

■ MongoDB

1. Task1

```
C:\Users\dinci>mongoimport --db hw6_0605 --collection students --type csv --headerline --file "C:\mongoDB\data\studentE.csv"
2024-06-05T17:38:23.856+0800    connected to: mongodb://localhost/
2024-06-05T17:38:23.928+0800    103 document(s) imported successfully. 0 document(s) failed to import.
C:\Users\dinci>
```

```
hw6> use hw6_0605
switched to db hw6_0605
```

```
hw6_0605> db.students.find({_id: 'r12631001'});
[
  {
    _id: 'r12631001',
    position: '學生',
    dept: '生物機電所',
    year: 1,
    name: '許喬淇 (HSU, CHIAO-CHI)',
    email: 'r12631001@ntu.edu.tw',
    class: '資料庫系統-從SQL到NoSQL (EE5178)'
  }
]
```

2. Task2

```
hw6_0605> db.students.aggregate({ $match: { position: "學生" } }, { $group: { _id: "$dept", total: { $sum: 1 } } }, { $sort: { total: -1 }, { $limit: 10 } });
[
  { _id: '資工所', total: 14 },
  { _id: '電機所', total: 11 },
  { _id: '生物機電所', total: 8 },
  { _id: '經濟系', total: 6 },
  { _id: '電機系', total: 6 },
  { _id: '資訊管理所', total: 5 },
  { _id: '電信所', total: 5 },
  { _id: '生物機電系', total: 4 },
  { _id: '資工系', total: 4 },
  { _id: '工科海洋所', total: 3 }
]
```

3. Task3

```
C:\Users\dinci>mongoimport --db hw6_0605 --collection students --type csv --headerline --file "C:\mongoDB\data\new_studentE.csv"
2024-06-05T17:42:27.155+0800    connected to: mongodb://localhost/
2024-06-05T17:42:27.228+0800    3 document(s) imported successfully. 0 document(s) failed to import.
```

```
hw6_0605> db.students.updateMany({}, { $set: { updated: ISODate("2024-05-23") } });
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 106,
  modifiedCount: 106,
  upsertedCount: 0
}
```

```
hw6_0605> db.students.find({ dept: '生物機電所' });
[
  {
    _id: 'r12631001',
    position: '學生',
    dept: '生物機電所',
    year: 1,
    name: '許喬淇 (HSU, CHIAO-CHI)',
    email: 'r12631001@ntu.edu.tw',
    class: '資料庫系統-從SQL到NoSQL (EE5178)',
    updated: ISODate('2024-05-23T00:00:00.000Z')
  },
  {
    _id: 'r12631009',
    position: '學生',
    dept: '生物機電所',
    year: 1,
    name: '謝欣妤 (HSIEH, HSIN-YU)',
    email: 'r12631009@ntu.edu.tw',
    class: '資料庫系統-從SQL到NoSQL (EE5178)',
    updated: ISODate('2024-05-23T00:00:00.000Z')
  },
  {
    _id: 'r12631012',
    position: '學生',
    dept: '生物機電所',
    year: 1,
    name: '連震宇 (LIAN, JEN-YU)',
    email: 'r12631012@ntu.edu.tw',
    class: '資料庫系統-從SQL到NoSQL (EE5178)',
    updated: ISODate('2024-05-23T00:00:00.000Z')
  },
]
```

```
{
  _id: 'r12631013',
  position: '學生',
  dept: '生物機電所',
  year: 1,
  name: '鄭朝鴻 (CHAO HUNG, JENG)',
  email: 'r12631013@ntu.edu.tw',
  class: '資料庫系統-從SQL到NoSQL (EE5178)',
  updated: ISODate('2024-05-23T00:00:00.000Z')
},
{
  _id: 'r12631014',
  position: '學生',
  dept: '生物機電所',
  year: 1,
  name: '蔡知芸 (TSAI, CHIH-YUN)',
  email: 'r12631014@ntu.edu.tw',
  class: '資料庫系統-從SQL到NoSQL (EE5178)',
  updated: ISODate('2024-05-23T00:00:00.000Z')
},
{
  _id: 'r12631025',
  position: '學生',
  dept: '生物機電所',
  year: 1,
  name: '白騏瑞 (BAI, CI-RUEI)',
  email: 'r12631025@ntu.edu.tw',
  class: '資料庫系統-從SQL到NoSQL (EE5178)',
  updated: ISODate('2024-05-23T00:00:00.000Z')
},
]
```

```

{
  _id: 'r12631069',
  position: '學生',
  dept: '生物機電所',
  year: 1,
  name: '洪旭初 (HONG, XU-CHU)',
  email: 'r12631069@ntu.edu.tw',
  class: '資料庫系統-從SQL到NoSQL (EE5178)',
  updated: ISODate('2024-05-23T00:00:00.000Z')
},
{
  _id: 'r12631036',
  position: '學生',
  dept: '生物機電所',
  year: 1,
  name: '陳思齊 (CHEN, SSU-CHI)',
  email: 'r12631036@ntu.edu.tw',
  class: '資料庫系統-從SQL到NoSQL (EE5178)',
  updated: ISODate('2024-05-23T00:00:00.000Z')
}
]

```

4. Task4

```

hw6_0605> db.students.updateMany({ _id: { $in: ['b19303008', 'b19303129', 'r09303019', 'r12631001'] }
}, { $set: { updated: ISODate("2024-06-01") } });
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 4,
  modifiedCount: 4,
  upsertedCount: 0
}

```

```

hw6_0605> db.students.find({ _id: { $in: ['b19303008', 'b19303129', 'r09303019', 'r12631001'] } });
[
  {
    _id: 'b19303008',
    position: '學生',
    dept: '太空系',
    year: 4,
    name: '劉海王 (LIU, NEPTUNE)',
    email: 'b19303008@ntu.edu.tw',
    class: '資料庫系統-從SQL到NoSQL (EE5178)',
    updated: ISODate('2024-06-01T00:00:00.000Z')
  },
  {
    _id: 'b19303129',
    position: '學生',
    dept: '太空所',
    year: 2,
    name: '吳火箭 (WU, ROCKET)',
    email: 'r19303129@ntu.edu.tw',
    class: '資料庫系統-從SQL到NoSQL (EE5178)',
    updated: ISODate('2024-06-01T00:00:00.000Z')
  },
  {
    _id: 'r09303019',
    position: '學生',
    dept: '太空所',
    year: 1,
    name: '黃人馬 (HUANG, CENTAURUS)',
    email: 'r09303019@ntu.edu.tw',
    class: '資料庫系統-從SQL到NoSQL (EE5178)',
    updated: ISODate('2024-06-01T00:00:00.000Z')
  }
]

```

```

{
  _id: 'r12631001',
  position: '學生',
  dept: '生物機電所',
  year: 1,
  name: '許喬淇 (HSU, CHIAO-CHI)',
  email: 'r12631001@ntu.edu.tw',
  class: '資料庫系統-從SQL到NoSQL (EE5178)',
  updated: ISODate('2024-06-01T00:00:00.000Z')
}
]

```

5. Task5

```

hw6_0605> db.students.aggregate([{$match: { updated: { $gte: ISODate("2024-01-01"), $lte: ISODate("2024-05-31") } } }, {$group: { _id: "$dept", totalStudents: { $sum: 1 } } }, {$out: "tally"}]);

```

```

hw6_0605> db.tally.find();
[
  { _id: '土木所CAE組', totalStudents: 1 },
  { _id: '工管系科管組', totalStudents: 1 },
  { _id: '土木所水利組', totalStudents: 1 },
  { _id: '資工系', totalStudents: 5 },
  { _id: '電信所', totalStudents: 6 },
  { _id: '生物機電系', totalStudents: 4 },
  { _id: '基因學位學程', totalStudents: 1 },
  { _id: '工管系企管組', totalStudents: 1 },
  { _id: '材料所應材班', totalStudents: 1 },
  { _id: '生醫電資所', totalStudents: 1 },
  { _id: '機械系', totalStudents: 1 },
  { _id: '工科海洋所', totalStudents: 3 },
  { _id: '經濟系', totalStudents: 6 },
  { _id: '電機所', totalStudents: 12 },
  { _id: '醫工系', totalStudents: 2 },
  { _id: '動科系', totalStudents: 2 },
  { _id: '生物機電所', totalStudents: 7 },
  { _id: '電機系', totalStudents: 8 },
  { _id: '材料系', totalStudents: 1 },
  { _id: '材料所', totalStudents: 1 }
]
Type "it" for more
hw6_0605> it
[
  { _id: '流預所', totalStudents: 1 },
  { _id: '財金系', totalStudents: 1 },
  { _id: '', totalStudents: 2 },
  { _id: '網媒所', totalStudents: 3 },
  { _id: '資工所', totalStudents: 15 },
  { _id: '資訊管理所', totalStudents: 5 },
  { _id: '機械所製造組', totalStudents: 2 },
  { _id: '機械所固力組', totalStudents: 2 },
  { _id: '土木所營管組', totalStudents: 2 },
  { _id: '政治所', totalStudents: 3 },
  { _id: '森林環資所', totalStudents: 1 }
]

```

```

hw6_0605> db.tally.find();
[
  { _id: '生物機電所', totalStudents: 1 },
  { _id: '太空所', totalStudents: 2 },
  { _id: '太空系', totalStudents: 1 }
]

```

6. Task6

```

C:\Users\dinci>mongoimport --db hw6_0605 --collection students --type csv --file "C:\mongoDB\data\student_groupE.csv" --mode merge --headerline
2024-06-05T17:53:39.499+0800 connected to: mongodb://localhost/
2024-06-05T17:53:39.560+0800 93 document(s) imported successfully. 0 document(s) failed to import.

```

```

hw6_0605> db.students.find({_id: 'r12631001'});
[
  {
    _id: 'r12631001',
    position: '學生',
    dept: '生物機電所',
    year: 1,
    name: '許喬淇 (HSU, CHIAO-CHI)',
    email: 'r12631001@ntu.edu.tw',
    class: '資料庫系統-從SQL到NoSQL (EE5178)',
    updated: ISODate('2024-06-01T00:00:00.000Z'),
    group: 1
  }
]

```

7. Task7

```

hw6_0605> db.students.aggregate([
...   {
...     $match: { group: { $exists: true, $ne: null } } // Exclude students without a group number
...   },
...   {
...     $group: {
...       _id: "$group",
...       groupMembers: { $push: "$name" }
...     }
...   },
...   {
...     $project: {
...       _id: 0, // Exclude the _id field from the output
...       group: "$_id", // Rename _id field to group
...       groupMembers: 1
...     }
...   }
... ]);
[
  {
    groupMembers: [
      '許喬淇 (HSU, CHIAO-CHI)',
      '謝欣婷 (HSIEH, HSIN-YU)',
      '連震宇 (LIAN, JEN-YU)',
      '鄭朝鴻 (CHAO HUNG, JENG)'
    ],
    group: 1
  },
  {
    groupMembers: [
      '周哲瑋 (CHOU, CHE-WEI)',
      '王偉力 (WANG, WEI-LI)',
      '吳吉加 (CHI-CHIA WU)',
      '鄧雅文 (TENG, YA-WEN)'
    ],
    group: 7
  }
]

```

```
{
  groupMembers: [
    '賴宇辰 (LAI, YU/CHEN)',
    '王奕翔 (Wang Yi-Hsiang)',
    '許國昌 (KUO-CHANG HSU)'
  ],
  group: 24
},
{
  groupMembers: [
    '王禹翔 (WANG YU-HSIANG)',
    '張瑋哲 (CHANG, WEI-CHE)',
    '劉育君 (YU-CHUN LIU)',
    '劉盈婷 (LIU, YING-YU)'
  ],
  group: 10
},
{
  groupMembers: [
    '蔡知芸 ( TSAI, CHIH-YUN)',
    '白騏瑞 (BAI, CI-RUEI)',
    '陳思齊 (CHEN, SSU-CHI)',
    '葉政翔 (ZHENG-XIANG YE)'
  ],
  group: 14
},
{
  groupMembers: [
    '曾光良 (TSENG, KUANG-LIANG)',
    '陳映璇 (YING-HSUAN CHEN)',
    '郭承諺 (CHENG-YEN KUO)',
    '卓均而 (CHO, CHUN-ERH)'
  ],
  group: 6
},
}
```

```

{
  groupMembers: [
    '林志瑋 (ZHI-XUAN, LIN)',
    '廖甜雅 (LIAO, TIEN-YA)',
    '吳東鴻 (WU, DONG-HONG)',
    '謝承恩 (HSIEH, CHENG-EN)'
  ],
  group: 19
},
{
  groupMembers: [
    '李哲維 (LEE, ZER-WEI)',
    '費俊昱 (CHUN-YU FEI)',
    '沈信宏 (SHEN, XIN-HONG)'
  ],
  group: 23
},
{
  groupMembers: [
    '張瀚文 (CHANG HAN-WEN)',
    '張容誠 (JUNG-CHENG CHANG)',
    '謝廷寬',
    '黃柏儒 (HUANG, BO-RU)'
  ],
  group: 16
},
{
  groupMembers: [
    '賴翰霖 (HAN-LIN LAI)',
    '江浩辰 (JIANG, HAO-CHEN)',
    '丁柏豪 (PO-HAO TING)',
    '陳乙馨 (CHEN, I-HSIN)'
  ],
  group: 3
},
}

```

```

{
  groupMembers: [
    '林睿霖 (LIN, RUEI-LIN)',
    '李胤楷 (Lee, yin-kai)',
    '林翰丞 (LIN, HAN-HSIN)',
    '林峻佑 (LIN, CHUN-YU)'
  ],
  group: 5
},
{
  groupMembers: [
    '許敬銓 (CHIH-CHUAN HSU)',
    '陳冠霖 (CHEN, GUAN-LIN)',
    '吳建勳 (WU, JIAN-HAN)',
    '林郁敬 (LIN, YU-MIN)'
  ],
  group: 9
},
{
  groupMembers: [
    '周昱宏 (CHOU, YU-HONG)',
    '楊沛蓉 (PEI-RONG YANG)',
    '林佳儀 (LIN, CHIA-YI)',
    '陳伶均 (CHEN, LING-CHUN)'
  ],
  group: 8
},
{
  groupMembers: [ '彭昱齊 (PENG YUCHI)', '楊冠柏 (YANG, GUAN-BO)', '吳柏賢 (WU PO-HSIEN)' ],
  group: 22
},
}

```

```

{
  groupMembers: [
    '鍾靖詮 (CHUNG, CHING-CHUAN)',
    '黃冠綸 (HUANG, GUAN-LUN)',
    '劉殊豆 (SHU-DOU, LIU)',
    '李宇軒 (LEE, YU-HSUAN)'
  ],
  group: 2
},
{
  groupMembers: [
    '李語婕 (LEE, YU-CHIEH)',
    '陳沛妤 (PEI-YU CHEN)',
    '游景恩 (YU, JING-EN)',
    '張心瑜 (CHANG, HSIN-YU)'
  ],
  group: 4
},
{
  groupMembers: [
    '晏文芳 (YEN, WEN-FANG)',
    '張乃恩 (ZHANG, NAI-EN)',
    '洪旭初 (HONG, XU-CHU)',
    '陳冠甫 (GUAN-FU, CHEN)'
  ],
  group: 18
},
{
  groupMembers: [
    '陳品文 (CHEN, PIN-WEN)',
    '邱泓翊 (CHIU, hung-yi)',
    '郭子敬 (TZU-CHING KUO)',
    '蔡予恩 ( TSAI, JONAS)'
  ],
  group: 11
},

```

```

{
  groupMembers: [
    '黃 靖 (HUANG, JING)',
    '柯岱佑 (KO, DAI-YOU)',
    '楊士聖 (YANG, SHIH-SHENG)',
    '陳祈安 (CHEN, CHI-AN)'
  ],
  group: 21
},
{
  groupMembers: [
    '呂彥欣 (LU, YAN-XIN)',
    '李英碩 (LEE YING-SHUO)',
    '高子維 (KAO, TZU-WEI)',
    '郭沛孚 (GUO, PEI-FU)'
  ],
  group: 13
}

```



```
Type "it" for more
hw6_0605> it
[
  {
    groupMembers: [
      '薛 龍 (HSUEH, LUNG)',
      '鄭 淳 哲 (CHENG CHUN-TSE)',
      '曹 宸 睿 (Chen Jui Tsao)',
      '毛 翊 堯 (MAO YI CHEN)'
    ],
    group: 15
  },
  {
    groupMembers: [
      '劉家妮 (CHIA-NIH LIU)',
      '蔡承耘 ( TSAI, CHENG-YUN)',
      '吳東諺 (WU, TUNG-YEN)',
      '陳彥亨 (1)'
    ],
    group: 12
  },
  {
    groupMembers: [
      '侯貝霖 (PEI-LIN HOU)',
      '黃于軒 (HUANG, YU-hsUAN)',
      '包杰修 (PAO, CHIEH-HSIU)',
      '劉瑄穎 (LIU, HSUAN-YING)'
    ],
    group: 17
  },
  {
    groupMembers: [
      '廖有弘 (YOU-HONG LIAO)',
      '許景滄 (HSU CHING YU)',
      '劉庭均 (Liu, ting-chun)',
      '吳承義 (WU, CHENG-XI)'
    ],
    group: 20
  }
]
```

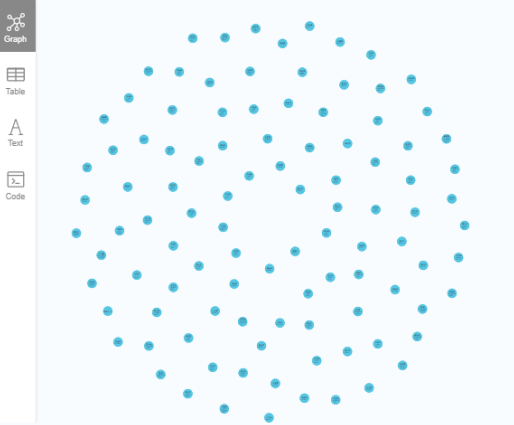
■ Neo4j

1. Task1

```
1 LOAD CSV WITH HEADERS FROM 'file:///studentE.csv' AS row
2 CREATE (:student {studentId: row._id, position: row.position, dept:row.dept, year:row.year, name:row.name, email:row.email,
class:row.class});
```

Added 103 labels, created 103 nodes, set 719 properties, completed after 65 ms.

neo4j\$ MATCH (s:student) RETURN s;

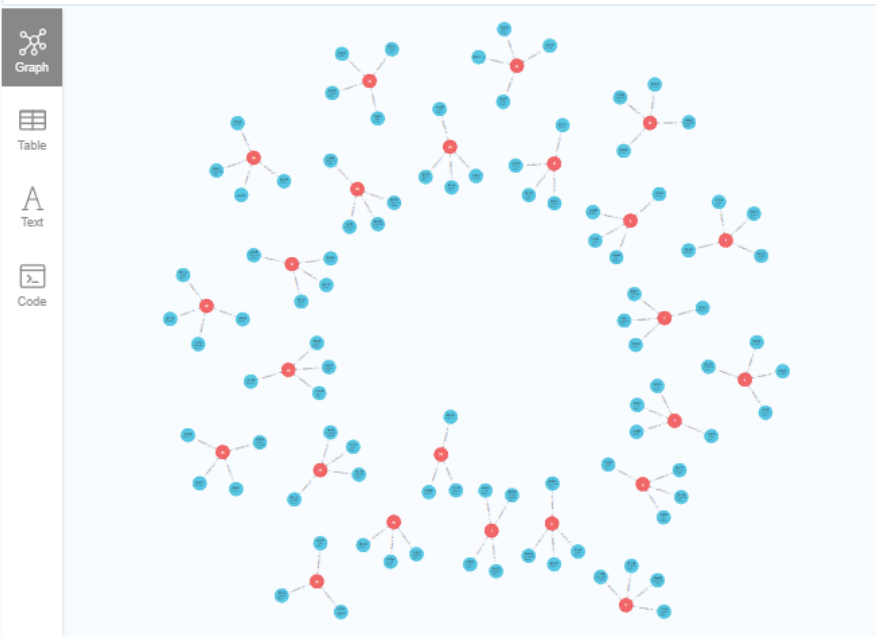


2. Task2

```
1 LOAD CSV WITH HEADERS FROM 'file:///student_groupE.csv' AS row
2 MATCH (s:student {studentId: row._id})
3 MERGE (g:group {name: row.group})
4 MERGE (s)-[:MEMBER_OF]→(g);
```

Added 24 labels, created 24 nodes, set 24 properties, created 93 relationships, completed after 103 ms.

neo4j\$ MATCH (s:student)-[:MEMBER_OF]→(g:group) RETURN s, g;



Overview

Node labels

* (117) student (93) group (24)

Relationship types

* (93) MEMBER_OF (93)

Displaying 117 nodes, 0 relationships.

3. Task3

```
1 MATCH (me:student {studentId: "r12631001"})-[:MEMBER_OF]→(g:group)←[:MEMBER_OF]-(partner:student)
2 WITH me, collect(partner.name) AS partners
3 RETURN me.name AS YourName, partners
```

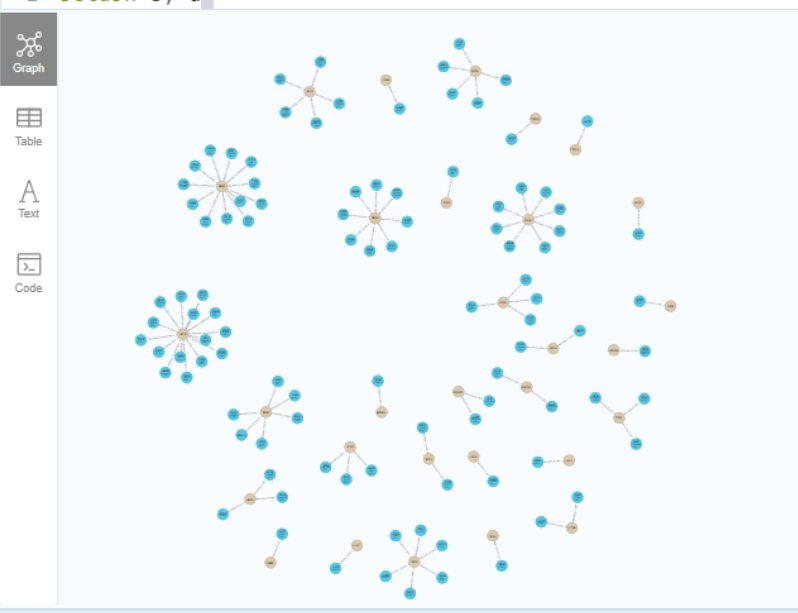
	YourName	partners
1	"許喬淇 (HSU, CHIAO-CHI)"	["連震宇 (LIAN, JEN-YU)", "謝欣妤 (HSIEH, HSIN-YU)", "鄭朝鴻 (CHAO HUNG, JENG)"]

4. Task4

```
1 MATCH (s:student)
2 WHERE s.dept IS NOT NULL AND s.dept <> ""
3 MERGE (d:Department {name: s.dept})
4 MERGE (s)-[:BELONGS_TO_DEPARTMENT]→(d)
```

Added 30 labels, created 30 nodes, set 30 properties, created 101 relationships, completed after 27 ms.

```
1 MERGE (s:student)-[:BELONGS_TO_DEPARTMENT]→(d:Department)
2 return s, d
```



5. Task5

1 MATCH (s:student)

2 WHERE s.position = '學生'

3 WITH s.dept AS department, COUNT(s) AS studentCount

4 RETURN department, studentCount

5 ORDER BY studentCount DESC

6 LIMIT 10

	department	studentCount
1	"資工所"	14
2	"電機所"	11
3	"生物機電所"	8
4	"經濟系"	6
5	"電機系"	6
6	"資訊管理所"	5

5

6

7

8

9

10

	department	studentCount
5	"電機系"	6
6	"資訊管理所"	5
7	"電信所"	5
8	"生物機電系"	4
9	"資工系"	4
10	"工科海洋所"	3

6. Task6

```
1 MATCH (s:student)-[:MEMBER_OF]→(g:group)
2 WHERE s.dept IS NOT NULL AND s.dept <> ""
3 WITH g.name AS groupName, COLLECT(DISTINCT s.dept) AS departments
4 ORDER BY SIZE(departments) DESC
5 LIMIT 5
6 WITH groupName, departments
7 ORDER BY groupName ASC
8 RETURN groupName AS groupNumber, departments
```

	groupNumber	departments
1	"10"	["材料所應材班", "材料所", "資工所", "材料系"]
2	"17"	["電機系", "機械所固力組", "經濟系", "機械所製造組"]
3	"3"	["電機所", "網媒所", "資工所"]
4	"4"	["電機所", "網媒所", "資工所"]
5	"6"	["生醫電資所", "資工所", "網媒所"]

7. Task7

```
1 MATCH (me:student {studentId:"r12631001"})-[:MEMBER_OF]→(g:group)←[:MEMBER_OF]-(partner:student)
2 MATCH (s:student)
3 WHERE s.dept = partner.dept AND s.class = me.class
4 RETURN partner.name AS partner_name, partner.dept AS dept_name, COUNT(s) AS dept_size
```

	partner_name	dept_name	dept_size
1	"連雲宇 (LIAN, JEN-YU)"	"生物機電所"	8
2	"謝欣婷 (HSIEH, HSIN-YU)"	"生物機電所"	8
3	"鄭朝鴻 (CHAO HUNG, JENG)"	"生物機電所"	8