國立陽明交通大學考試試卷

Exam Paper of National Yang Ming Chiao Tung University

課程名稱 Course Name PDA

姓名 Name 郭婕榆

學號 Student ID 311510170

班別 Department

日期 Date 112/11/6

※ 考試作弊者將受記大過以上處分

※If you cheat in exam, you will be punished

題號 NO	分數 Score
1	10
2	10
3	10
4	5
5	10
6	25
7	10+2
8	
9	
10	
11	
12	
13	
14	
15	
總分 Total	80

1. False

10

若同樣儲存一串資料，

每一輪都要進行插入 or 刪除某一筆 data → 此時使用 linklist 只要 O(1) time complexity

若用 array or vector implement

則需要較高的 time complexity

因為可能會需要整個 array/vector copy 到一個新的 array/vector

⇒ O(n)

2. No,

10

因為 TSP 屬於 NP problem，HC 也是

且 HC 可以 reduce 成 TSP problem

→ 因此此演算法若能在 polynomial time 內解決 TSP problem

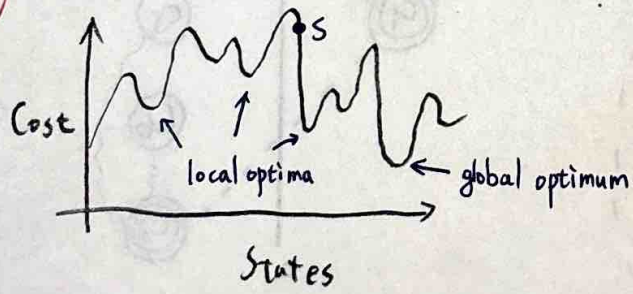
也要能在 polynomial time 內解決 HC problem

3.

10

在當個 loop 的 solution 變差時，仍讓它有机会接受此 solution，

如左圖，當 s 在 local optima 時，需要有 up-hill，才有可能到達 global optimum



但也不能保證 simulated annealing 一定可以得到 global optimum，可能在得到前就因終止條件而停止.

4.

5

不一定

node a 交換的 gain：3-6 = -3

node b 〃 〃：4-2 = 2

但還需要扣掉 a.b 之間的連線的 gain

→ ~~不確定是否~~能 reduce cut cost

5.

(0 balanced bipartition :

$rW - S_{max} \le |A| \le rW + S_{max}$

r: balanced factor, $W = |A| + |B|$, $S_{max} = \max_i s(i)$ ⇒ $r = 0.3$, $W = 15$, $S_{max} = 4$

⇒ $0.3 \times 15 - 4 = 0.5 \le |A| \le 0.3 \times 15 + 4 = 8.5$, $0.7 \times 15 - 4 = 6.5 \le |B| \le 0.7 \times 15 + 4 = 14.5$

⇒ $1 \le |A| \le 8$, $7 \le |B| \le 14$

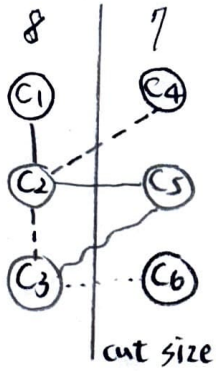
net m {C_1, C_2, C_5} ——

net q {C_2, C_3, C_4} ----

net k {C_3, C_5} ~~~

net p {C_3, C_6} ·····

i=0



i	cell	g(i)	Σg(i)	cutsize
0	—	—	—	4
1	C_3	2	2	2
2	C_2	1	3	1 ✓
3	C_4	-1	2	2
4	C_1	1	3	1
5	C_6	-1	2	2
6	C_5	-2	0	4

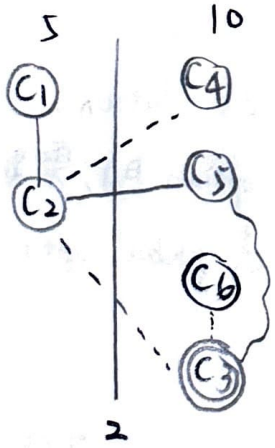
⇒ 移動 C_3, C_2 ※

$gain(C_1) = 0$ $gain(C_4) = 1$

$gain(C_2) = 0$ $gain(C_5) = 2$

$gain(C_3) = 2$ $gain(C_6) = 1$

i=1 (move C_3)



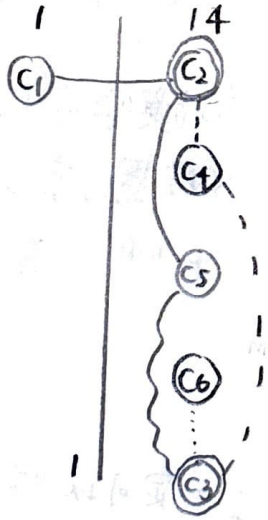
$gain(C_2)' = 1$

$gain(C_4)' = 0$

$gain(C_5)' = 0$

$gain(C_6)' = -1$

i=2 (move C_2)



$gain(C_1)' = 1$

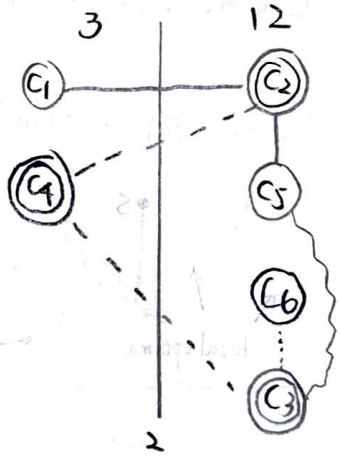
$gain(C_4)' = -1$

$gain(C_5)' = -1$

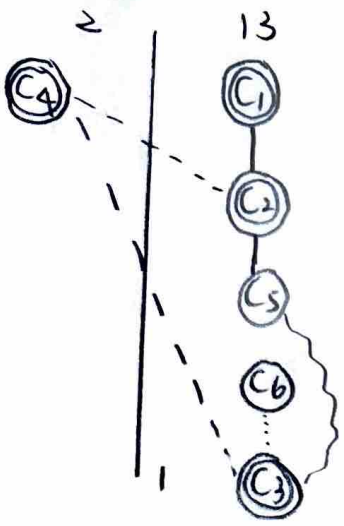
⇒ gain max 為 C_1

但會不 balance ⇒ C_4

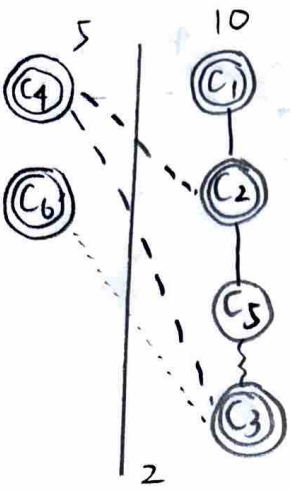
i=3 (move C_4)



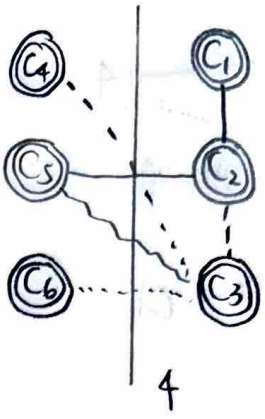
i = 4 (move C_1)



i = 5 (move C_6)



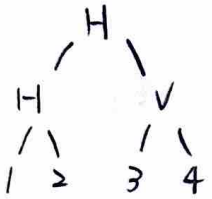
i = 6 (move C_5)



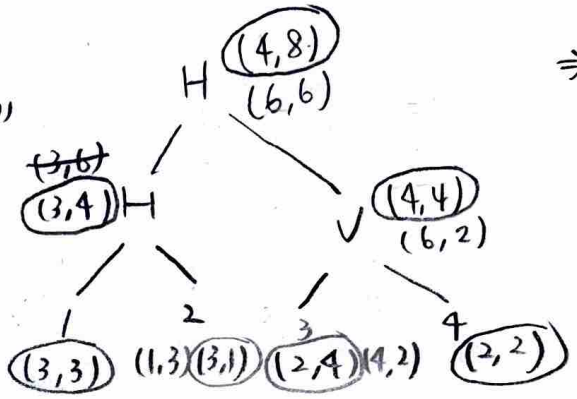
gain $(C_5)' = -2$

6.

(a)



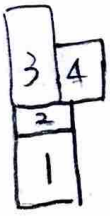
(b)



⇒ 4 × 8 rectangle

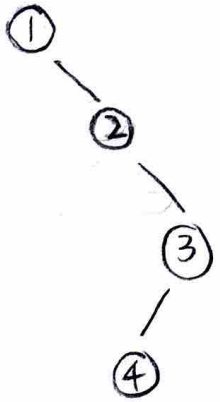
⇒ area = 32

(c)

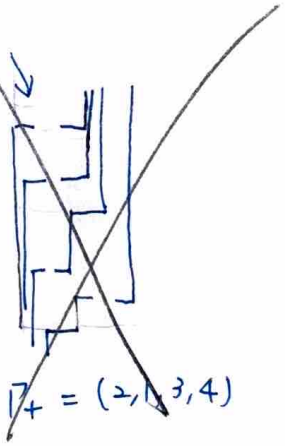


⇒

B* tree

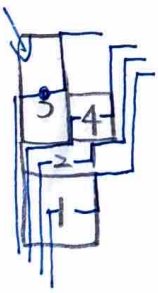


(d)

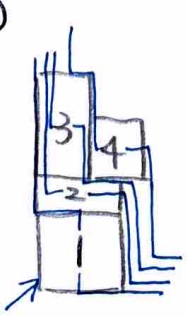


$\Gamma_+ = (2, 1, 3, 4)$

(d)

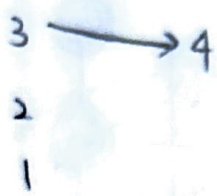


$\Gamma_+ = \{3, 4, 2, 1\}$

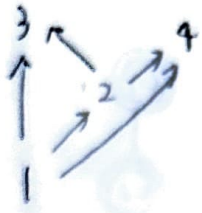


$\Gamma_- = \{1, 2, 3, 4\}$

(e)

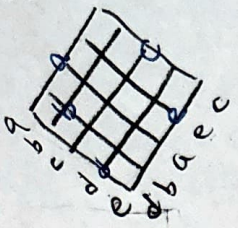


Ch

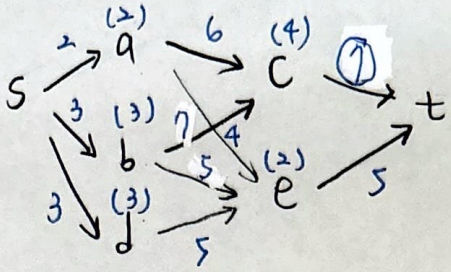


Cv

7. (a)

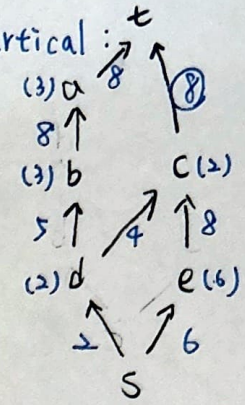


horizontal:



width: longest path = 7

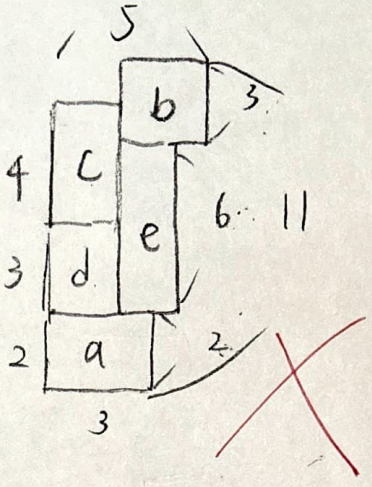
vertical:



height: longest path = 8

⇒ minimum area: 7 × 8 = 56 ※

(b)



11 × 5 = 55 ※