

PART 1 – TASK 1

```
JS hw6_part1_task1.mongodb.js > ...
    Currently connected to homework6.uqfhenw.mongodb.net. Click here to change connection.
1 // TASK 1
2 use ('hw6');
3 db.students.find({ "學號": "R10945002" })
4
5
6
7
8
9
10
11
12
13
14
```

```
1 {
2
3   "_id": {
4     "$oid": "64801a0dfc04b88e94d3c05d"
5   },
6   "身份": "學生",
7   "系所": "生醫電資所",
8   "年級": 1,
9   "學號": "R10945002",
10  "姓名": "林柏詠 (LIN, BO-YONG)",
11  "信箱": "r10945002@ntu.edu.tw",
12  "班別": "資料庫系統-從SQL到NoSQL (EE5178)"
13 }
14
```

PART 1 – TASK 2

```
JS hw6_part1_task1.mongodb.js > ...
16 use ('hw6');
17 db.students.find({ "系所": "生醫電資所" })
18
19
20
21
```

```
1 {
2
3   "_id": {
4     "$oid": "64801a0dfc04b88e94d3c05d"
5   },
6   "身份": "學生",
7   "系所": "生醫電資所",
8   "年級": 1,
9   "學號": "R10945002",
10  "姓名": "林柏詠 (LIN, BO-YONG)",
11  "信箱": "r10945002@ntu.edu.tw",
12  "班別": "資料庫系統-從SQL到NoSQL (EE5178)"
13 },
14 {
15   "_id": {
16     "$oid": "64801a0dfc04b88e94d3c05f"
17   },
18   "身份": "學生",
19   "系所": "生醫電資所",
20   "年級": 1,
21   "學號": "R11945005",
22   "姓名": "郭庭沂 (KUO, TING-YI)",
23   "信箱": "r11945005@ntu.edu.tw",
24   "班別": "資料庫系統-從SQL到NoSQL (EE5178)"
25 },
26 {
27   "_id": {
28     "$oid": "64801a0dfc04b88e94d3c060"
29   },
30   "身份": "學生",
31   "系所": "生醫電資所",
32   "年級": 1,
33   "學號": "R11945018",
34   "姓名": "曾于瑄 (YU-HSUAN TSENG)",
35   "信箱": "r11945018@ntu.edu.tw",
36   "班別": "資料庫系統-從SQL到NoSQL (EE5178)"
37 },
38 {
39   "_id": {
40     "$oid": "64801a0dfc04b88e94d3c061"
41   },
42   "身份": "學生",
43   "系所": "生醫電資所",
44   "年級": 1,
45   "學號": "R11945044",
46   "姓名": "張瑜德 (ZHANG, YU-JIE)",
47   "信箱": "r11945044@ntu.edu.tw",
48   "班別": "資料庫系統-從SQL到NoSQL (EE5178)"
49 }
50 }
```

PART 1 – TASK 3

```
JS hw6_part1_task1.mongodbs.js > ...
12 db.students.aggregate([
13   {
14     $group: {
15       _id: { 系所: "$系所", 年級: "$年級" },
16       count: { $sum: 1 }
17     }
18   }
19 ]);
20
21
```

```
1 [
2   {
3     "_id": {
4       "系所": "資工系",
5       "年級": 2
6     },
7     "count": 5
8   },
9   {
10    "_id": {
11      "系所": "資工系",
12      "年級": 4
13    },
14    "count": 1
15  },
16  {
17    "_id": {
18      "系所": "基蛋所",
19      "年級": 3
20    },
21    "count": 1
22  },
23  {
24    "_id": {
25      "系所": "資料科學學程",
26      "年級": 2
27    },
28    "count": 2
29  },
30  {
31    "_id": {
32      "系所": "物理系",
33      "年級": 4
34    },
35    "count": 2
36  },
37  {
38    "_id": {
39      "系所": "土木系水利組",
40      "年級": 1
41    },
42    "count": 2
43  },
44  {
45    "_id": {
46      "系所": "生物機電系",
47      "年級": 4
48    },
49    "count": 1
50  },
51  {
52    "_id": {
53      "系所": "資管系",
54      "年級": 2
55    },
56    "count": 3
57  },
58  {
59    "_id": {
60      "系所": "電機系",
61      "年級": 1
62    },
63    "count": 16
64  },
65  {
66    "_id": {
67      "系所": "機械系系控組",
68      "年級": 1
69    },
70    "count": 1
71  },
72  {
73    "_id": {
74      "系所": "土木系電輔組",
75      "年級": 1
76    },
77    "count": 3
78  },
79  {
80    "_id": {
81      "系所": "電機系",
82      "年級": 2
83    },
84    "count": 2
85  },
86  {
87    "_id": {
88      "系所": "基蛋所",
89      "年級": 2
90    },
91    "count": 1
92  },
93 ]
```

PART 1 – TASK 4

```
JS hw6_part1_task1.mongodbs.js > ...
27 db.students.insertMany([
28   {
29     身份: "旁聽生",
30     系所: "電機所",
31     年級: 2,
32     學號: "R10123456",
33     姓名: "小紅",
34     信箱: "r10123456@ntu.edu.tw",
35     join_date: "2023-06-02",
36   },
37   {
38     身份: "學生",
39     系所: "物理系",
40     年級: 3,
41     學號: "B09987653",
42     姓名: "小黃",
43     信箱: "b09987653@ntu.edu.tw",
44     join_date: "2023-06-02",
45   },
46   {
47     身份: "觀察者",
48     系所: "電信所",
49     年級: 1,
50     學號: "R11123001",
51     姓名: "小綠",
52     信箱: "r11123001@ntu.edu.tw",
53     join_date: "2023-06-02",
54   },
55 ]);
56 db.students.find({
57   $or: [
58     { 學號: "R10945002" },
59     { join_date: "2023-06-02" }
60   ]
61 });
62
```

```
1 [
2   {
3     "_id": {
4       "$oid": "64801a0dfc04b88e94d3c05d"
5     },
6     "身份": "學生",
7     "系所": "生醫電資所",
8     "年級": 1,
9     "學號": "R10945002",
10    "姓名": "林柏諤 (LIN, BO-YONG)",
11    "信箱": "r10945002@ntu.edu.tw",
12    "班別": "資料庫系統-從SQL到NoSQL (EE5178)",
13    "join_date": "2023-03-01"
14  },
15  {
16    "_id": {
17      "$oid": "648034e3dd27123e04da4fd0"
18    },
19    "身份": "旁聽生",
20    "系所": "電機所",
21    "年級": 2,
22    "學號": "R10123456",
23    "姓名": "小紅",
24    "信箱": "r10123456@ntu.edu.tw",
25    "join_date": "2023-06-02"
26  },
27  {
28    "_id": {
29      "$oid": "648034e3dd27123e04da4fd1"
30    },
31    "身份": "學生",
32    "系所": "物理系",
33    "年級": 3,
34    "學號": "B09987653",
35    "姓名": "小黃",
36    "信箱": "b09987653@ntu.edu.tw",
37    "join_date": "2023-06-02"
38  },
39  {
40    "_id": {
41      "$oid": "648034e3dd27123e04da4fd2"
42    },
43    "身份": "觀察者",
44    "系所": "電信所",
45    "年級": 1,
46    "學號": "R11123001",
47    "姓名": "小綠",
48    "信箱": "r11123001@ntu.edu.tw",
49    "join_date": "2023-06-02"
50  }
51 ]
```

PART 1 – TASK 5

```
JS hw6_part1_task1.mongodbs.js > ...
23 db.students.updateMany({}, { $set: { join_date: "2023-03-01" } });
24 db.students.find( 系所: "生醫電資所" );
25
26
27
28
29
30
31
32
33
```

```
1 {
2
3   {
4     "_id": {
5       "$oid": "64801a0dfc04b88e94d3c05d"
6     },
7     "身份": "學生",
8     "系所": "生醫電資所",
9     "年級": 1,
10    "學號": "R10945002",
11    "姓名": "林柏詠 (LIN, BO-YONG)",
12    "信箱": "r10945002@ntu.edu.tw",
13    "班別": "資料庫系統-從SQL到NoSQL (EE5178)",
14    "join_date": "2023-03-01"
15  },
16  {
17    "_id": {
18      "$oid": "64801a0dfc04b88e94d3c05f"
19    },
20    "身份": "學生",
21    "系所": "生醫電資所",
22    "年級": 1,
23    "學號": "R11945005",
24    "姓名": "郭庭沂 (KUO, TING-YI)",
25    "信箱": "r11945005@ntu.edu.tw",
26    "班別": "資料庫系統-從SQL到NoSQL (EE5178)",
27    "join_date": "2023-03-01"
28  },
29  {
30    "_id": {
31      "$oid": "64801a0dfc04b88e94d3c060"
32    },
33    "身份": "學生",
34    "系所": "生醫電資所",
35    "年級": 1,
36    "學號": "R11945018",
37    "姓名": "曾于瑄 (YU-HSUAN TSENG)",
38    "信箱": "r11945018@ntu.edu.tw",
39    "班別": "資料庫系統-從SQL到NoSQL (EE5178)",
40    "join_date": "2023-03-01"
41  },
42  {
43    "_id": {
44      "$oid": "64801a0dfc04b88e94d3c061"
45    },
46    "身份": "學生",
47    "系所": "生醫電資所",
48    "年級": 1,
49    "學號": "R11945044",
50    "姓名": "張瑜佳 (ZHANG, YU-JIE)",
51    "信箱": "r11945044@ntu.edu.tw",
52    "班別": "資料庫系統-從SQL到NoSQL (EE5178)",
53    "join_date": "2023-03-01"
54  }
55 }
```

PART 1 – TASK 6.1

```
JS hw6_part1_task1.mongodbjs > ...
60 var queryDate = "2023-03-31";
61 var updateSessionStats = function (queryDate) {
62   db.students.aggregate([
63     {
64       $match: {
65         join_date: { $lt: queryDate },
66       },
67     },
68     {
69       $group: {
70         _id: { 系所: "$系所", 年級: "$年級" },
71         count: { $sum: 1 },
72       },
73     },
74     {
75       $project: {
76         value: {
77           count: "$count",
78         },
79       },
80     },
81     {
82       $merge: {
83         into: "tally",
84         whenMatched: [
85           {
86             $set: {
87               "value.count": { $add: ["$value.count", "$$new.value.count"] },
88             },
89           },
90         ],
91         whenNotMatched: "insert",
92       },
93     },
94   ]);
95   updateSessionStats(queryDate);
96   db.tally.find({ "_id.系所": { $in: ["電機所", "物理系", "電信所"] } });
97 }
```

```
1 [
2   {
3     "_id": {
4       "系所": "電信所",
5       "年級": 1
6     },
7     "value": {
8       "count": 3
9     }
10  },
11  {
12    "_id": {
13      "系所": "電信所",
14      "年級": 2
15    },
16    "value": {
17      "count": 3
18    }
19  },
20  {
21    "_id": {
22      "系所": "物理系",
23      "年級": 4
24    },
25    "value": {
26      "count": 2
27    }
28  }
29 ]
```

PART 1 – TASK 6.2

```
JS hw6_part1_task1.mongodbjs > ...
60 var queryDate = "2023-06-10";
61 var updateSessionStats = function (queryDate) {
62   db.students.aggregate([
63     {
64       $match: {
65         join_date: { $lt: queryDate },
66       },
67     },
68     {
69       $group: {
70         _id: { 系所: "$系所", 年級: "$年級" },
71         count: { $sum: 1 },
72       },
73     },
74     {
75       $project: {
76         value: {
77           count: "$count",
78         },
79       },
80     },
81     {
82       $merge: {
83         into: "tally",
84         whenMatched: [
85           {
86             $set: {
87               "value.count": { $add: ["$value.count", "$$new.value.count"] },
88             },
89           },
90         ],
91         whenNotMatched: "insert",
92       },
93     },
94   ]);
95   updateSessionStats(queryDate);
96   db.tally.find({ "_id.系所": { $in: ["電機所", "物理系", "電信所"] } });
97 }
```

```
1 [
2   {
3     "_id": {
4       "系所": "電機所",
5       "年級": 2
6     },
7     "value": {
8       "count": 1
9     }
10  },
11  {
12    "_id": {
13      "系所": "物理系",
14      "年級": 4
15    },
16    "value": {
17      "count": 2
18    }
19  },
20  {
21    "_id": {
22      "系所": "電信所",
23      "年級": 2
24    },
25    "value": {
26      "count": 3
27    }
28  },
29  {
30    "_id": {
31      "系所": "電信所",
32      "年級": 1
33    },
34    "value": {
35      "count": 4
36    }
37  },
38  {
39    "_id": {
40      "系所": "物理系",
41      "年級": 3
42    },
43    "value": {
44      "count": 1
45    }
46  }
47 ]
```

PART 2 – TASK 1

The screenshot shows the Neo4j Explore interface. On the left, a search bar contains "Show me a graph". Below it, a node view for "students" with ID "R10945002" is displayed. The node has the following properties:

Property	Value
年級	1
系所	生醫電資所
身份	學生
姓名	林柏諒 (LIN, BO-YONG)
信箱	r10945002@ntu.edu.tw
班別	資料庫系統-從SQL到NoSQL (EE5178)
學號	R10945002

The main graph area shows a dense cluster of yellow nodes. On the right, a sidebar shows the "Nodes" tab with a filter for "students" and a count of 98. The "Relationships" tab is also visible.

PART 2 – TASK 3

```

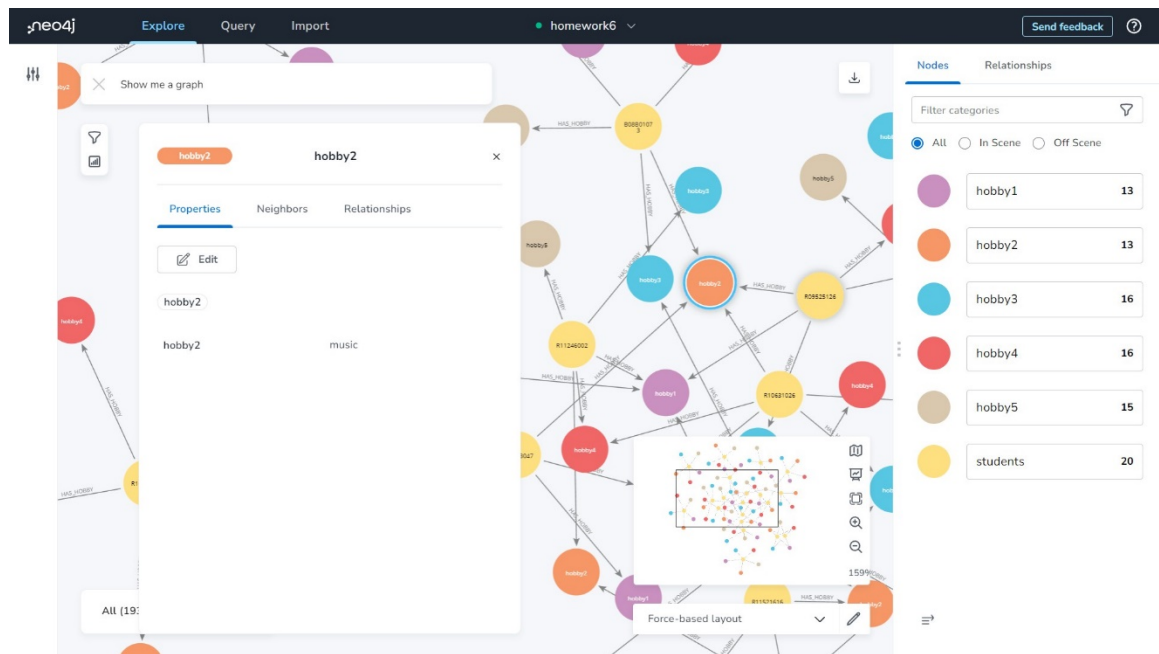
1 CREATE (g:groups {group: 8})
2 WITH g
3 MATCH (s1:students {`學號`: 'R10945002'}),
4       (s2:students {`學號`: 'R11945044'}),
5       (s3:students {`學號`: 'R11945005'}),
6       (s4:students {`學號`: 'R11945018'})
7 CREATE p1=(s1)-[:MEMBER_OF]→(g),
8       p2=(s2)-[:MEMBER_OF]→(g),
9       p3=(s3)-[:MEMBER_OF]→(g),
10      p4=(s4)-[:MEMBER_OF]→(g)
11 RETURN *

```

The screenshot shows the Neo4j Results Overview interface. On the left, a graph visualization shows a central orange node labeled "8" connected to four green nodes labeled "張瑜儀 (ZHANG, YU-...)", "曾子強 (YU-HSIUAN T...)", "林柏諒 (LIN, BO-YO-...)", and "郭庭沂 (KUO, TING-...)". The relationships are labeled "MEMBER_OF". On the right, the "Results Overview" panel shows the following summary:

- Nodes (5)
 - groups (1)
 - students (4)
- Relationship (4)
 - MEMBER_OF (4)

PART 3 – TASK 1

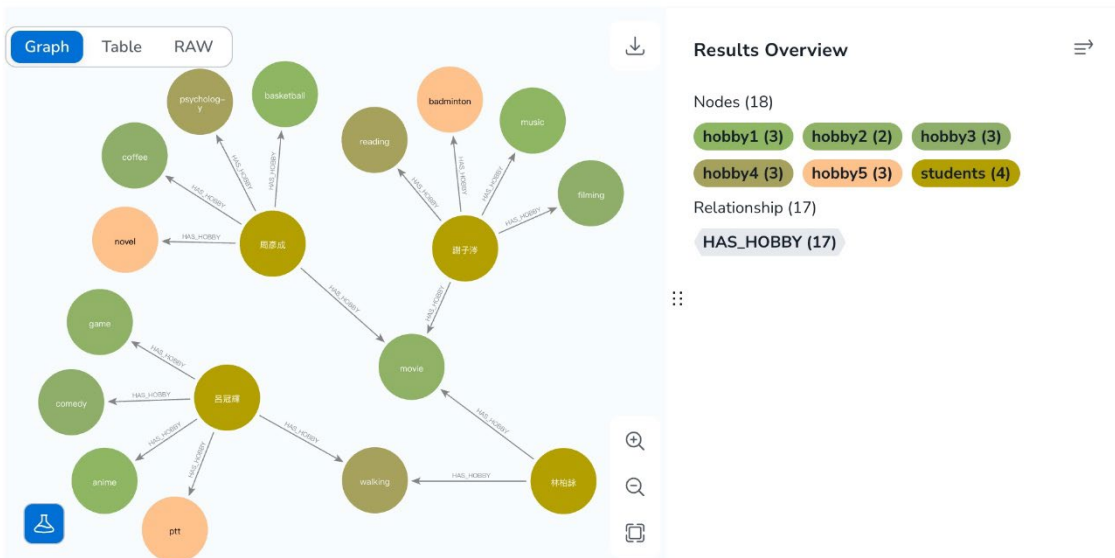


PART 3 – TASK 2

```

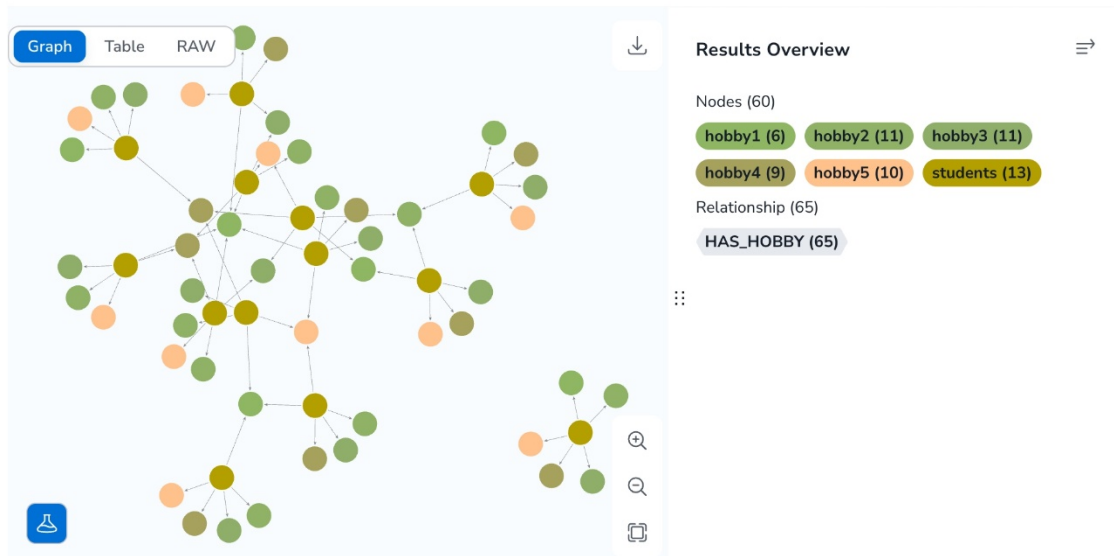
1 MATCH hf=(me:students {`學號`: 'R10945002'})-[:HAS_HOBBY]→(h)←
  [:HAS_HOBBY]-(other:students)
2 MATCH hfh=(other:students)-[:HAS_HOBBY]→(h2)
3 RETURN *

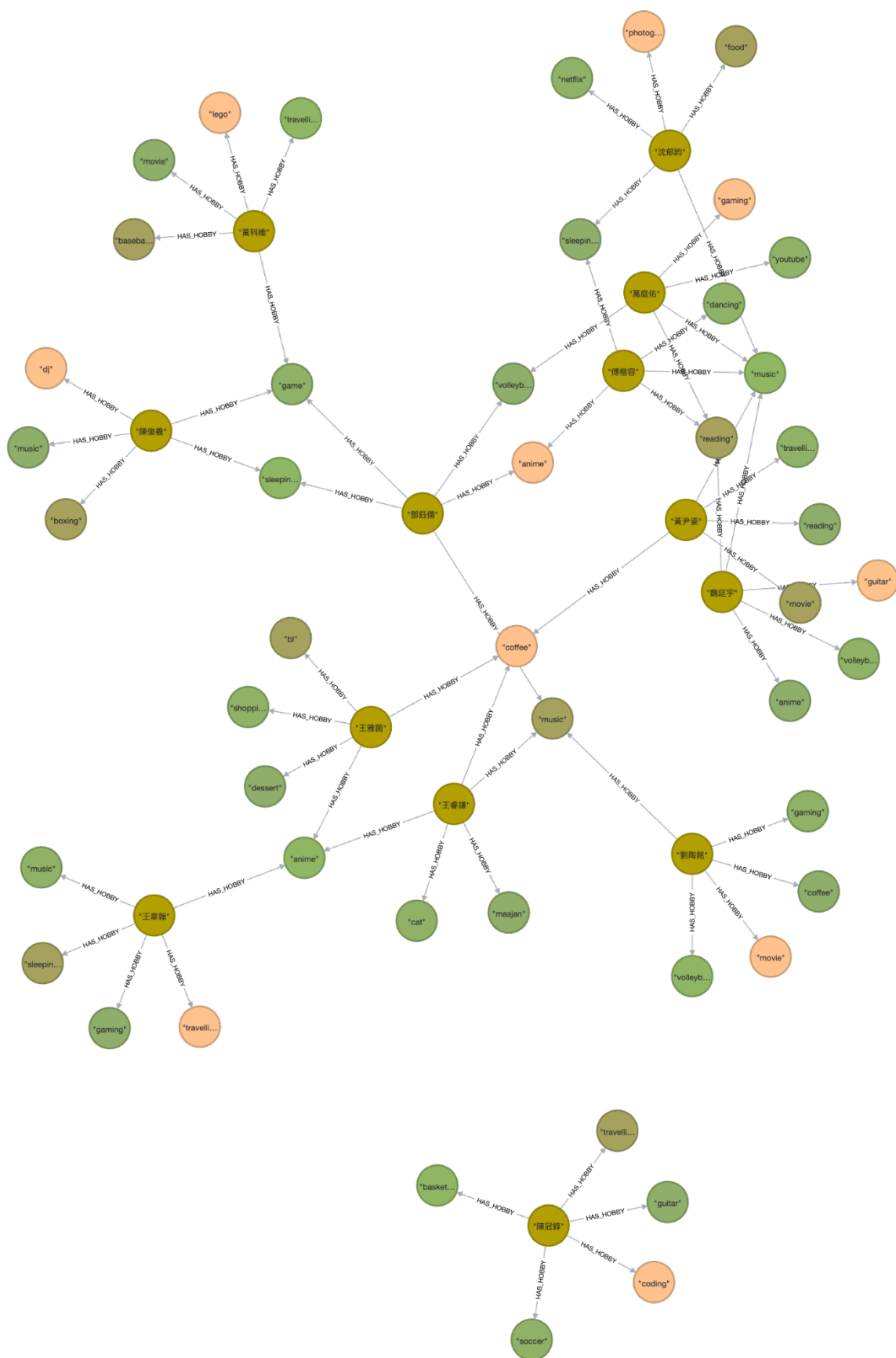
```



PART 3 – TASK 3

```
1 MATCH p1=(me:students {'學號': 'R10945002'})-[:HAS_HOBBY]→(h)←
  [:HAS_HOBBY]-(hf:students)
2 MATCH p2=(hf:students)-[:HAS_HOBBY]→(h2)←[:HAS_HOBBY]-
  (foaf:students)
3 MATCH p3=(foaf)-[:HAS_HOBBY]→(h3)
4 WHERE me <> foaf AND NOT EXISTS((me)-[:HAS_HOBBY]→()-[:HAS_HOBBY]-
  (foaf))
5 RETURN p3
```





PART 3 – TASK 4

```
1 MATCH (g:students)-[:HAS_HOBBY]→(h)←[:HAS_HOBBY]-(foaf2:students)
2 WHERE g.`學號` IN ['R11945044', 'R11945005', 'R11945018']
3 WITH collect(DISTINCT g) AS gList, collect(DISTINCT foaf2) AS foaf2List
4 RETURN [foaf2 IN foaf2List WHERE NOT foaf2 IN gList] AS foaf2
```

Graph

Table

RAW



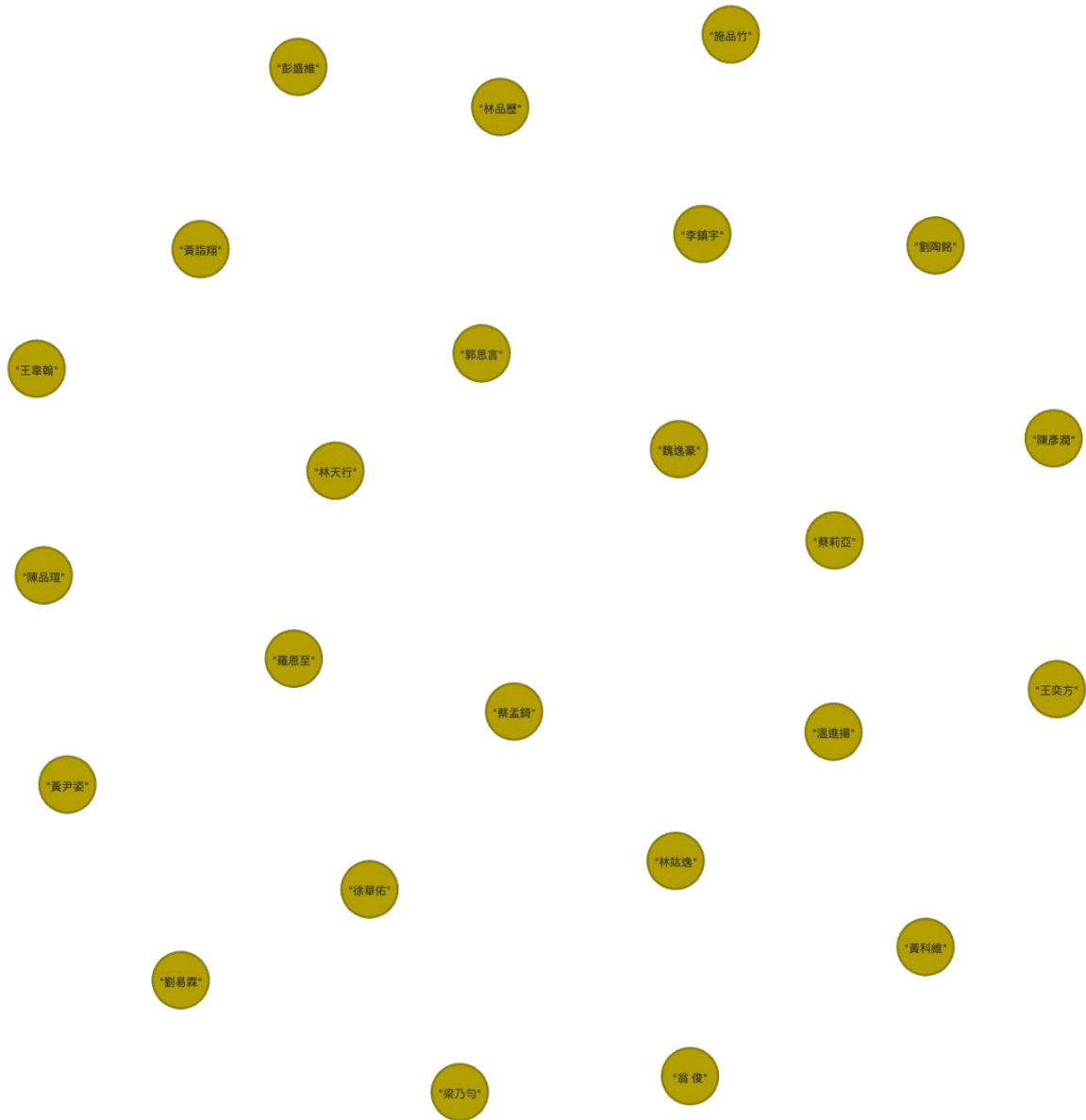
Results Overview



Nodes (24)

students (24)





PART 3 – TASK 5

```
1 MATCH p1=(me:students {`學號`: 'R10945002'})-[:HAS_HOBBY]→(h)←[:HAS_HOBBY]-(hf:students)
2 MATCH p2=(hf:students)-[:HAS_HOBBY]→(h2)←[:HAS_HOBBY]-(foaf:students)
3 MATCH p3=(foaf)-[:HAS_HOBBY]→(h3)
4 WHERE me <> foaf AND NOT EXISTS((me)-[:HAS_HOBBY]→()-[:HAS_HOBBY]-(foaf))
5 WITH foaf
6
7 MATCH (g:students)-[:HAS_HOBBY]→(h)←[:HAS_HOBBY]-(foaf2:students)
8 WHERE g.`學號` IN ['R11945044', 'R11945005', 'R11945018']
9 WITH collect(DISTINCT g) AS gList, collect(DISTINCT foaf2) AS foaf2List,
   collect(DISTINCT foaf) AS foafList
10 RETURN [foaf2 IN foaf2List WHERE NOT foaf2 IN gList AND NOT foaf2 IN foafList]
   AS foaf2
```



