

## 資料結構 HW7

運管 15

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內容說明：

test1 和 test2.txt 為老師 site 上的測資，第一排要輸入測資的  $n$ , range, if  $w(e)$ ,  $w(e)=$  ，接下來再輸入相鄰矩陣。

執行結果：

1. Generate a graph  $G=(V, E)$  in random, the weights and density of the edges in  $G$  can be assigned by user:

The screenshot shows a software application window titled "Form1" with a light blue header bar. The window is divided into two main sections. The left section contains input fields for generating a graph and options for solving shortest paths. The right section displays the generated graph's adjacent matrix and other related data.

**Form1**

Read G

Randomly generated

n = 10

range(w(e)) = 1000

if w(e) > 250

w(e) = 99999

source = 3

Generate G

Shortest path solver

☒ Print result

Single source all destinations

All pairs

Transitive closures

G's adjacent matrix   Graph in adjacent matrix   SSAD tables   All pairs   All pairs table   TransitiveClosure

	0	1	2	3	4	5	6
▶ 0	99999	99999	99999	99999	99999	99999	99999
1	99999	99999	41	99999	160	99999	99999
2	99999	41	99999	99999	99999	99999	99999
3	99999	99999	99999	99999	84	99999	99999
4	99999	160	99999	84	99999	99999	99999
5	99999	99999	99999	99999	99999	99999	99999
6	99999	99999	99999	99999	99999	99999	99999
7	99999	99999	99999	120	121	99999	99999
8	99999	99999	99999	99999	99999	144	115
• 9	190	99999	99999	99999	99999	99999	99999



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w(e) = 99999

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Generate G

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		5	6	7	8	9	from
▶ 0	999	99999	99999	99999	99999	99999	3
1	4	244	244	244	244	244	4
2	5	285	285	285	285	285	1
3		0	0	0	0	0	3
4		84	84	84	84	84	3
5	999	99999	99999	99999	99999	99999	3
6	999	99999	99999	99999	99999	99999	3
7	0	120	120	120	120	120	3
8	999	99999	99999	99999	99999	99999	3
• 9	999	99999	99999	99999	99999	99999	3

3. Find shortest distance between and two points

Form1

Read G

Randomly generated

n = 10

range(w(e)) = 1000

if w(e) > 250

w(e) = 99999

source = 3

Generate G

Shortest path solver

☒ Print result

Single source all destinations

All pairs

Transitive closures

G's adjacent matrix   Graph in adjacent matrix   SSAD tables   All pairs   All pairs table   TransitiveClosure

	0	1	2	3	4	5	6
▶ 0	0	99999	99999	99999	99999	533	504
1	99999	0	41	244	160	99999	99999
2	99999	41	0	285	201	99999	99999
3	99999	244	285	0	84	99999	99999
4	99999	160	201	84	0	99999	99999
5	533	99999	99999	99999	99999	0	259
6	504	99999	99999	99999	99999	259	0
7	99999	281	322	120	121	99999	99999
8	389	99999	99999	99999	99999	144	115
• 9	190	99999	99999	99999	99999	343	314



Form1

Read G

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range(w(e)) = 1000

if w(e) > 250

w(e) = 99999

source = 3

Generate G

Shortest path solver

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Single source all destinations

All pairs

Transitive closures

G's adjacent matrix   Graph in adjacent matrix   SSAD tables   All pairs   All pairs table   TransitiveClosure

	3	4	5	6	7	8	9
▶ 0	0	0	9	9	0	9	0
1	4	1	1	1	4	1	1
2	4	1	2	2	4	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	8	5	5	8
6	5	6	8	6	6	6	8
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
* 9	9	9	8	8	9	9	9

5. Find transitive closure of the given graph.

Form1

Read G

Randomly generated

n = 10

range(w(e)) = 1000

if w(e) > 250

w(e) = 99999

source = 3

Generate G

Shortest path solver

☒ Print result

Single source all destinations

All pairs

Transitive closures

G's adjacent matrix   Graph in adjacent matrix   SSAD tables   All pairs   All pairs table   TransitiveClosure

	0	1	2	3	4	5	6
▶ 0	1	0	0	0	0	1	1
1	0	1	1	1	1	0	0
2	0	1	1	1	1	0	0
3	0	1	1	1	1	0	0
4	0	1	1	1	1	0	0
5	1	0	0	0	0	1	1
6	1	0	0	0	0	1	1
7	0	1	1	1	1	0	0
8	1	0	0	0	0	1	1
* 9	1	0	0	0	0	1	1

Form1

Read G

Randomly generated

n = 10

range(w(e)) = 1000

if w(e) > 250

w(e) = 99999

source = 3

Generate G

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Single source all destinations

All pairs

Transitive closures

G's adjacent matrix   Graph in adjacent matrix   SSAD tables   All pairs   All pairs table   TransitiveClosure

	3	4	5	6	7	8	9
0	0	0	1	1	0	1	1
1	1	1	0	0	1	0	0
2	1	1	0	0	1	0	0
3	1	1	0	0	1	0	0
4	1	1	0	0	1	0	0
5	0	0	1	1	0	1	1
6	0	0	1	1	0	1	1
7	1	1	0	0	1	0	0
8	0	0	1	1	0	1	1
9	0	0	1	1	0	1	1

6. Report the shortest paths from the source to all destinations

Form1

Read G

Randomly generated

n = 10

range(w(e)) = 1000

if w(e) > 250

w(e) = 99999

source = 3

Generate G

Shortest path solver

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```

min: 4
min: 7
min: 1
min: 2
min: 5
min: 6
min: 0
min: 8
min: 9
The shortest distance from 3 to 0 is 99999 with path 3--[99999]-->0
The shortest distance from 3 to 1 is 244 with path 3--[84]-->4--[160]-->1
The shortest distance from 3 to 2 is 285 with path 3--[84]-->4--[160]-->1--[41]-->2
The shortest distance from 3 to 4 is 84 with path 3--[84]-->4
The shortest distance from 3 to 5 is 99999 with path 3--[99999]-->5
The shortest distance from 3 to 6 is 99999 with path 3--[99999]-->6
The shortest distance from 3 to 7 is 120 with path 3--[120]-->7
The shortest distance from 3 to 8 is 99999 with path 3--[99999]-->8
The shortest distance from 3 to 9 is 99999 with path 3--[99999]-->9

The shortest distance from 0 to 1 is 99999 with path 0--[99999]-->1
The shortest distance from 0 to 2 is 99999 with path 0--[99999]-->2
The shortest distance from 0 to 3 is 99999 with path 0--[99999]-->3
The shortest distance from 0 to 4 is 99999 with path 0--[99999]-->4
The shortest distance from 0 to 5 is 533 with path 0--[190]-->9--[343]-->5
The shortest distance from 0 to 6 is 504 with path 0--[190]-->9--[314]-->6

```