

■ 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: '白駿瑞 (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)',  
      '謝欣妤 (HSIEH, HSIN-YU)',  
      '連震宇 (LIAN, JEN-YU)',  
      '鄭朝鴻 (CHAO HUNG, JENG)',  
      '周哲璿 (CHOU, CHE-WEI)',  
      '王偉力 (WANG, WEI-LI)',  
      '吳吉加 (CHI-CHIA WU)',  
      '鄧雅文 (TENG, YA-WEN)',  
    ],  
    group: 1  
  },  
  {  
    groupMembers: [  
      '許喬淇 (HSU, CHIAO-CHI)',  
      '謝欣妤 (HSIEH, HSIN-YU)',  
      '連震宇 (LIAN, JEN-YU)',  
      '鄭朝鴻 (CHAO HUNG, JENG)',  
      '周哲璿 (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)',  
        '劉盈妤 (LIU, YING-YU)'  
    ],  
    group: 10  
},  
{  
    groupMembers: [  
        '蔡知芸 (TSAI, CHIH-YUN)',  
        '白驥瑞 (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: [  
        '林志璿 (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: [  
        '林睿森 (LIN, RUEI-LIN)',  
        '李鳳楷 (Lee, yin-kai)',  
        '林翰莘 (LIN, HAN-HSIN)',  
        '林峻佑 (LIN, CHUN-YU)'  
    ],  
    group: 5  
},  
{  
    groupMembers: [  
        '許致綱 (CHIH-CHUAN HSU)',  
        '陳冠霖 (CHEN, GUAN-LIN)',  
        '吳建翰 (WU, JIAN-HAN)',  
        '林郁敏 (LIN, YU-MIN)'  
    ],  
    group: 9  
},  
{  
    groupMembers: [  
        '周昱宏 (CHOU, YU-HONG)',  
        '楊沛蓉 (PEI-RONG YANG)',  
        '林佳儀 (LIN, CHIA-YI)',  
        '陳怜均 (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 縡 (HUANG, GUAN-LUN)',  
        '劉 妮 豆 (SHU-DOU, LIU)',  
        '李 宇 軒 (LEE, YU-HSUAN)',  
    ],  
    group: 2  
},  
{  
    groupMembers: [  
        '李 誥 婕 (LEE, YU-CHIEH)',  
        '陳 淳 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 弘 翱 (CHIU, hung-yi)',  
        '郭 子 敬 (TZU-CHING KUO)',  
        '蔡 予 恩 (TSAI, JONAS)',  
    ],  
    group: 11  
},  
{  
    groupMembers: [  
        '黃 靖 (HUANG, JING)',  
        '柯 岱 佑 (KAO, 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 淳 妗 (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)',
      '毛翊蓁 (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: [
      '廖宥弘 (YOU-HONG LIAO)',
      '許景湧 (HSU CHING YU)',
      '劉庭均 (Liu, ting-chun)',
      '吳承羲 (WU, CHENG-XI)'
    ],
    group: 20
  }
]
```

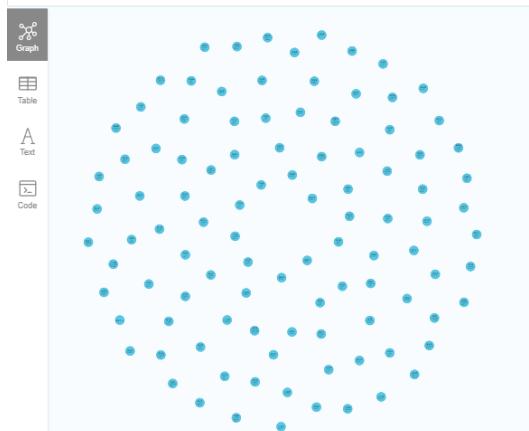
■ Neo4j

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;
```

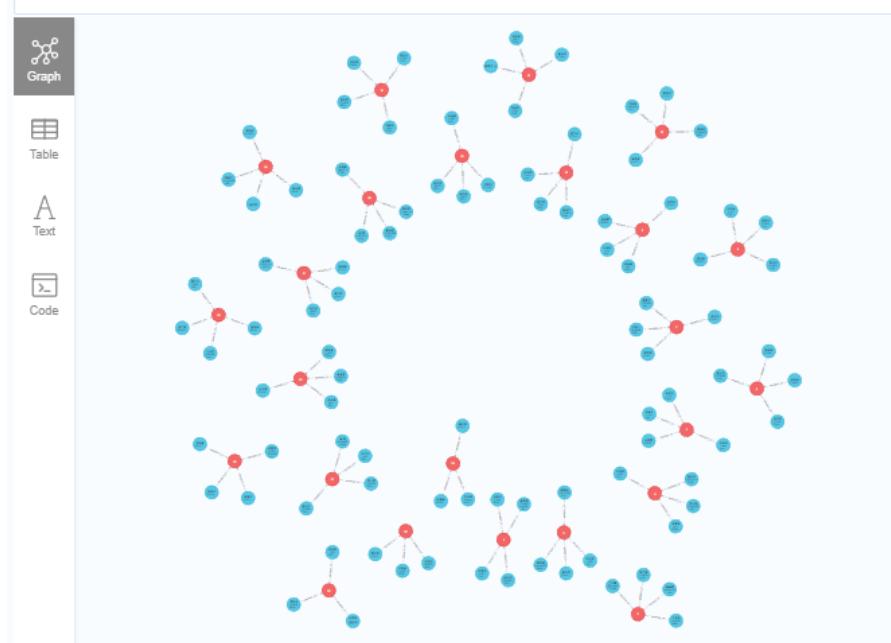


2. Task2

```
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.



Graph



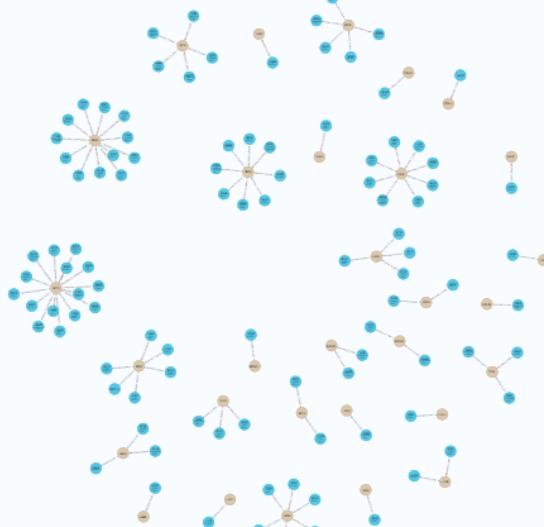
Table



Text



Code



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

	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
```

Table	groupNumber	departments
Text	1 "10"	["材料所應材班", "材料所", "資工所", "材料系"]
Code	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
```

Table	partner_name	dept_name	dept_size
Text	1 "連震宇 (LIAN, JEN-YU)"	"生物機電所"	8
Code	2 "謝欣妤 (HSIEH, HSIN-YU)"	"生物機電所"	8
	3 "鄭韻涵 (CHAO HUNG, JENG)"	"生物機電所"	8