

# Assignment 8

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畢工待論

1. The cost of a path is the largest arc cost on the path.

stage 4.

$$c_4(-3) = 5 \quad c_4(-1) = 2 \Rightarrow c_4(1) = 1 \quad c_4(3) = 2$$

stage 3.

$$c_3(2) = \min [\max(a_{32}, c_4(2)), \max(a_{31}, c_4(1))] = \min [\max(6, 2), \max(5, 1)] = \min [6, 5] = 5$$

$$c_3(0) = a_{01} = 4$$

$$c_3(-2) = a_{-21} = 4$$

stage 2.

$$c_2(1) = \min [\max(a_{12}, c_3(2)), \max(a_{10}, c_3(0))] = \min [c_3(2) = 5, c_3(0) = 4] = c_3(0) = 4$$

$$c_2(-1) = \min [\max(a_{-10}, c_3(0)), \max(a_{-12}, c_3(2))] = \min [4, a_{-12} = 5] = c_3(0) = 4$$

stage 1.

$$c_1(0) = \min [\max(a_{01}, c_2(1)), \max(a_{0-1}, c_2(-1))] = c_2(1) = c_2(-1) = 4$$

# Minimum cost path

①  $c_1(0) \rightarrow c_2(1) \rightarrow c_3(0) \rightarrow c_4(1)$   
 ②  $c_1(0) \rightarrow c_2(-1) \rightarrow c_3(0) \rightarrow c_4(1)$

Minimum cost = 4.

>. The cost of a path is the product of arc costs on the path.

stage 4:

$$c_4(-3) = 5 \quad c_4(-1) = 2 \Rightarrow c_4(1) = 1 \quad c_4(3) = 2$$

stage 3:

$$c_3(2) = \min \begin{cases} U: 4 \cdot 2 = 8 \\ D: 5 \cdot 5 = 25 \end{cases} = 8 \quad z_3(2) = U$$

$$c_3(0) = \min \begin{cases} U: 4 \cdot 1 = 4 \\ D: 6 \cdot 2 = 12 \end{cases} = 4 \quad z_3(0) = U$$

$$c_3(2) = \min \begin{cases} U: 6 \cdot 2 = 12 \\ D: 5 \cdot 1 = 5 \end{cases} = 5 \quad z_3(2) = D$$

stage 2:

$$c_2(1) = \min \begin{cases} U: 3 \cdot 5 = 15 \\ D: 2 \cdot 4 = 8 \end{cases} = 8 \quad z_2(1) = D$$

$$c_2(-1) = \min \begin{cases} U: 4 \cdot 4 = 16 \\ D: 5 \cdot 8 = 40 \end{cases} = 16 \quad z_2(-1) = U$$

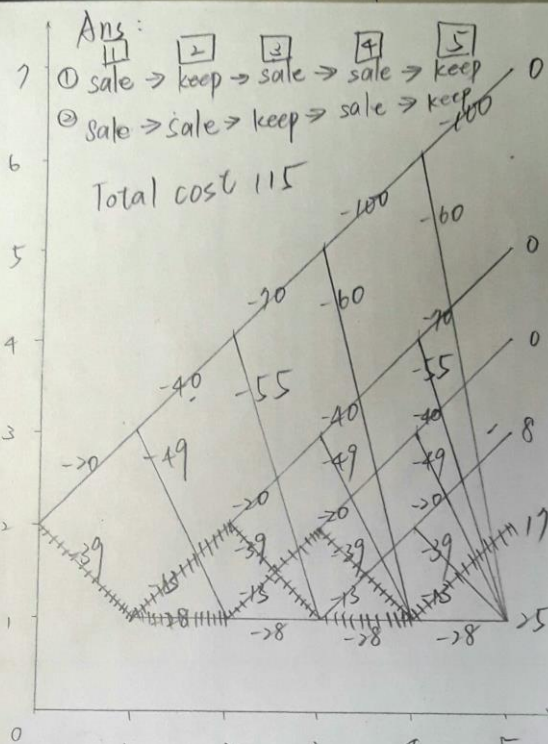
stage 1.

$$c_1(0) = \min \begin{cases} U: 2 \cdot 8 = 16 \\ D: 1 \cdot 16 = 16 \end{cases} = 16 \quad z_1(0) = D \text{ or } U$$

Minimum Cost Path:

①  $c_1(0) \rightarrow c_2(1) \rightarrow c_3(0) \rightarrow c_4(1)$   
 ②  $c_1(0) \rightarrow c_2(-1) \rightarrow c_3(0) \rightarrow c_4(1)$

Minimum cost = 16



year 0  
 $C_0(2) = \max(-20-97, -39-76)$   
 $= -115$

year 5  
 $C_5(7) = 0$   $C_5(5) = 0$   $C_5(4) = 0$

$C_5(3) = 8$   $C_5(2) = 17$   $C_5(1) = 25$

year 4.

$C_4(1) = \max(-13+17, -28+25) = 4$   $C_4(5) = \max(-100-25, -60+4) = -56$

$C_4(2) = \max(-20+8, -39+25) = -12$  year 2

$C_4(3) = \max(-40+0, -49+25) = -24$   $C_2(1) = \max(-13-35, -28-24) = -48$

$C_4(4) = \max(-70+0, -55+25) = -30$   $C_2(2) = \max(-20-45, -39-24) = -63$

$C_4(5) = \max(-100+0, -60+25) = -35$   $C_2(4) = \max(-70-56, -55-24) = -79$

year 1

$C_1(1) = \max(-13-63, -28-48) = -76$

$C_1(2) = \max(-40-79, -49-48) = -97$

7	6	28	
52	65	39	49
48		29	28
		63	97
			40
			79
			119