離散數學 107-2 Homework 10

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Handout: 2019.06.3 (week-16)

題目

題目與注意事項

作答區

解題

完成作業小時數

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Homework 10 題目

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(Prob. 1) page 683, chapter 10.1 Exercise 2
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(Prob. 2) page 699, chapter 10.2 Exercise 8

(Prob. 3) page 710, chapter 10.3 Exercise 8

(Prob. 4) page 724, chapter 10.4 Exercise 2

(Prob. 5) page 741, chapter 10.5 Exercise 54

(Prob. 6) page 753, chapter 10.6 Exercise 26

(Prob. 7) page 761, chapter 10.7 Exercise 14

(Prob. 8) page 768, chapter 10.8 Exercise 6

題目 00

注意事項

- (a) 要熟悉 LaTeX 請翻閱 Ishort。
- (b) 記得在最後一頁,回報完成作業小時數(估算,取整數)。
- (c) 將檔案夾命名為 hw10 107820xxx,將檔案夾壓縮成 hw10_107820xxx.zip,上傳到網路學園。
- (d) LaTeX 數學符號請查此表: List of LaTeX mathematical symbols。
- (e) 作業抄襲,以零分計。作業提供給他人抄襲,以零分計。
- (f) 作業遲交一週內成績打五折,作業遲交超過一週以零分計。

Problem 1 (10.1 Exercise 2)

- (a) simple graph
- (b) multigraph
- (c) pseudograph

Problem 2 (10.2 Exercise 8)

Ans: In this directed multigraph there are <u>4</u> vertices and <u>8</u> edges.

The degrees are:

$$\deg^-(a) = 2$$
, $\deg^+(a) = 2$,

$$\deg^-(b) = 3$$
, $\deg^+(b) = 4$,

$$\deg^-(c) = 2$$
, $\deg^+(c) = 1$,

$$\deg^-(d) = 1$$
, $\deg^+(d) = 1$,

Problem 3 (10.3 Exercise 8)

Problem 4 (10.4 Exercise 2)

- (a) This <u>is</u> (is, is not) a path of length <u>4</u>, it <u>is not</u> (is, is not) a circuit, it <u>is</u> (is, is not) simple.
- (b) This <u>is</u> (is, is not) a path of length <u>4</u>, it <u>is</u> (is, is not) a circuit, it <u>is not</u> (is, is not) simple.
- (c) This <u>is not</u> (is, is not) a path, since there is no edge from d to b.
- (d) This <u>is not</u> (is, is not) a path, since there is no edge from b to d.

Problem 5 (10.5 Exercise 54)

Ans:

__. An Euler_ (An Euler, A Hamilton) path will cover every link, so it can be used to test the links.

<u>A Hamilton</u> (An Euler, A Hamilton) path will cover all the devices, so it can be used to test the devices.

Problem 6 (10.6 Exercise 26)

- (a) Circuit: a-b-c-d-e-a, Weight = 3 + 10 + 6 + 1 + 7 = 27
- (b) Circuit: a-b-c-e-d-a, Weight = 3 + 10 + 5 + 1 + 4 = 23
- (c) Circuit: a-b-d-c-e-a, Weight = 3 + 9 + 6 + 5 + 7 = 30
- (d) Circuit: a-b-d-e-c-a, Weight = 3 + 9 + 1 + 5 + 8 = 26
- (e) Circuit: a-b-e-c-d-a, Weight = 3 + 2 + 5 + 6 + 4 = 20
- (f) Circuit: a-b-e-d-c-a, Weight = 3 + 2 + 1 + 6 + 8 = 20
- (g) Circuit: a-c-b-d-e-a, Weight = 8 + 10 + 9 + 1 + 7 = 35
- (h) Circuit: a-c-b-e-d-a, Weight = 8 + 10 + 2 + 1 + 4 = 25
- (i) Circuit: a-c-d-b-e-a, Weight = 8 + 6 + 9 + 2 + 7 = 32
- (j) Circuit: a-c-e-b-d-a, Weight = 8 + 5 + 2 + 9 + 4 = 28
- (k) Circuit: a-d-b-c-e-a, Weight = 4 + 9 + 10 + 5 + 7 = 35
- (I) Circuit: a-d-c-b-e-a, Weight = 4 + 6 + 10 + 2 + 7 = 29

The circuits <u>a,b,e,c,d,a</u> and <u>a,b,e,d,c,a</u> are the ones with minimum total weight.

Problem 7 (10.7 Exercise 14)

Ans:

Euler's formula says that v - e + r = 2.

We are given e = 30 and r = 20.

Therefore v = e - r + 2 = 30 - 20 + 2 = 12.

Problem 8 (10.8 Exercise 6)

Ans: Since there is a triangle in the graph, we will need at least 3 colors. Because vertex g is connected to all other vertices, so it needs to be assigned a unique color. Then we can assign one color to b,d and f and another to a,c and e.

完成作業小時數

完成作業小時數:共4 小時(估算,取整數)