CS4400: Introduction to Database Systems
Description of SQL Testing Database (Thursday, March 24, 2022)

This database is constructed as an extension to the Company Database as defined in the Elmasri & Navathe textbook used in class. Chapter 3 of the text gives an extensive description of the initial database tables: employees, departments, projects, and dependents. The description below covers the remaining tables.

The employees at the company work in (and sometimes manage) various departments, and work on various projects. In an effort to minimize costs, they are offering their employees the opportunity to work from home. Employees must select one or the other: either work from home via remote_access, or work in_office.

If they work remotely, then the database must be able to track the employees Internet Protocol (IP address) and the user account that they use to logon to the system. The database must also be able to track the different periods that they normally access the system to help detect unauthorized access attempts. The periods are stored using the hour that they logon (i.e., start working using a 24-hour clock based on GMT) and the duration of the session (in hours).

Result Grid | Filter Rows: Search | Edit: | Export/Import:

ssn	ip_address	user_account
666884444	403e:8f59:336e:d11b:0425:ed18:2f34:48a3	rnarayan3
888665555	26c8:4186:2105:cf66:7b3f:4b03:5dd7:3eb4	jborg1
987654321	3208:78e4:578b:034b:c7ff:1b55:6e41:8ece	jwallace3

table 1: remote_access

Result Grid | Filter Rows: Search | Edit: | Export/Import:

ssn	start_hour	duration
666884444	13	9
888665555	15	4
987654321	11	4
987654321	23	5

table 2: time_frames

If they work in the office, then the database must be able to track the building and room number of their work office.

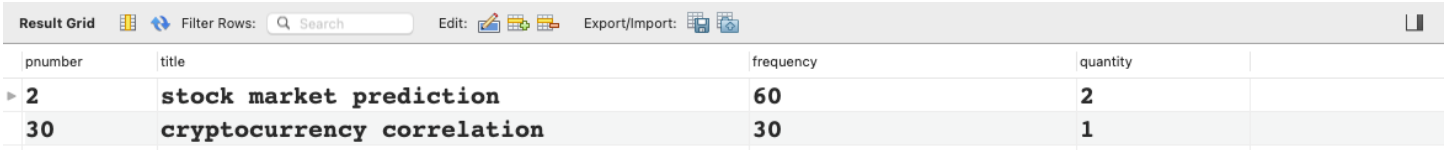
Result Grid | Filter Rows: Search | Edit: | Export/Import:

ssn	building	room
123456789	Main	33-C
333445555	Main	100
453453453	Main	33-C
987987987	Computing	Bridge
999887777	Research	NULL

table 3: in_office

The employees also work on various projects, and those projects have various combinations of different aspects. Some projects require analysis of collected data; some projects require a continuous operational staff; and others require maintenance of the hardware and software components.

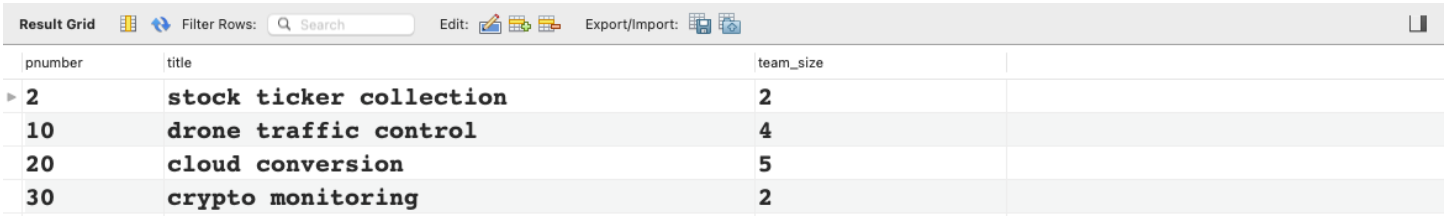
For projects that have an analysis component, the database must be able to track a title that describes the purpose of the data being collected, along with the number of times that the data must be collected each month (i.e., monthly frequency) and the amount of data (measured in gigabytes/GB) collected during each event.



pnumber	title	frequency	quantity
2	stock market prediction	60	2
30	cryptocurrency correlation	30	1

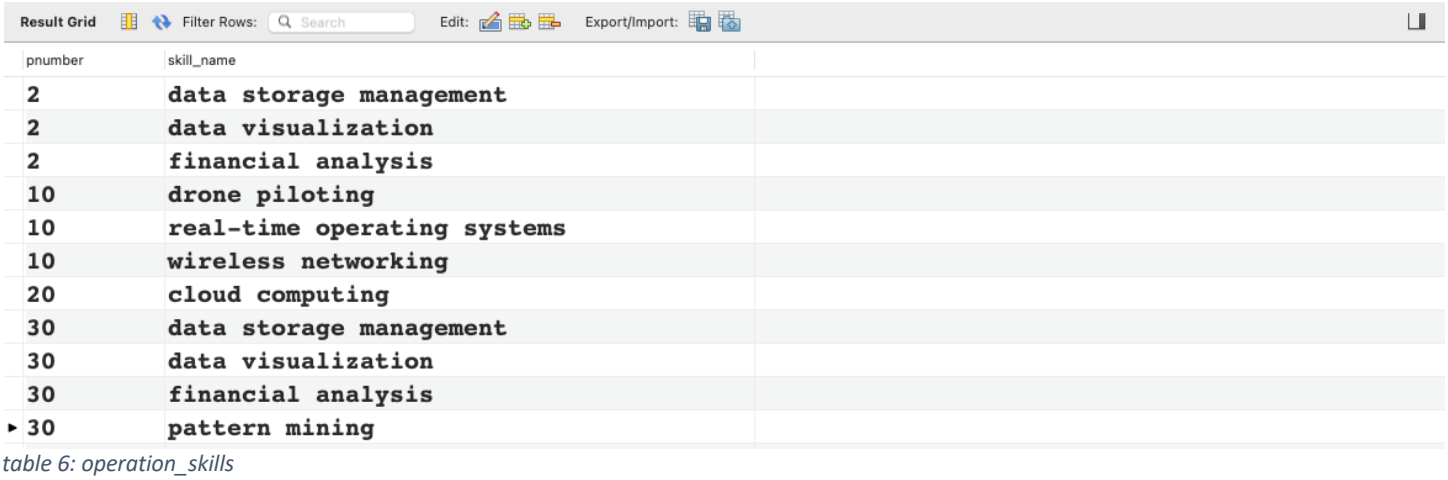
table 4: analysis

For projects that have an operations component, the database must be able to track the title that describes the type of operation or activity being conducted, along with the number of people needed to conduct the operation. The database must also be able to track the different skills that the members of the operational team need to have to conduct the operation successfully.



pnumber	title	team_size
2	stock ticker collection	2
10	drone traffic control	4
20	cloud conversion	5
30	crypto monitoring	2

table 5: operations

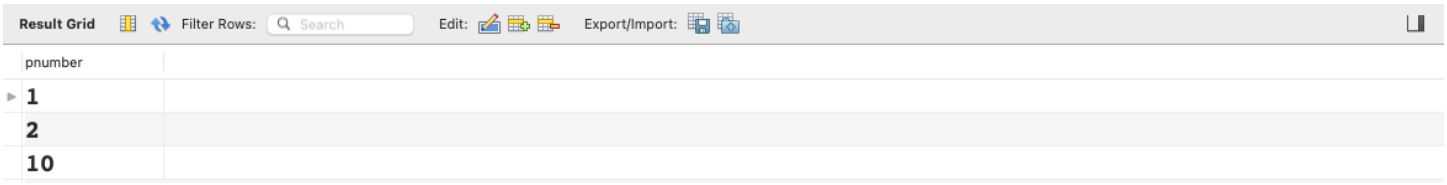


pnumber	skill_name
2	data storage management
2	data visualization
2	financial analysis
10	drone piloting
10	real-time operating systems
10	wireless networking
20	cloud computing
30	data storage management
30	data visualization
30	financial analysis
30	pattern mining

table 6: operation_skills

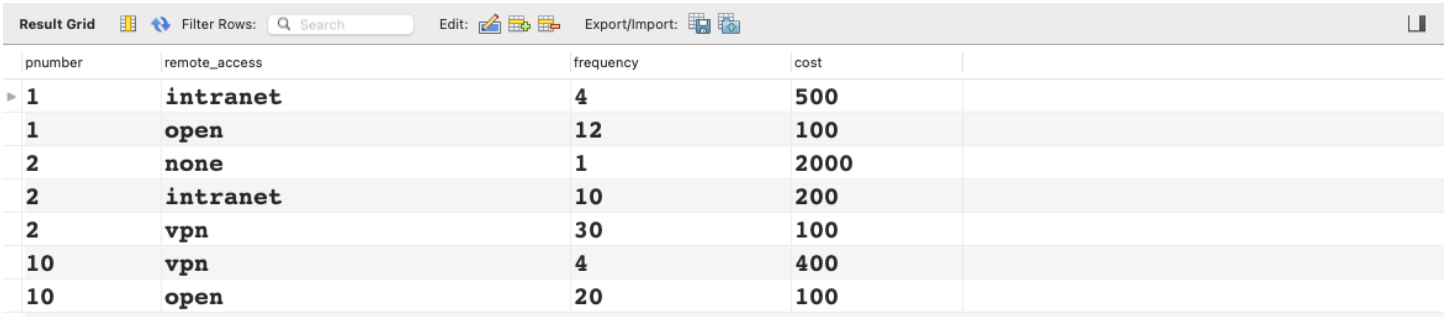
For projects that have a maintenance component, the database must be able to track the numerous types of updates, fixes and repairs required (monthly) to ensure that the project operates successfully. Some types of maintenance can

be performed remotely, either using the 'open' web, or more securely via a virtual private network ('vpn'). Other types of maintenance must be performed via the 'intranet' in the same physical building, or directly with hands-on contact at the affected system (i.e., 'none' as in no remote access) – for example, replacing a failed server or routing component. And the cost of each individual maintenance service is also given in U.S. Dollars.



pnumber
1
2
10

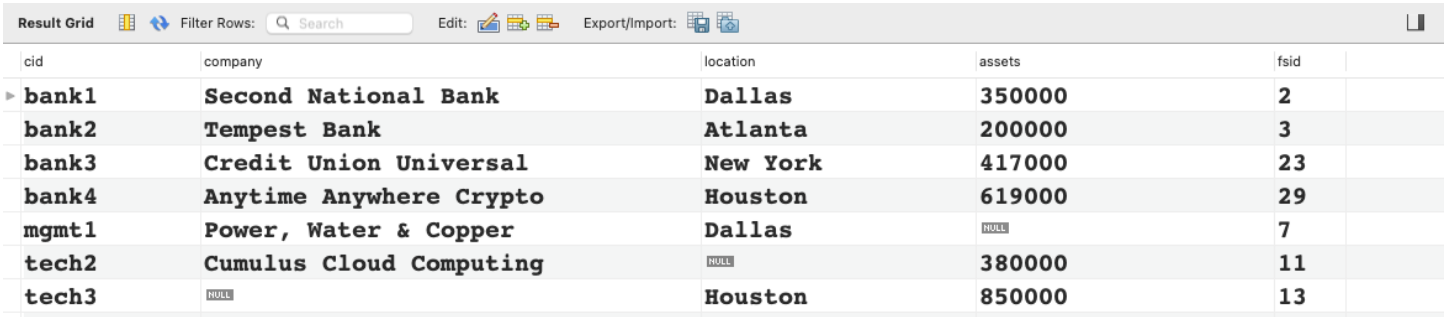
table 7: maintenance



pnumber	remote_access	frequency	cost
1	intranet	4	500
1	open	12	100
2	none	1	2000
2	intranet	10	200
2	vpn	30	100
10	vpn	4	400
10	open	20	100

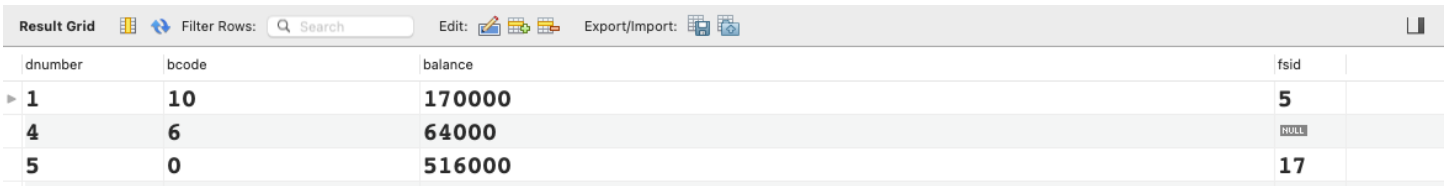
table 8: maintenance_types

All of these projects require funding to succeed. Funding can come from two very different sources: customers and budgets. Customers often provide the funds needed to pursue a project, and the database must be able to track the customer's company, location and assets (i.e., total available funds). On the other hand, budgets are directed by departments, and the database must be able to track which department directs each budget, along with the total balance of funds for each budget.



cid	company	location	assets	fsid
bank1	Second National Bank	Dallas	350000	2
bank2	Tempest Bank	Atlanta	200000	3
bank3	Credit Union Universal	New York	417000	23
bank4	Anytime Anywhere Crypto	Houston	619000	29
mgmt1	Power, Water & Copper	Dallas	NULL	7
tech2	Cumulus Cloud Computing	NULL	380000	11
tech3	NULL	Houston	850000	13

table 9: customer



dnumber	bcode	balance	fsid
1	10	170000	5
4	6	64000	NULL
5	0	516000	17

table 10: budget

As the customers and budgets are used to fund projects some portions of the total funds are allocated for use, and the database must be able to track the funds remaining of the allocation along with the amount of funds that are used each month (i.e., the usage or "burn" rate).

Result Grid Filter Rows: Search Edit: Export/Import:

fsid	remaining	usage_rate	pnumber
2	10000	1000	1
3	27000	1000	2
5	31000	2000	2
7	16000	1000	3
11	6000	1000	10
13	9000	2000	10
17	61000	5000	10
23	24000	3000	20
29	21000	1000	30

table 11: fund_source

Finally, the dependents are occasionally offered the opportunity to gain valuable experience with some of the departments. The database must be able to track the most recent instance of a dependent interning with a department, along with a rating to assess their performance (e.g., from 1 to 10, with 1 representing a "sub-standard/poor" effort, and 10 representing a "superlative/top-level" effort).

Result Grid Filter Rows: Search Edit: Export/Import:

essn	dependent_name	dnumber	rating
123456789	Alice	1	7
123456789	Alice	4	8
123456789	Michael	4	6
123456789	Michael	5	8
333445555	Alice	5	10

table 12: interns_in