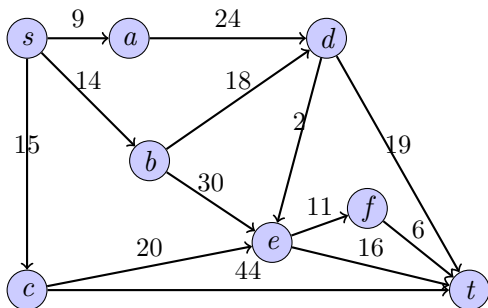


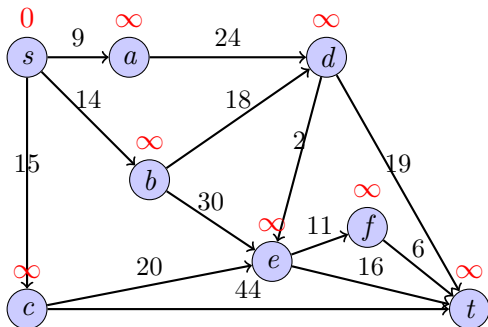
# Dijkstra's algorithm: an example



# Dijkstra's algorithm: an example

$$S = \{\}$$

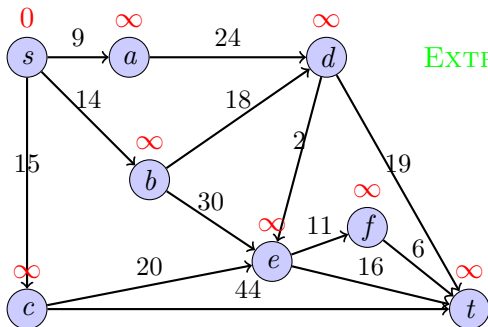
$$PQ = \{s(0), a(\infty), b(\infty), c(\infty), d(\infty), e(\infty), f(\infty), t(\infty)\}$$



# Dijkstra's algorithm: an example

$$S = \{ \}$$

$$PQ = \{s(0), a(\infty), b(\infty), c(\infty), d(\infty), e(\infty), f(\infty), t(\infty)\}$$

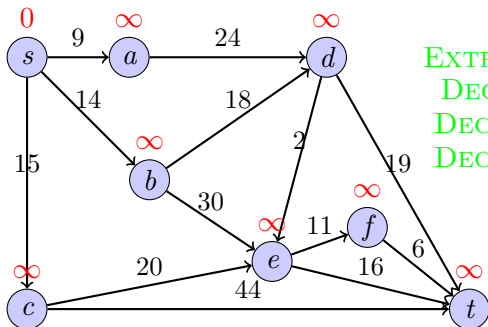


EXTRACTMIN returns  $s$

# Dijkstra's algorithm: an example

$$S = \{ \}$$

$$PQ = \{s(0), a(\infty), b(\infty), c(\infty), d(\infty), e(\infty), f(\infty), t(\infty)\}$$

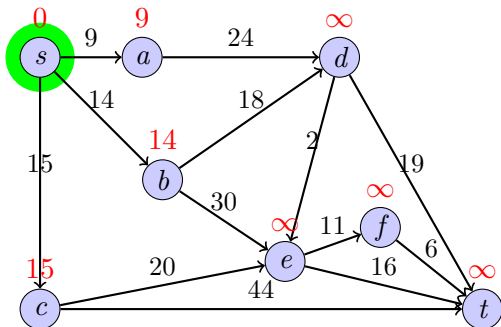


EXTRACTMIN returns  $s$   
DECREASEKEY( $a, 9$ )  
DECREASEKEY( $b, 14$ )  
DECREASEKEY( $c, 15$ )

# Dijkstra's algorithm: an example

$$S = \{s\}$$

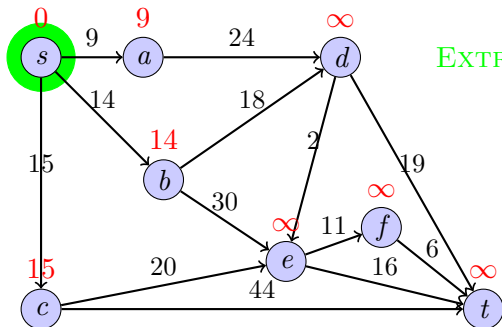
$$PQ = \{a(9), b(14), c(15), d(\infty), e(\infty), f(\infty), t(\infty)\}$$



# Dijkstra's algorithm: an example

$$S = \{s\}$$

$$PQ = \{a(9), b(14), c(15), d(\infty), e(\infty), f(\infty), t(\infty)\}$$

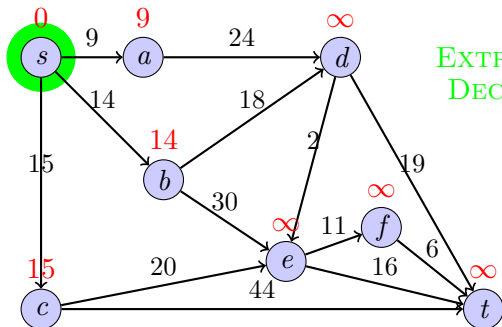


EXTRACTMIN returns  $a$

# Dijkstra's algorithm: an example

$$S = \{s\}$$

$$PQ = \{a(9), b(14), c(15), d(\infty), e(\infty), f(\infty), t(\infty)\}$$

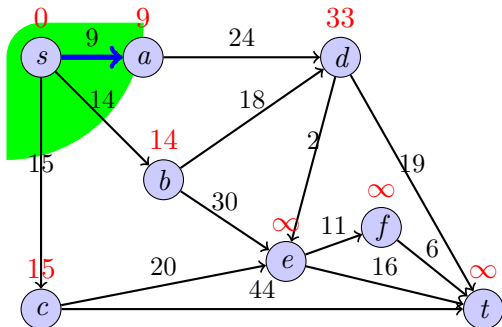


EXTRACTMIN returns  $a$   
DECREASEKEY( $d, 33$ )

# Dijkstra's algorithm: an example

$$S = \{s, a\}$$

$$PQ = \{b(14), c(15), d(33), e(\infty), f(\infty), t(\infty)\}$$

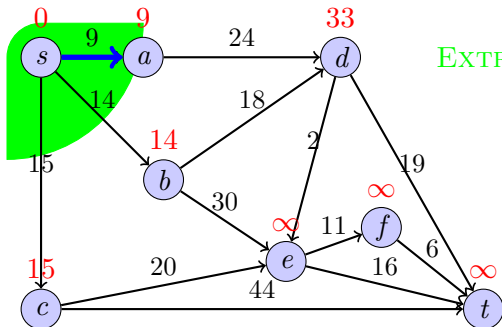




# Dijkstra's algorithm: an example

$$S = \{s, a\}$$

$$PQ = \{b(14), c(15), d(33), e(\infty), f(\infty), t(\infty)\}$$

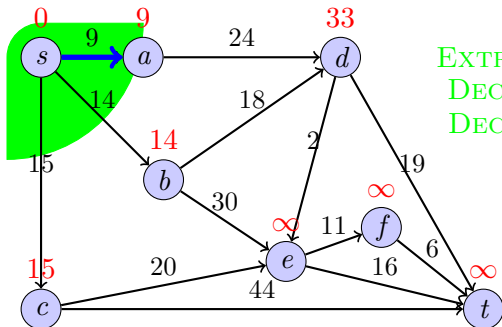


EXTRACTMIN returns *b*

# Dijkstra's algorithm: an example

$$S = \{s, a\}$$

$$PQ = \{b(14), c(15), d(33), e(\infty), f(\infty), t(\infty)\}$$

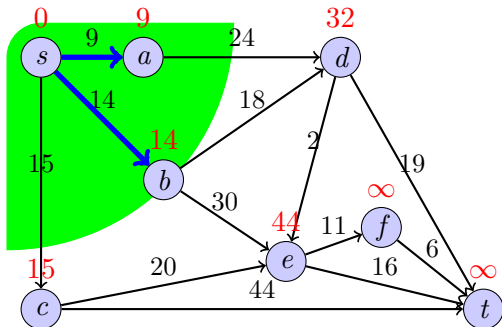


EXTRACTMIN returns  $b$   
DECREASEKEY( $d, 32$ )  
DECREASEKEY( $e, 44$ )

# Dijkstra's algorithm: an example

$$S = \{s, a, b\}$$

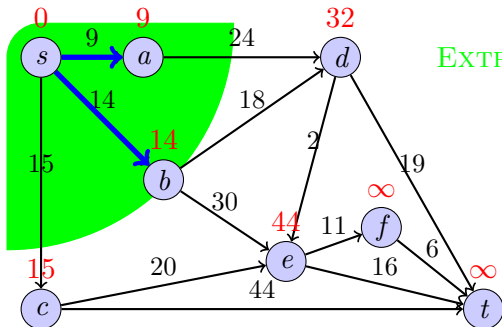
$$PQ = \{c(15), d(32), e(44), f(\infty), t(\infty)\}$$



# Dijkstra's algorithm: an example

$$S = \{s, a, b\}$$

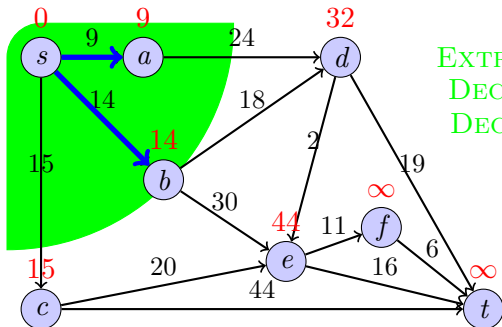
$$PQ = \{c(15), d(32), e(44), f(\infty), t(\infty)\}$$



# Dijkstra's algorithm: an example

$$S = \{s, a, b\}$$

$$PQ = \{c(15), d(32), e(44), f(\infty), t(\infty)\}$$

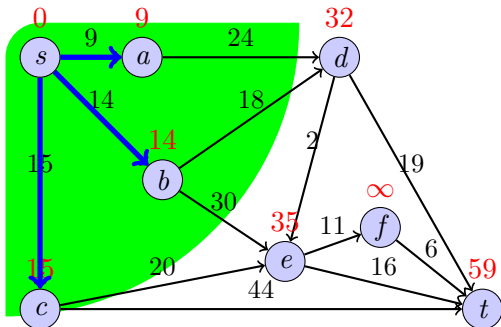


EXTRACTMIN returns  $c$   
DECREASEKEY( $e, 35$ )  
DECREASEKEY( $t, 59$ )

# Dijkstra's algorithm: an example

$$S = \{s, a, b, c\}$$

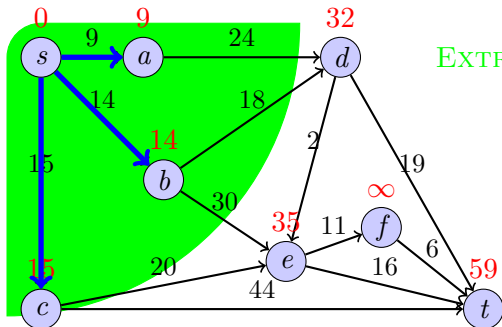
$$PQ = \{d(32), e(35), t(59), f(\infty)\}$$



# Dijkstra's algorithm: an example

$$S = \{s, a, b, c\}$$

$$PQ = \{d(32), e(35), t(59), f(\infty)\}$$

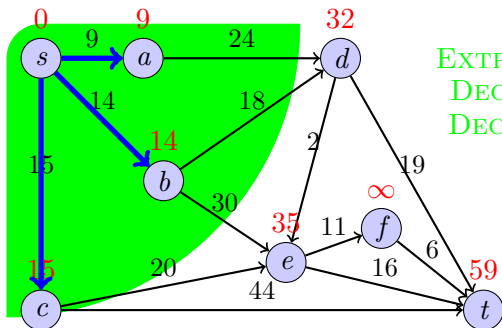


EXTRACTMIN returns  $d$

# Dijkstra's algorithm: an example

$$S = \{s, a, b, c\}$$

$$PQ = \{d(32), e(35), t(59), f(\infty)\}$$

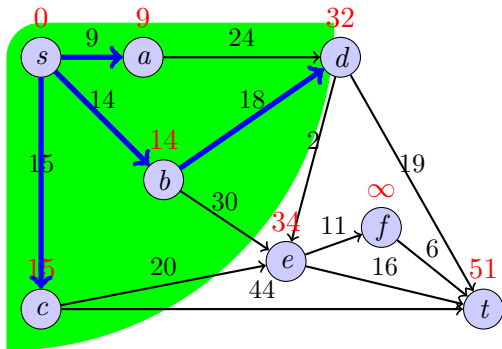


EXTRACTMIN returns  $d$   
DECREASEKEY( $t$ , 51)  
DECREASEKEY( $e$ , 34)



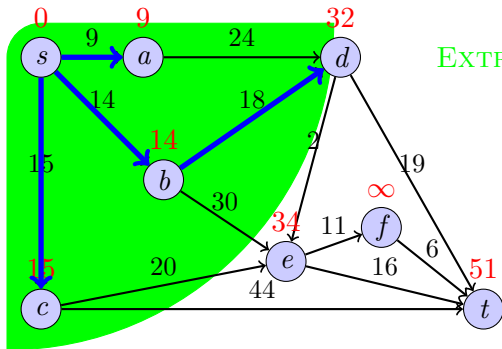
# Dijkstra's algorithm: an example

$$S = \{s, a, b, c, d\}$$
$$PQ = \{e(34), t(51), f(\infty)\}$$



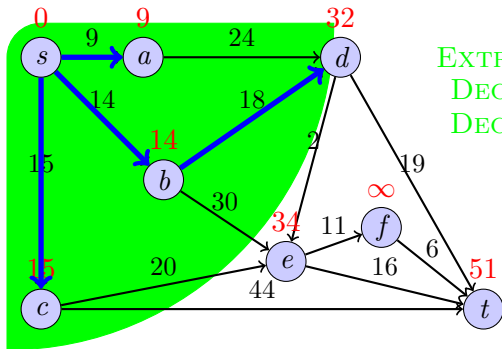
# Dijkstra's algorithm: an example

$$S = \{s, a, b, c, d\}$$
$$PQ = \{e(34), t(51), f(\infty)\}$$



# Dijkstra's algorithm: an example

$S = \{s, a, b, c, d\}$   
 $PQ = \{e(34), t(51), f(\infty)\}$

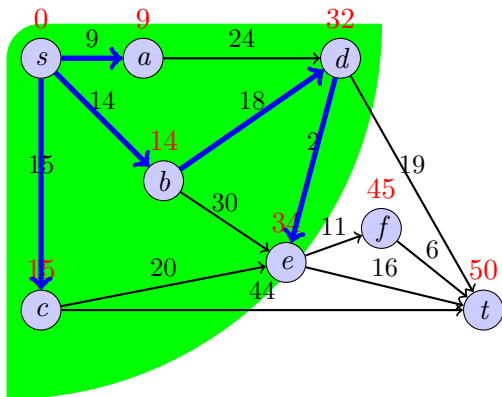


EXTRACTMIN returns  $e$   
DECREASEKEY( $f$ , 45)  
DECREASEKEY( $t$ , 50)

# Dijkstra's algorithm: an example

$S = \{s, a, b, c, d, e\}$

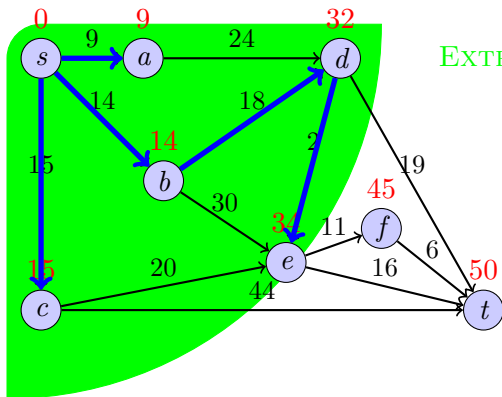
$PQ = \{f(45), t(50)\}$



# Dijkstra's algorithm: an example

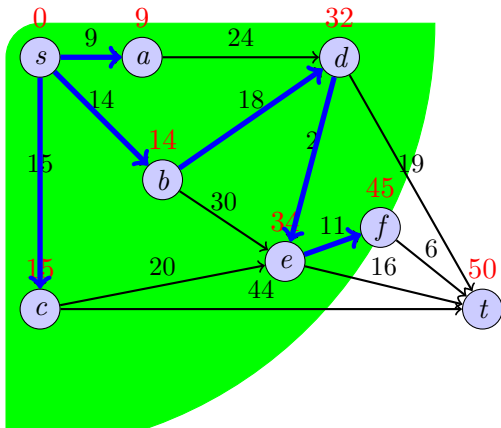
$S = \{s, a, b, c, d, e\}$

$PQ = \{f(45), t(50)\}$



# Dijkstra's algorithm: an example

$$S = \{s, a, b, c, d, e, f\}$$
$$PQ = \{t(50)\}$$



# Dijkstra's algorithm: an example

$$S = \{s, a, b, c, d, e, f, t\}$$
$$PQ = \{\}$$

