

# UNIVERSIDAD NACIONAL DE CAJAMARCA



## FACULTAD DE INGENIERÍA

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### ESCUELA ACADÉMICO PROFESIONAL DE INGENIERÍA DE SISTEMAS

#### “Ejercicio Flujo Máximo “

#### Asignatura:

- Investigación de Operaciones II

#### Docente:

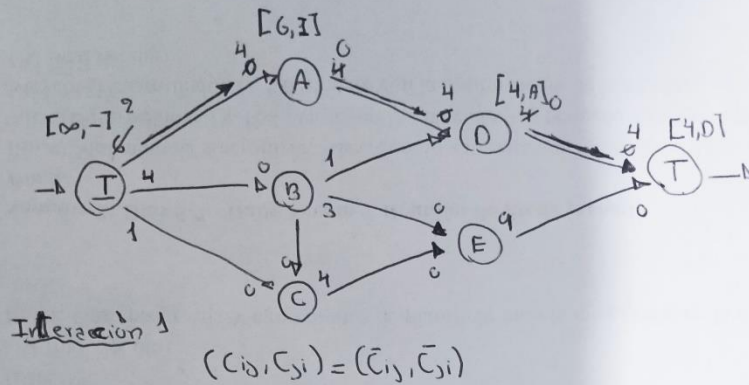
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#### Estudiante:

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Cajamarca – Perú

2024



$i = I$

$S_I = \{A, B, C\}$

$\max [c_{IA}, c_{IB}, c_{IC}] = c_{IA} \Rightarrow k = A$

$a_A = c_{IA} = 6$

$j = A$

$S_A = \{D\}$

$\max [c_{AD}] = c_{AD} \Rightarrow k = D$

$a_D = c_{AD} = 4$

~~luego~~  $k = D$

$k = D$

$S_A = \{T\}$

$\max [c_{DT}] = c_{DT} \Rightarrow k = T$

$a_T = c_{DT} = 4$

$(I) \rightarrow [4, 0] \rightarrow (D) \rightarrow [4, 1] \rightarrow (A) \rightarrow [6, 1] \rightarrow (T)$

$N1 = [I, A, D, T]$

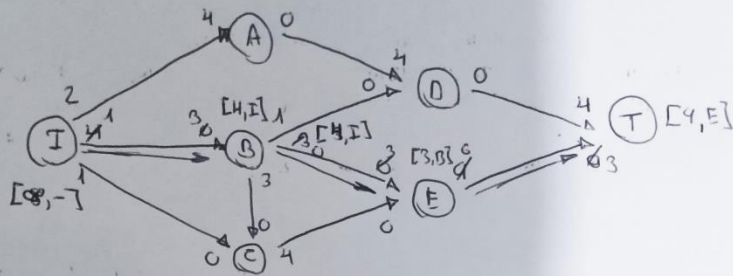
$\epsilon_1 = \min \{a_A, a_D, a_T\} = \min \{6, 4, 4\} = 4$

Capacidades residuales

$(c_{IA}, c_{AI}) = (6 - 4, 0 + 4) = (2, 4)$

$(c_{AD}, c_{DA}) = (4 - 4, 0 + 4) = (0, 4)$

$(c_{DT}, c_{TD}) = (4 - 4, 0 + 4) = (0, 4)$



Iteración 2

$$(c_{ij}, \bar{c}_{ij}) = (\bar{c}_{ij}, \bar{c}_{ij})$$

$$I = I$$

$$S_I = \{A, B, C\}$$

$$\max [c_{IA}, c_{IB}, c_{IC}] = c_{IB} \Rightarrow k = B$$

$$a_B = c_{IB} = 4$$

$$I = B$$

$$S_B = \{D, E, T\}$$

$$\max [c_{BD}, c_{BE}, c_{BT}] = c_{BE} \Rightarrow k = E$$

$$a_E = c_{BE} = 3$$

$$I = E$$

$$S_E = \{T\}$$

$$\max [c_{ET}] = c_{ET} \Rightarrow k = T$$

$$a_T = c_{ET} = 4$$

$$(T) \rightarrow [4, E] \rightarrow (E) \rightarrow [3, B] \rightarrow (B) \rightarrow [4, I] \rightarrow (I)$$

$$N_2 = [I, B, E, T]$$

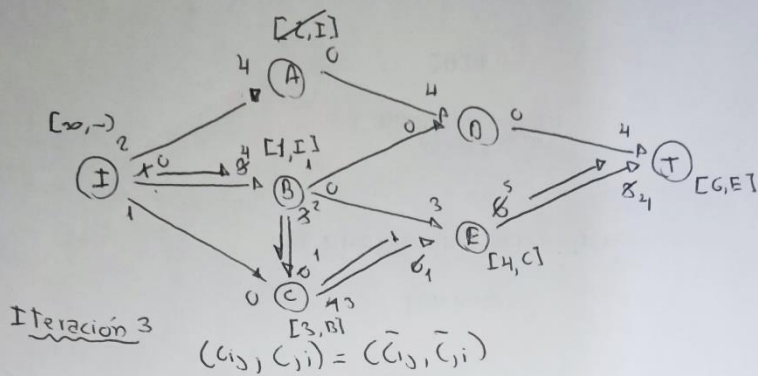
$$t_2 = \min \{a_B, a_E, a_T\} = \min \{4, 3, 4\} = 3$$

Capacidades Residuales

$$(c_{IB}, c_{BI}) = (4-3, 0+3) = (1, 3)$$

$$(c_{BE}, c_{EB}) = (3-3, 0+3) = (0, 3)$$

$$(c_{ET}, c_{TE}) = (4-3, 0+3) = (1, 3)$$



$i = I$

$$S_I = \{A, B, C\}$$

$$\max\{c_{IA}, c_{IB}, c_{IC}\} = c_{IA} \Rightarrow K = A$$

$$u_A = c_{IA} = 2$$

$j = A$

$$S_A = \{\emptyset\} \Rightarrow \text{Retirocedemos.}$$

$i = I$

$$S_I = \{B, C\}$$

$$\max\{c_{IB}, c_{IC}\} = c_{IB} \Rightarrow K = B$$

$$u_B = c_{IB} = 1$$

$j = B$

$$S_B = \{C\}$$

$$\max\{c_{BC}, c_{BD}\} = c_{BC} \Rightarrow K = C$$

$$u_C = c_{BC} = 3$$

$i = C$

$$S_C = \{E\}$$

$$\max\{c_{CE}\} = c_{CE} \Rightarrow K = E$$

$$u_D = c_{CE} = 4$$

$j = E$

$$S_E = \{T\}$$

$$\max\{c_{ET}\} = c_{ET} \Rightarrow K = T$$

$$u_T = c_{ET} = 6$$

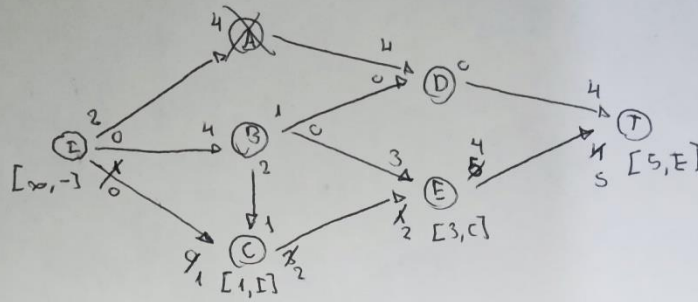
$$(T) \rightarrow [6, E] \rightarrow (E) \rightarrow [4, C] \rightarrow (C) \rightarrow [3, B] \rightarrow (B) \rightarrow [1, I] \rightarrow (I)$$

$$N_3 = \{I, B, C, E, T\} \quad (c_{IB}, \bar{c}_{IB}) = (1 - 1, 3 + 1) = (0, 4)$$

$$t_3 = \min\{u_B, u_C, u_E, u_T\} \quad (c_{BC}, \bar{c}_{BC}) = (3 - 1, 0 + 1) = (2, 1)$$

$$t_3 = \min\{1, 3, 4, 6\} \quad (c_{CE}, \bar{c}_{CE}) = (4 - 1, 0 + 1) = (3, 1)$$

$$\boxed{t_3 = 1} \quad (c_{ET}, \bar{c}_{ET}) = (6 - 1, 3 + 1) = (5, 4)$$



Iteración 4  
 $(C_{ij}, c_{ji}) = (\bar{C}_{ij}, \bar{c}_{ji})$

$\lambda = I$

$$S_I = \{C\}$$

$$\max [C_{IC}] = C_{IC} \Rightarrow K = C \quad a_C = C_{IC} = 1$$

$\lambda = C$

$$S_C = \{E\}$$

$$\max [C_{CE}] = C_{CE} \Rightarrow K = E \quad a_E = C_{CE} = 3$$

$\lambda = E$

$$S_E = \{T\}$$

$$\max [C_{ET}] = C_{ET} \Rightarrow K = T \quad a_T = C_{ET} = 5$$

$$(T) \rightarrow [5, E] \rightarrow (E) \rightarrow [3, C] \rightarrow (C) \rightarrow [1, I] \rightarrow (I)$$

$$N_4 = \{I, C, E, T\}$$

$$\{4, 3, 1, 5\} = \min \{1, 3, 5\} = 1$$

Capacidades residuales

$$(C_{IC}, c_{CI}) = (1-1, 0+1) = (0, 1)$$

$$(C_{CE}, c_{EC}) = (3-1, 1+1) = (2, 2)$$

$$(C_{ET}, c_{TE}) = (5-1, 4+1) = (4, 5)$$

RESPUESTA.

$$\text{Flujo Máximo} = f_1 + f_2 + f_3 + f_4$$

$$= 4 + 3 + 1 + 1$$

$$= 9$$