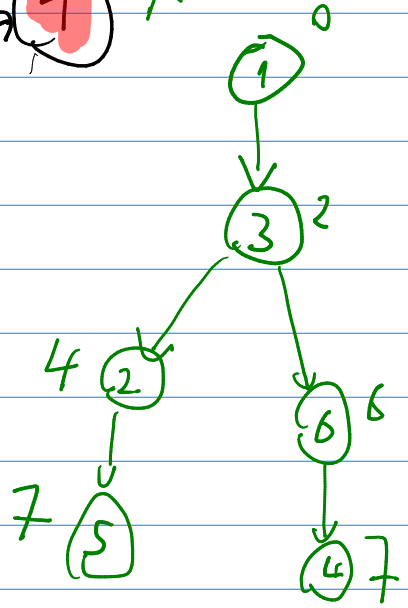
red = [0, 3, 1, 6, 2, 3]

$S = \{1,3,2,6,4,5\}$

$\overline{S} = \emptyset$



red = [0, 3, 1, 6, 2, 3]




```
([0,3,1,6,2,3],[0.0,4.0,2.0,7.0,7.0,6.0])
```