


Ejercicio de búsqueda - Metro de Tokio

El objetivo es partir desde la estación Tatsumi y llegar a la estación Otemachi, recorriendo la menor cantidad de paradas posibles evitando trasbordos largos, indicados en el mapa de la siguiente manera: 



$$E = \{ \quad \} \quad F = \{ \begin{matrix} & 7 \\ \text{Y} & \\ 23 & \end{matrix} \} \quad T(\begin{matrix} & 7 \\ \text{Y} & \\ 23 & \end{matrix}) = F$$

$$E = \{ \overset{7}{\underset{0 \ 7}{\boxed{Y_{23}}}} \} \quad F = \{ \overset{9}{\underset{1 \ 8}{\boxed{Y_{24}}}}, \overset{7}{\underset{1 \ 6}{\boxed{Y_{22}}}}, \overset{7}{\underset{1 \ 6}{\boxed{Y_{23}}}} \} \quad T(\overset{7}{\underset{1 \ 6}{\boxed{Y_{22}}}}) = F$$

$$E = \left\{ \overset{7}{\underset{0 \ 7}{\boxed{Y_{23}}}}, \overset{7}{\underset{1 \ 6}{\boxed{Y_{22}}}}, \overset{7}{\underset{2 \ 5}{\boxed{Y_{23}}}} \right\} \quad F = \left\{ \overset{9}{\underset{1 \ 8}{\boxed{Y_{24}}}}, \overset{7}{\underset{2 \ 5}{\boxed{Y_{21}}}}, \overset{7}{\underset{3 \ 4}{\boxed{Y_{22}}}} \right\} \quad T(\overset{7}{\underset{2 \ 5}{\boxed{Y_{21}}}}) = F$$

$$E = \left\{ \begin{matrix} 7 \\ \boxed{Y_{23}} \end{matrix}, \begin{matrix} 7 \\ \boxed{Y_{22}} \end{matrix}, \begin{matrix} 7 \\ \boxed{Y_{21}} \end{matrix} \right\} \quad F = \left\{ \begin{matrix} 9 \\ \boxed{Y_{24}} \end{matrix}, \begin{matrix} 9,5 \\ \boxed{E_{16}} \end{matrix}, \begin{matrix} 7 \\ \boxed{Y_{20}} \end{matrix} \right\} \quad T\left(\begin{matrix} \boxed{Y_{20}} \end{matrix}\right) = F$$

$$E = \{ \overset{7}{\boxed{Y_{23}}}, \overset{7}{\boxed{Y_{22}}}, \overset{7}{\boxed{Y_{21}}}, \overset{7}{\boxed{Y_{20}}} \} \quad F = \{ \overset{9}{\boxed{Y_{24}}}, \overset{9,5}{\boxed{E_{16}}}, \overset{12}{\boxed{H_{11}}}, \overset{7}{\boxed{Y_{19}}} \} \quad T(\overset{7}{\boxed{Y_{19}}}) = F$$

$$E = \{ \overset{7}{Y}, \overset{7}{Y}, \overset{7}{Y}, \overset{7}{Y}, \overset{7}{Y} \}, E = \{ \overset{9}{Y}, \overset{9,5}{E}, \overset{12}{H}, \overset{7}{Y}, \overset{10}{M}, \overset{11}{H}, \overset{11}{G} \}, T(Y) = E$$

0 7 1 6²³ 2 5²² 3 4²¹ 4 3²⁰

7 7 7 7 7 7

$$E = \{ \begin{matrix} \boxed{23} & \boxed{22} & \boxed{21} & \boxed{20} & \boxed{19} & \boxed{18} \\ 0 & 7 & 1 & 6 & 2 & 5 & 3 & 4 & 4 & 3 & 5 & 2 \end{matrix} \begin{matrix} Y_{23} \\ Y_{22} \\ Y_{21} \\ Y_{20} \\ Y_{19} \end{matrix} \}$$

$$F = \{ \overset{1}{\underset{8}{\boxed{Y_{24}}}}, \overset{3}{\underset{6,5}{\boxed{E_{16}}}}, \overset{4}{\underset{8}{\boxed{Y_{21}}}}, \overset{4}{\underset{8}{\boxed{H_{11}}}}, \overset{5}{\underset{5}{\boxed{Y_{20}}}}, \overset{5}{\underset{5}{\boxed{M_{16}}}}, \overset{5}{\underset{6}{\boxed{Y_{19}}}}, \overset{5}{\underset{6}{\boxed{H_{09}}}}, \overset{5}{\underset{6}{\boxed{G_{09}}}}, \overset{6}{\underset{4}{\boxed{Y_{19}}}}, \overset{6}{\underset{4}{\boxed{I_{08}}}}, \overset{6}{\underset{4}{\boxed{Y_{01}}}} \}$$

$$E = \left\{ \begin{matrix} \boxed{Y_{23}} \\ 0 \quad 7 \end{matrix}, \begin{matrix} \boxed{Y_{22}} \\ 1 \quad 6 \end{matrix}, \begin{matrix} \boxed{Y_{21}} \\ 2 \quad 5 \end{matrix}, \begin{matrix} \boxed{Y_{20}} \\ 3 \quad 4 \end{matrix}, \begin{matrix} \boxed{Y_{19}} \\ 4 \quad 3 \end{matrix}, \begin{matrix} \boxed{Y_{18}} \\ 5 \quad 2 \end{matrix}, \begin{matrix} \boxed{Y_{24}} \\ 1 \quad 8 \end{matrix}, \begin{matrix} \boxed{Y_{23}} \\ 2 \quad 9 \end{matrix} \right\}$$

$F = \{ \overset{9,5}{\underset{3 \ 6,5}{\text{E}_{16}}} \overset{12}{\underset{4 \ 8}{\text{Y}_{21}}} \overset{10}{\underset{5 \ 5}{\text{H}_{11}}} \overset{10}{\underset{5 \ 5}{\text{Y}_{19}}} \overset{11}{\underset{6 \ 6}{\text{H}_{09}}} \overset{11}{\underset{5 \ 6}{\text{Y}_{19}}} \overset{11}{\underset{6 \ 6}{\text{G}_{09}}} \overset{10}{\underset{6 \ 4}{\text{Y}_{19}}} \overset{11}{\underset{6 \ 5}{\text{I}_{08}}} \overset{11}{\underset{6 \ 5}{\text{Y}_{18}}} \overset{11}{\underset{6 \ 5}{\text{C}_{09}}} \overset{11}{\underset{6 \ 5}{\text{Y}_{18}}} \overset{11}{\underset{6 \ 5}{\text{H}_{08}}} \overset{11}{\underset{6 \ 5}{\text{Y}_{18}}} \}$

$$\mathbf{E} = \left\{ \overset{7}{\mathbf{Y}_{23}}, \overset{7}{\mathbf{Y}_{22}}, \overset{7}{\mathbf{Y}_{21}}, \overset{7}{\mathbf{Y}_{20}}, \overset{7}{\mathbf{Y}_{19}}, \overset{7}{\mathbf{Y}_{18}}, \overset{9}{\mathbf{Y}_{24}}, \overset{9}{\mathbf{Y}_{17}} \right\}$$

$$F = \{ \overset{9,5}{\boxed{E_{16}}}, \overset{12}{\boxed{H_{11}}}, \overset{10}{\boxed{M_{16}}}, \overset{11}{\boxed{H_{09}}}, \overset{11}{\boxed{G_{09}}}, \overset{10}{\boxed{I_{08}}}, \overset{11}{\boxed{C_{09}}}, \overset{11}{\boxed{H_{08}}}, \overset{11}{\boxed{Y_{16}}} \} \quad T(\boxed{E_{16}}) = F$$

Algoritmo (a igual coste) -> FIFO

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Coste
 g = N° de paradas hasta el destino

Heurística

$$h = 1 \times n + 0,5 \times 3 + 1 \times 3$$

↓

Nº de paradas
hasta destino

↓

Trasbordos
cortos

↓

Trasbordos
largos

Heurística

$$h = 1 \times n + 0,5 \times 3 + 1 \times 3$$

↓

Nº de paradas
hasta destino

↓

Trasbordos
cortos

↓

Trasbordos
largos

