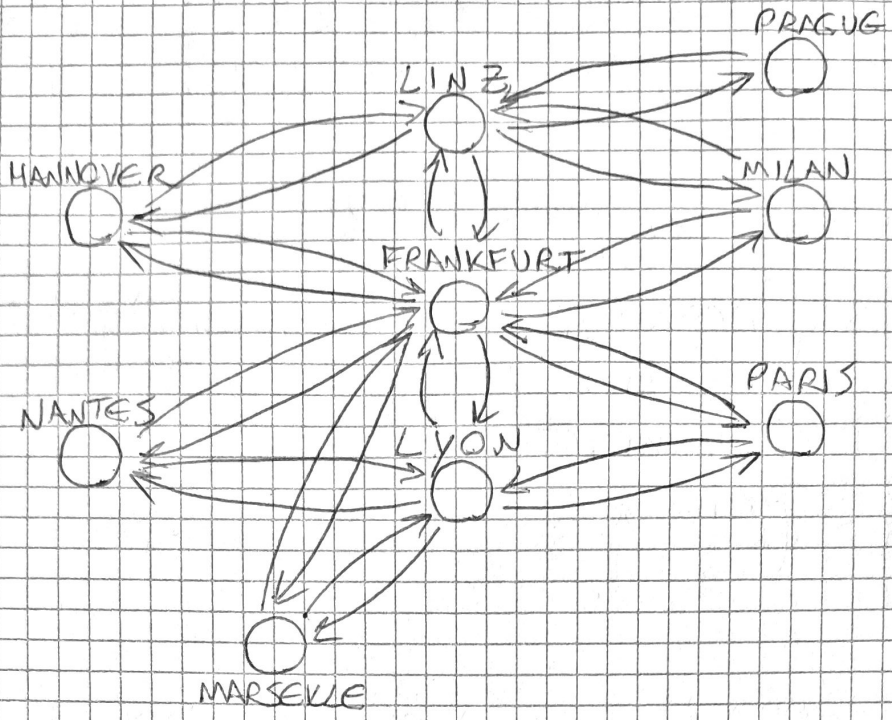
ESERCITAZIONE 2 29/10/2020



PARAMETERS

- K { SHOES, VEGETABLES }
- $G = (V, E)$
- V = { NANTES, PARIS, HANNOVER, MARSEILLE, MILAN, PRAGUE, LYON, FRANKFURT, LINZ }
- E = { (LYON, FRANKFURT), (FRANKFURT, LYON), (FRANKFURT, LINZ), (LINZ, FRANKFURT) } CONNESSIONI PRIMARIE

  (NANTES / PARIS / MARSEILLE, FRANKFURT / LYON)
  (FRANKFURT / LYON, NANTES / PARIS / MARSEILLE)
  (HANNOVER / MILAN, FRANKFURT / LINZ)
  (FRANKFURT / LINZ, HANNOVER / MILAN)
  (PRAGA, LINZ), (LINZ, PRAGA) } CONNESSIONI SECONDARIE

- $O(\text{SHOES}) = \{ \text{NANTES}, \text{PARIS}, \text{HANNOVER} \}$
- $O(\text{VEGETABLES}) = \{ \text{PARIS}, \text{MARSEILLE}, \text{PRAGUE} \}$
- $D(\text{SHOES}) = \{ \text{MARSEILLE}, \text{MILAN}, \text{PRAGUE} \}$
- $D(\text{VEGETABLES}) = \{ \text{NANTES}, \text{HANNOVER}, \text{MILAN} \}$

- $T(SHOES) = \{LYON, FRANKFURT, LINZ\}$
- $T(VEGETABLES) = \{LYON, FRANKFURT, LINZ\}$

Assegno dei valori numerici per semplificare la notazione

NANTES : 1	PRAGUE : 6	SHOES : S
PARIS : 2	LYON : 7	VEGETABLES : V
MARSEILLE : 3	FRANKFURT : 8	
HANNOVER : 4	LINZ : 9	
MILAN : 5		

$o_1^S = 150$ $o_3^S = 0$ $o_5^S = 0$

$o_2^S = 220$ $o_4^S = 300$ $o_6^S = 0$

$o_1^V = 0$ $o_3^V = 180$ $o_5^V = 0$

$o_2^V = 380$ $o_4^V = 0$ $o_6^V = 230$

$d_1^S = 0$ $d_3^S = 290$ $d_5^S = 200$

$d_2^S = 0$ $d_4^S = 0$ $d_6^S = 200$

$d_1^V = 200$ $d_3^V = 0$ $d_5^V = 200$

$d_2^V = 0$ $d_4^V = 300$ $d_6^V = 0$

$q_{78} = q_{87} = q_{89} = q_{98} = 2000$

$q_{17} = q_{71} = q_{18} = q_{81} = 600$

$q_{27} = q_{72} = q_{28} = q_{82} = 600$

$q_{37} = q_{73} = q_{38} = q_{83} = 600$

$q_{48} = q_{84} = q_{49} = q_{94} = 600$

$q_{58} = q_{85} = q_{59} = q_{95} = 600$

$q_{69} = q_{96} = 600$

$q^S_{ij} = q^V_{ij} = 1000$ con $(i \text{ e } j) \in \{$ CONNESSIONE PRIMARIE $\}$

$q^S_{ij} = q^V_{ij} = 400$ con $(i \text{ e } j) \in \{$ CONNESSIONI SECONDARIE $\}$

$l_{ij} = 70000$ con $(i,j) \in \{$ CONNESSIONI PRIMARIE $\}$

$l_{ij} = 50000$ con $(i,j) \in \{$ CONNESSIONI SECONDARIE $\}$

VARIABILI DECISIONALI

y_{ij} $(i,j) \in E$

x^k_{ij} $(i,j) \in E, k \in K$

FUNZIONE OBIETTIVO

$$\min \sum_{(i,j) \in E} l_{ij} \cdot y_{ij} + \sum_{k \in K} \sum_{(i,j) \in E} c^k_{ij} \cdot x^k_{ij}$$

VINCOLI

$$\sum_{j \in V} x^k_{ij} - \sum_{j \in V} x^k_{ji} = O^k_i \quad \forall k \in K \; \forall i \in O(k)$$

$$\sum_{j \in V} x^k_{ji} - \sum_{j \in V} x^k_{ij} = d^k_i \quad \forall k \in K \; \forall i \in D(k)$$

$$\sum_{j \in V} x_{ij}^k - \sum_{j \in V} x_{ji}^k = 0 \quad \forall k \in K \; \forall i \in T(K)$$

$$\sum_{k \in K} x_{ij}^k \leq q_{ij} \cdot y_{ij} \quad \forall (i,j) \in E$$

$$0 \leq x_{ij}^k \leq q_{ij}^k \quad \forall (i,j) \in E \quad \forall k \in K$$

$$y_{ij} \in \{0, 1\} \quad \forall (i,j) \in E$$