

## Algoritmo de Kruskal

Crear el heap inicial

Aristas\_Examinadas  $\leftarrow$  0

Aristas\_T  $\leftarrow$  0

T  $\leftarrow$   $\emptyset$

**mientras** (Aristas\_T < (N - 1)) **y**

(Aristas\_Examinadas < M) **hacer**

{ a  $\leftarrow$  arista ( $v_1$ ,  $v_2$ ) de la raíz del heap

Aristas\_Examinadas  $\leftarrow$  Aristas\_Examinadas + 1

Quitar a de la raíz y volver a crear un nuevo heap

$r_1$   $\leftarrow$  Raíz del subárbol que contiene a  $v_1$

$r_2$   $\leftarrow$  Raíz del subárbol que contiene a  $v_2$

**si**  $r_1 \neq r_2$  **entonces**

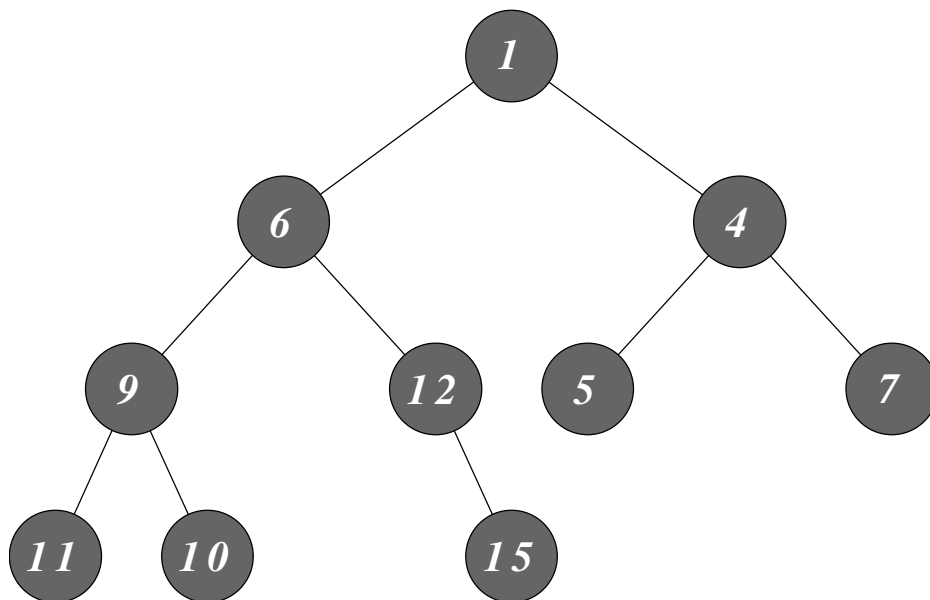
{ T  $\leftarrow$  T  $\cup$  { a }

Aristas\_T  $\leftarrow$  Aristas\_T + 1

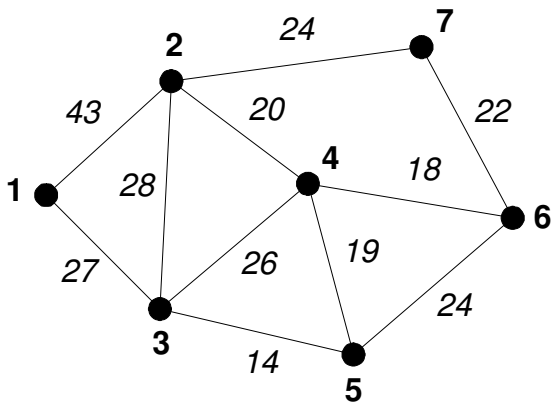
Unir los dos subárboles con raíces  $r_1$  y  $r_2$

}

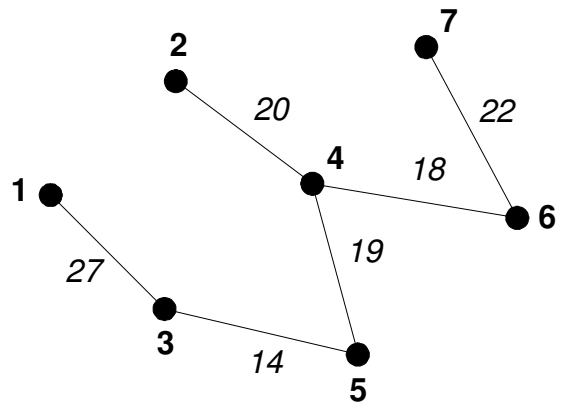
}



**Figura 1: Estructura de un heap.**



(a)



(b)

**Figura 2: (a) Grafo no dirigido; (b) Su MST asociado.**

Subárboles	Aristas del MST	Sig. arista	Costo arista	Ciclo?	Costo MST
[1] [2] [3] [4] [5] [6] [7]	$\emptyset$	(3, 5)	14	NO	0
[1] [2] [3-5] [6] [7]	(3, 5)	(4, 6)	18	NO	14
[1] [2] [3-5] [4-6] [7]	(3, 5)-(4, 6)	(4, 5)	19	NO	32
[1] [2] [3-4-5-6] [7]	(3, 5)-(4, 6)-(4, 5)	(2, 4)	20	NO	51
[1] [2-3-4-5-6] [7]	(3, 5)-(4, 6)-(4, 5)-(2, 4)	(6, 7)	22	NO	71
[1] [2-3-4-5-6-7]	(3, 5)-(4, 6)-(4, 5)-(2, 4)-(6, 7)	(2, 7)	24	SI	93
[1] [2-3-4-5-6-7]	(3, 5)-(4, 6)-(4, 5)-(2, 4)-(6, 7)	(5, 6)	24	SI	93
[1] [2-3-4-5-6-7]	(3, 5)-(4, 6)-(4, 5)-(2, 4)-(6, 7)	(3, 4)	26	SI	93
[1] [2-3-4-5-6-7]	(3, 5)-(4, 6)-(4, 5)-(2, 4)-(6, 7)	(1, 3)	27	NO	93
[1-2-3-4-5-6-7]	(3, 5)-(4, 6)-(4, 5)-(2, 4)-(6, 7)-(1, 3)	—	—	—	<b>120</b>

**Tabla 1: Kruskal sobre el grafo anterior.**

## Algoritmo de Prim

Escoger el vértice inicial  $s$

$V_T \leftarrow \{ s \}$

$E_T \leftarrow \emptyset$

Conexo  $\leftarrow$  TRUE

**mientras** ( $V_T \neq V$ ) **y** (Conexo = TRUE) **hacer**

{  $a \leftarrow$  arista ( $u \in V_T, v \in (V - V_T)$ ) de menor costo

**si** no existe tal arista **entonces**

Conexo = FALSE

**en otro caso**

{  $E_T \leftarrow E_T \cup \{ a \}$

$V_T \leftarrow V_T \cup \{ v \}$

}

}

Aristas del MST	Siguiente arista	Vértices	Costo total
$\emptyset$	(1, 3)	1	0
(1, 3)	(3, 5)	1, 3	27
(1, 3)-(3, 5)	(5, 4)	1, 3, 5	41
(1, 3)-(3, 5)-(5, 4)	(4, 6)	1, 3, 5, 4	60
(1, 3)-(3, 5)-(5, 4)-(4, 6)	(4, 2)	1, 3, 5, 4, 6	78
(1, 3)-(3, 5)-(5, 4)-(4, 6)-(4, 2)	(6, 7)	1, 3, 5, 4, 6, 2	98
<b>(1, 3)-(3, 5)-(5, 4)-(4, 6)-(4, 2)-(6, 7)</b>	—	1, 3, 5, 4, 6, 2, 7	<b>120</b>

**Tabla 2: Prim sobre el grafo de la Figura 2 (a).**