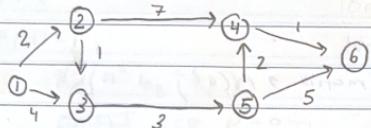
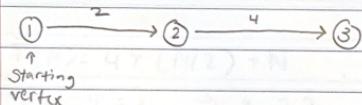


### 3.6 Dijkstra Algorithm - Single Source Shortest Path - Greedy Method

#### Dijkstra Algorithm



Can work on both  
directed and non-directed  
graph!

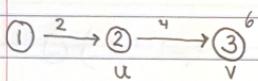


Find: Shortest Path to (2) or (3)

(2): 2 (direct path)

(3): No direct path  
( $2+4=6$ )

#### Relaxation



if  $(d[u] + c(u,v) < d[v])$

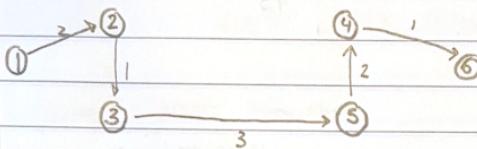
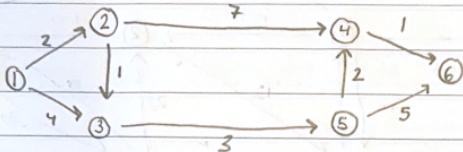
$$d[v] = d[u] + c(u,v)$$

$c$  = cost of an edge

$d$  = distance of

Bellman Ford, Floyd Warshall, Johnsons, Dynamic Programming

BBB



$d[V]$  (distance to  $V$ , from 1)

2 | 2

3 | 3

4 | 8

$N = |V|$

5 | 6

6 | 9

### Time Complexity

to find the time complexity we can see that it is  $N = |V|$  and then you have to do relaxation.

8:32

$n = |V|$

$|V|$   
 $\widehat{N \times N} \rightarrow N^2$

Worst Case:  $N^2$

$\Theta(|V|^2)$

$\Theta(N^2)$

## Dijkstra Algorithm

Starting vertex 1

Selected vertex	2	3	4	5	6
	50	45	10	$\infty$	$\infty$

