ALG 20/11/23 LC STRING

PER SAPERE SE $x_i = y_j \in S_{(i,j)}$ DEVO SAPERE SE $x_{i-1} \in S_{(i-1,j-1)}$

$\rightarrow$ PB AUX LCSTRING CHE TERMINA CON $x_n = y_m$

PASSO $(i,j) > 0$ C.B. ($i = 0$ o $j = 0$)

$c_{ij} = 1 + c_{i-1,j-1}$ SE $x_i = y_j$ $c_{ij} = 0$

0 SE $x_i \neq y_j$

S PB ORIGINALE

$\max(c_{ij})$ $1 \leq i \leq m$, $1 \leq j \leq m$

LZIG-ZAG S

$Z = \langle z_1 \dots z_n \rangle$ $z_i < z_{i+1}$ PER i DISPARI
$z_i > z_{i+1}$ PER i PARI

DATA X TROVARE ℓ DI LZS MAX DI X

→ PB AUX LZS CHE TERMINA CON x_m

SE c_i PARI $c_i = 1 + \max A \mid A = \{c_h \mid 1 \leq h < i \land c_h$ DISPARI $\land x_h < x_i\} \land A \neq \emptyset$ P

$c_i = 0$ SE $A = \emptyset$

SE c_i DISPARI $c_i = 1 + \max\{c_h \mid 1 \leq h < i \land c_h$ PARI $\land x_h > x_i\}$ D

$c_i = \max\{P, D\}$

C.B. $c_i = 1$ $i = 1$

SOLUZIONE P.B. OR. $\max \{c_i\}$ $1 \leq i \leq n$

CAMMINO MINIMO DA i A j IN CUI CI SONO 2 ARCHI CONSECUTIVI ROSSI

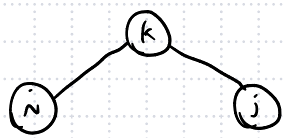
(V, E, W, col) $col : E \to \{\text{rosso}, \text{blu}\}$

I ik $\exists$ 2 R
kj $\exists$ 2 R

II ik $\nexists$ 2 R
kj $\exists$ 2 R

III ik $\exists$ 2 R
kj $\nexists$ 2 R

IV ik FINISCE R
kj INIZIA R



$\to$ PB AUX $\forall (a,b) \in C^2$ $\forall (i,j)$ CAMMINO MINIMO CON COL PRIMO ARCO $= a$ E ULTIMO ARCO $= b$

SOTTO PB (k, p, a, b) $p = \{\underbrace{T}_{\text{2 ROSSI CON.}}, \underbrace{F}_{\text{NO 2 ROSSI CON.}}\}$

C.B $k = 0$ $p \in \{T, F\}$

$$d_{ij}^{0,T,a,b} = \begin{cases} \infty & \text{SE } i = j \\ \infty & \text{SE } i \neq j \wedge (i,j) \in E \end{cases}$$

$$d_{ij}^{0,F,a,b} = \begin{cases} \infty & \text{SE } i = j \\ w_{ij} & \text{SE } i \neq j \wedge (i,j) \in E \\ & \wedge\ a = b = col(i,j) \\ \infty & \text{ALTRIMENTI} \end{cases}$$

PASSO $k > 0$ $\quad P \in \{T, F\}$

SE $K \notin$ CAMMINO

$$d_{ij}^{k,P,a,b} = d_{ij}^{k-1,P,a,b} \qquad \text{A}$$

SE $K \in$ CAMMINO

NON VINCOLATI

$$d_{ij}^{k,T,a,b} = \min_{\forall c,d} \; d_{ik}^{k-1,T,a,\underline{c}} + d_{kj}^{k-1,T,d,\underline{b}} \qquad \text{I}$$

$$\min_{\forall c,d} \; d_{ik}^{k-1,T,a,c} + d_{kj}^{k-1,F,d,b} \qquad \text{II}$$

$$\min_{\forall c,d} \; d_{ik}^{k-1,F,a,c} + d_{kj}^{k-1,T,d,b} \qquad \text{III}$$

$$\min_{c=d=\text{ROSSO}} \; d_{ik}^{k-1,F,a,c} + d_{kj}^{k-1,F,d,b} \qquad \text{IV}$$

$$d_{ij}^{k,F,a,b} = \min_{\substack{c \neq \text{ROSSO } \vee \\ d \neq \text{ROSSO}}} \; d_{ik}^{k-1,F,a,c} + d_{kj}^{k-1,F,d,b} \qquad \text{B}$$

$$d_{ij}^{k,T,a,b} = \min \left(\text{I}, \text{II}, \text{III}, \text{IV}, \text{A} \right)$$

$$d_{ij}^{k,F,a,b} = \min \left(\text{A}, \text{B} \right)$$

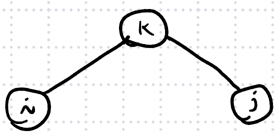
SOL PB. ORIGINALE

$$d_{ij} = \min_{a,b \in C^2} \begin{pmatrix} n, T, a, b \\ d_{ij} \end{pmatrix} \quad \text{se } i \neq j$$

ALG - 21/11/23

ISTANZA $V, E, col : V \to \{\text{ROSSO}, \text{BLU}\}$

SOL $\forall (i,j) \in V^2$ se $\exists$ CAMMINO DA i A j CON 2 VERTICI ROSSI CONSECUTIVI



I $\quad ik \ni 2R \wedge kj \not\ni 2R$

II $\quad ik \not\ni 2R \wedge kj \ni 2R$

III $\quad ik \ni 2R \wedge kj \ni 2R$

$d_{ij}^{k, p \in \{T, F\}}$

C.B.

$k = 0$, $p = T$: T $\quad i \neq j \quad i = j = R$, $(i,j) \in E$; F OTHERW.

$\wedge i \neq R \vee j \neq R$?

$k = 0$, $p = F$: T $\quad (i,j) \in E \vee i = j$; F OTHERW.

PASSO

$k > 1$, $p = T$: $\vee\left(\overset{k\in}{I}, II, III, \overset{k\notin}{d_{ij}^{k-1,T}}\right)$

$k > 1$, $p = F$: $\vee\left(\overset{k\notin}{d_{ij}^{k-1,F}}, \overset{k\in}{d_{ik}^{k-1,F} \wedge d_{kj}^{k-1,F}}\right)$

ALG - 22/11/23 - HATEVILLE FIORITO PARI

$X_n \quad \forall i \in X_n \quad d_i \in \mathbb{N}$ DONAZIONE $\quad e_i \in \mathbb{N}$ PIANTE GIARDINO

SOL: MAX $A \subseteq X_n$ COMP. $\wedge \sum_{i \in A} e_i \ \% \ 2 = 0$

SOTTO PB. (i, p) $\quad i \le n \quad p \in \{0, 1\}$ (TOT PARI / TOT DISP.)

$S_{ip} \subseteq X_i$ CON DONAZIONE MAX E PIANTE PARI O DISP. [P]

C. B. $\quad i = 0 \lor i = 1 \quad \forall p$

$S_{0,0} = \emptyset$
OPT $= 0$

$S_{1,0} = \begin{cases} \{1\} & \text{SE } t_1 \text{ PARI} \quad OPT = d_i \\ \emptyset & \text{OTHW.} \quad OPT = 0 \end{cases}$

$\nexists S_{0,1}$
OPT $= -\infty$

$S_{1,1} = \begin{cases} \{1\} & \text{SE } t_1 \text{ DISPARI} \quad OPT = d_i \\ \nexists & \text{OTHW.} \quad OPT = -\infty \end{cases}$

PASSO $\quad i > 1 \quad \forall p$

$S_{i0} = S_{i-1,0}$ $\quad OPT_{i0} = OPT_{i-1,0}$ $\quad$ SE $i \notin S_{i0}$ $\quad$ (E1)

$S_{i-2,0} \cup i$ $\quad OPT = t_i + OPT_{i-2,0}$ $\quad$ SE $i \in S_{i0} \land t_i$ PARI

(E2)

SE $\exists$ $S_{i-2,1} \cup i$ $\quad OPT = t_i + OPT_{i-2,1}$ $\quad$ SE $i \in S_{i0} \land t_i$ PARI

$S_{i1} = S_{i-1,1}$ $\quad OPT_{i1} = OPT_{i-1,1}$ $\quad$ SE $i \notin S_{i1}$ $\quad$ (E3)

$S_{i-2,0} \cup i$ $\quad OPT = OPT_{i-2,0}$ $\quad$ SE $i \in S_{i1} \land t_i$ DISPARI

(E4)

SE $\exists$ $S_{i-2,1} \cup i$ $\quad OPT = OPT_{i-2,1}$ $\quad$ SE $i \in S_{i1} \land t_i$ PARI

$OPT_{i0} = MAX(E1, E2)$
$OPT_{i1} = MAX(E3, E4)$

HATEVILLE SENZA 2 ROSSI CONSEC.

X_n $\forall i \in X_n$ d_i DONAZIONE col_i COLORE CASA $\{r, b\}$

SOTTO PB (i, p) $p = \{0, 1\}$ NO r o OK r

PB AUX $i \in S_i$

BASE PASSO $i > 2$

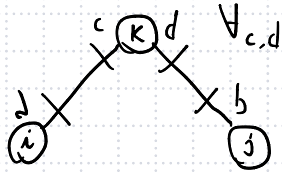
$opt_1 = d_1$ $opt_i = d_i + \max\{opt_h \mid 1 \le h < i-1\}$ SE $col_i \neq r$

$opt_2 = d_2$ $= d_i + \max\{opt_h \mid 1 \le h \le i-1 \wedge col_h \neq r\}$ SE $col_i = r$

SOL OG $\max(opt_i)$ $1 \le i \le n$

ISTANZA: $V, E, col: E \to C$

$\exists$ CAMMINO DA i A j t.c.
col(1° ARCO) = col (ULTIMO ARCO)



PB AUX $d_{i,j}^{k,a,b}$ col(1°) = a col(ult) = b

BASE PASSO $K > 0$

$d_{i,j}^{0,a,b} = F$ $i = j$ $\forall a, b$
T $i \neq j$ $(i,j) \in E$ $\wedge$ $a = b$

$d_{i,j}^{k,a,b} = \bigvee_{\forall c,d} \left(d_{i,k}^{k-1,a,c} \wedge d_{k,j}^{k-1,d,b} \right)$ $k \in$

$\vee$ $d_{i,j}^{k-1,a,b}$ $k \notin$

PB OG $\bigvee d_{i,j}^{n,a,a}$ $\forall a$