

CPSC 304 Project Cover Page

Milestone 4

Due Date: Nov. 25, 2022

Group Number: 22

Name	Student Number	CS Alias (Userid)	Preferred E-mail Address
Serdar	91621482	s0q8j	serdar.hasan2@gmail.com
Andy	22451884	g2i4q	andyshenzhao@gmail.com
Eric	30515167	g9y0b	erichsieh25@gmail.com

By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia.

SQL Script

To be found in the GitHub repository under ~/init.sql

Project Description

The project models an IT help desk at a university. It encapsulates students, staff, and faculty from a variety of departments. Each of these users must be part of a lab group in order to use the help desk. Any lab must have members associated with at least one department and therefore contribute to that department. Users can hold different positions in different labs (ie. primary investigator, consultant, research assistant). Any user can submit a ticket to the help desk to reserve an asset or request IT support. The help desk receives tickets and will reserve and lend any requested assets or support. Assets are defined as any of the following: software licenses, hardware, lab equipment, electronics, and tools. Assets available for use at any help desk were purchased by the department to which the help desk belongs. Departments have an annual budget that limits how much they can spend on purchasing assets. Labs have annual funding, limited by their Department's yearly budget.

Departments and labs are located in buildings, and this information must be made available to the user. Labs are located in specific rooms, which are identifiable only by room number and building code. A help desk must also be located in only one room.

IT support teams are also available from help desks. These teams are responsible for the repairs and maintenance required on any department assets.

How is our final schema different from the initially planned?

Some variations were made to the final schema.

1. We removed some of the Asset sub-entities: Lab Equipment and Tools did not provide enough information to warrant distinction from
2. The table structures were vastly altered to enforce certain key and participation constraints and to simplify our relational model

- a. Submitted_By field added to Tickets
 - b. Room_Number and Building_Code fields added to Help_Desk
 - c. Department heads and help desk IDs added to Department
 - d. Building_Code field added to Room's primary key since it's a weak entity of Building
 - e. Dept field added to Purchased_Asset to denote which department purchased which asset
 - f. Sub-classes of Purchased_Asset made into tables with foreign keys referencing Purchased_Asset
3. Other tables were added to represent relations that weren't previously modeled
- a. Requests_IT_Support
 - b. Reserves_Asset
 - c. Lab_Located_In
 - d. Dept_Located_In
 - e. Participates_in
 - f. Contributes_To
 - g. Repairs_And_Maintains

Schema and Screenshots

Help_Desk(hid, phone_number, room_number, building_code)

HID	PHONE_NUMBER	ROOM_NUMBER	BUIL
1	6049876543	5	ICCS
2	6044832948	201	HENN
3	7783294283	310	DMP
4	6041938294	300	KENN
5	6044829183	104	BUCH

IT_Support(team_number, phone_number)

TEAM_NUMBER	PHONE_NUMBER
1	6041234567
2	7784392384
3	6041842934
4	6044829384
5	6043145314

Department(dept_name, budget, dept_head, hid)

DEPT_NAME	BUDGET	DEPT_HEAD	HID
Computer Science	50000	22451884	1
Psychology	38000	30515167	4
Physics	20000	22451884	2
Economics	25000	22451884	3
Philosophy	15000	91621482	5

Building(building_code, building_name, address)

```
BUIL
-----
BUILDING_NAME
-----
ADDRESS
-----
ICCS
Institute for Computing Information and Computer Science/Cognitive Systems
2366 Main Mall

DMP
Hugh Dempster Pavillion
6245 Agronomy Rd

BUIL
-----
BUILDING_NAME
-----
ADDRESS
-----
KENN
Douglas Kenny
2136 West Mall

HENN
Hennings

BUIL
-----
BUILDING_NAME
-----
ADDRESS
-----
6224 Agricultural Road

BUCH
Buchanan
1866 Main Mall
```

Room(room_number, building_code, floor)

ROOM_NUMBER	BUIL	FLOOR
350	ICCS	2
5	ICCS	1
310	DMP	3
210	DMP	2
300	KENN	3
210	KENN	2
200	HENN	2
201	HENN	2
104	BUCH	1
201	BUCH	2

10 rows selected.

Faculty_Member(user_id, full_name, admin_access)

USER_ID	FULL_NAME	ADMIN_ACCESS
22451884	Andy Zhao	1
30515167	Eric Hsieh	1
USER_ID	FULL_NAME	ADMIN_ACCESS
91621482	Serdar Hasan	1
12345678	John Doe	
USER_ID	FULL_NAME	ADMIN_ACCESS
74723029	Jane Smith	0

Ticket(ticket_number, status, date_created, date_resolved, submitted_by)

TICKET_NUMBER	STATUS	DATE_CREA	DATE_RESO	HELP_DESK	SUBMITTED_BY
20220001	Open	04-OCT-22		1	22451884
20220003	Open	04-OCT-22		2	74723029
20220004	Under Review	04-OCT-22		3	91621482
20220002	Resolved	13-OCT-22	15-NOV-22	1	12345678
20220005	Resolved	04-OCT-22	15-OCT-22	1	91621482

Purchased_Asset(inv_number, cost, name, model, dept)

INV_NUMBER	COST	NAME	DEPT
<hr/>			
MODEL			DEPT
10000001 512GB	1599.99	M1 Macbook Air	Computer Science
10000002 256GB	1399.99	M1 Macbook Air	Computer Science
20000003 2021B	139.99	MATLAB	Physics
INV_NUMBER	COST	NAME	DEPT
<hr/>			
MODEL			DEPT
30000001 Jucoan M3	19.99	Hex Spacer Standoffs	Computer Science
40000001 12700K	550	Intel Core i7	Psychology
40000002 RTX 4090	2099.99	NVIDIA GeForce RTX	Computer Science

Software_License(inv_number, license_code)

INV_NUMBER	LICENSE_CODE
<hr/>	
20000003	AC4X3 C63G4 5JB31

Hardware(inv_number, type, specification)

INV_NUMBER	TYPE
<hr/>	
SPECIFICATION	
30000001	standoff M3x12mm

Electronics(inv_number, wattage, serial_number)

INV_NUMBER	WATTAGE	SERIAL_NUMBER
<hr/>		
40000001	95	2ZGF5hU
40000002	450	5XWbE7i7

Repairs_And_Maintains(team_number, inv_number)

TEAM_NUMBER	INV_NUMBER
1	10000001
1	10000002
2	40000001
2	40000002
3	30000001
4	20000003

Reserves_Asset(ticket_number, inv_number)

TICKET_NUMBER	INV_NUMBER
20220001	10000001
20220001	10000002
20220002	40000002
20220003	20000003
20220005	10000002

Requests_IT_Support(ticket_number, team_number)

TICKET_NUMBER	TEAM_NUMBER
20220001	1
20220002	2
20220003	3
20220004	4
20220005	5

Dept_Located_In(dept_name, building)

DEPT_NAME	BUIL
Computer Science	DMP
Computer Science	ICCS
Economics	DMP
Philosophy	BUCH
Physics	HENN
Psychology	KENN

Lab(lab_name, phone_number, homepage_url, email)

LAB_NAME	PHONE_NUMBER
-----	-----
HOME PAGE URL	
-----	-----
EMAIL	
-----	-----
ASAP Lab asap.psych.ubc.ca asap@psych.ubc.ca	6043829482
-----	-----
Behavioural Lab zhaolab.psych.ubc.ca zhao@psych.ubc.ca	6044318392
-----	-----
LAB_NAME	PHONE_NUMBER
-----	-----
HOME PAGE URL	
-----	-----
EMAIL	
-----	-----
Computer Vision Lab vision.cs.ubc.ca vision@cs.ubc.ca	6048229382
-----	-----
Visual Cognition Lab viscoglab.psych.ubc.ca	6048229302
-----	-----
LAB_NAME	PHONE_NUMBER
-----	-----
HOME PAGE URL	
-----	-----
EMAIL	
-----	-----
viscog@psych.ubc.ca	
-----	-----
Algorithms Lab cs.ubc.ca/labs/algorithms algorithm@cs.ubc.ca	6044839283

Lab_Located_In(lab_name, room_number)

LAB_NAME	ROOM_NUMBER	BUIL
-----	-----	-----
ASAP Lab	210	KENN
Algorithms Lab	200	HENN
Behavioural Lab	201	BUCH
Computer Vision Lab	350	ICCS
Visual Cognition Lab	210	DMP

Participates_In(user_id, lab_name, position)

USER_ID	LAB_NAME
POSITION	
30515167	ASAP Lab Primary Investigator
30515167	Behavioural Lab Primary Investigator
22451884	Computer Vision Lab Primary Investigator
USER_ID	LAB_NAME
POSITION	
91621482	Visual Cognition Lab Primary Investigator
91621482	Algorithms Lab Primary Investigator
12345678	ASAP Lab Research Assistant
USER_ID	LAB_NAME
POSITION	
74723029	Computer Vision Lab Research Assistant

Contributes_To(lab_name, dept_name)

LAB_NAME	DEPT_NAME
ASAP Lab	Psychology
Algorithms Lab	Computer Science
Algorithms Lab	Physics
Behavioural Lab	Psychology
Computer Vision Lab	Computer Science
Visual Cognition Lab	Computer Science
Visual Cognition Lab	Psychology

Screenshots Of SQL Query Results

INSERT Operation: Add an asset.

```
SQL> INSERT INTO Purchased_Asset (inv_number, cost, name, model, dept)
VALUES (10000003, 2999.99, 'Lenovo Carbon X1', '1TB', 'Computer Science'); 2
```

1 row created.

```
SQL> SELECT * FROM Purchased_Asset;
```

INV_NUMBER	COST	NAME	MODEL	DEPT
10000001	1599.99	M1 Macbook Air	512GB	Computer Science
10000002	1399.99	M1 Macbook Air	256GB	Computer Science
20000003	139.99	MATLAB	2021B	Physics

INV_NUMBER	COST	NAME	MODEL	DEPT
30000001	19.99	Hex Spacer Standoffs	Jucoan M3	Computer Science
40000001	550	Intel Core i7	12700K	Psychology
40000002	2099.99	NVIDIA GeForce RTX	RTX 4090	Computer Science

INV_NUMBER	COST	NAME	MODEL	DEPT
10000003	2999.99	Lenovo Carbon X1	1TB	Computer Science

DELETE Operation: Delete an asset.

```
SQL> DELETE FROM Purchased_Asset WHERE inv_number = 10000003;
1 row deleted.

SQL> SELECT * FROM Purchased_Asset;

INV_NUMBER      COST NAME
-----          -----
MODEL           DEPT
-----          -----
 10000001    1599.99 M1 Macbook Air
512GB           Computer Science
 10000002    1399.99 M1 Macbook Air
256GB           Computer Science
 20000003    139.99 MATLAB
2021B            Physics

INV_NUMBER      COST NAME
-----          -----
MODEL           DEPT
-----          -----
 30000001    19.99 Hex Spacer Standoffs
Jucoan M3        Computer Science
 40000001    550 Intel Core i7
12700K           Psychology
 40000002    2099.99 NVIDIA GeForce RTX
RTX 4090         Computer Science
```

UPDATE Operation: Resolve ticket.

```
SQL> SELECT * FROM Ticket;

TICKET_NUMBER STATUS      DATE_CREA DATE_RESOLUTION HELP_DESK SUBMITTED_BY
-----          -----
 20220001 Open        04-OCT-22          1       22451884
 20220003 Open        04-OCT-22          2       74723029
 20220004 Under Review 04-OCT-22          3       91621482
 20220002 Resolved    13-OCT-22 15-NOV-22 1       12345678
 20220005 Resolved    04-OCT-22 15-OCT-22 1       91621482

SQL> UPDATE Ticket T
SET status = 'Resolved', date_resolved = '25-NOV-22'
WHERE T.ticket_number = 20220001; 2      3

1 row updated.

SQL> SELECT * FROM Ticket;

TICKET_NUMBER STATUS      DATE_CREA DATE_RESOLUTION HELP_DESK SUBMITTED_BY
-----          -----
 20220001 Resolved    04-OCT-22 25-NOV-22 1       22451884
 20220003 Open        04-OCT-22          2       74723029
 20220004 Under Review 04-OCT-22          3       91621482
 20220002 Resolved    13-OCT-22 15-NOV-22 1       12345678
 20220005 Resolved    04-OCT-22 15-OCT-22 1       91621482
```

Selection: Select open tickets

```
SQL> SELECT T.ticket_number, T.status, T.date_created, T.help_desk, T.submitted_by
  FROM Ticket T
 WHERE status = 'Open'; 2    3
```

TICKET_NUMBER	STATUS	DATE_CREA	HELP_DESK	SUBMITTED_BY
20220003	Open	04-OCT-22	2	74723029

Open Tickets

Ticket #	Status	Date Created	Date Resolved	Submitted By	
20220001	Open	04-OCT-22	-	Andy Zhao	View Ticket
20220003	Open	04-OCT-22	-	Jane Smith	View Ticket
20220004	Under Review	04-OCT-22	-	Serdar Hasan	View Ticket

Resolved Tickets

Ticket #	Status	Date Created	Date Resolved	Submitted By	
20220002	Resolved	13-OCT-22	15-NOV-22	John Doe	View Ticket
20220005	Resolved	04-OCT-22	15-OCT-22	Serdar Hasan	View Ticket

Projection: Load asset

```
SQL> SELECT PA.inv_number, PA.cost, PA.name, PA.model
  FROM Purchased_Asset PA
 WHERE dept = 'Computer Science'; 2    3
```

INV_NUMBER	COST	NAME
MODEL		
10000001	1599.99	M1 Macbook Air 512GB
10000002	1399.99	M1 Macbook Air 256GB
30000001	19.99	Hex Spacer Standoffs Jucoan M3

INV_NUMBER	COST	NAME
MODEL		
40000002	2099.99	NVIDIA GeForce RTX RTX 4090

Join: Load Asset from sub-tables (load Softwares)

```
SQL> SELECT SL.inv_number, PA.cost, PA.name, PA.model, PA.dept, SL.license_code
  FROM Purchased_Asset PA, Software_License SL
 WHERE PA.inv_number = SL.inv_number AND dept = 'Physics';  2      3

INV_NUMBER          COST NAME
-----
MODEL                           DEPT
-----
LICENSE_CODE
-----
 20000003      139.99 MATLAB
2021B                               Physics
AC4X3 C63G4 5JB31
```

Aggregation with Group By: User's page

```
SQL> SELECT fm.full_name, fm.user_id, count(t.ticket_number)
  2  FROM Faculty_Member fm, Ticket t
  3  WHERE tsubmitted_by = fm.user_id
  4  GROUP BY fm.full_name, fm.user_id;
```

```
FULL_NAME
-----
USER_ID COUNT(T.TICKET_NUMBER)
-----
Andy Zhao
 22451884           1

Serdar Hasan
 91621482           2

John Doe
 12345678           1
```

```
FULL_NAME
-----
USER_ID COUNT(T.TICKET_NUMBER)
-----
Jane Smith
 74723029           1
```

Aggregation with Having: Frequent ticketers

```
SQL> SELECT fm.full_name
  2  FROM Faculty_Member fm, Ticket t
  3  WHERE tsubmitted_by = fm.user_id AND tsubmitted_by IN (
  4      SELECT tsubmitted_by
  5      FROM Ticket t
  6      GROUP BY tsubmitted_by
  7      HAVING COUNT(tsubmitted_by) > 1
  8  )
  9  GROUP BY fm.full_name;
```

```
FULL_NAME
```

```
-----
```

```
Serdar Hasan
```

Nested Aggregation with Group By: Most helpful IT support team
(note: first few screenshots are just to show insertion of extraneous data to demonstrate the query)

```
SQL> select * from requests_it_support;

TICKET_NUMBER TEAM_NUMBER
----- -----
 20220001      1
 20220002      2
 20220003      3
 20220004      4
 20220005      5

SQL> insert into requests_it_support(ticket_number, team_number) values (20220002, 1);

1 row created.
```

```
SQL> select * from requests_it_support;

TICKET_NUMBER TEAM_NUMBER
----- -----
 20220001      1
 20220002      1
 20220002      2
 20220003      3
 20220004      4
 20220005      5

6 rows selected.
```

query:

```
SQL> SELECT team_number, most_tickets
 2 FROM (
 3     SELECT MAX(r.num_tickets) most_tickets, team_number
 4     FROM (
 5         SELECT COUNT(s.ticket_number) as num_tickets, s.team_number as team_number
 6         FROM Requests_IT_Support s
 7         GROUP BY s.team_number
 8     ) r
 9     GROUP BY team_number
10     ORDER BY 1 DESC
11 )
12 WHERE rownum < 2;

TEAM_NUMBER MOST_TICKETS
----- -----
 1          2
```

Dashboard - 91621482

Number of Open Tickets

Number of Assets in Inventory

Most Helpful IT Support Team

Support Team #-1

Manage Assets

Inventory #	Cost	Name	Model	
10000001	1599.99	M1 Macbook Air	512GB	Computer Science
10000002	1399.99	M1 Macbook Air	256GB	Computer Science
20000003	139.99	MATLAB	2021B	Physics
30000001	19.99	Hex Spacer Standoffs	Jucan M3	Computer Science
40000001	550	Intel Core i7	12700K	Psychology
40000002	2099.99	NVIDIA GeForce RTX	RTX 4090	Computer Science
2	139.99	MATLAB	R2021b	Computer Science

Frequent Ticketers

Name	User ID	Submitted tickets	Resolved tickets
------	---------	-------------------	------------------

Manage Open Tickets

Ticket #	Status	Date Created	Date Resolved	Submitted By
----------	--------	--------------	---------------	--------------

-	-	-	-	-	View Ticket
-	-	-	-	-	View Ticket
-	-	-	-	-	View Ticket
-	-	-	-	-	View Ticket

Division: See all available assets

```
SQL> SELECT A.inv_number, A.cost, A.name, A.model
  2  FROM Purchased_Asset A
  3 WHERE NOT EXISTS (
  4     SELECT T.ticket_number
  5     FROM Ticket T
  6     WHERE T.status <> 'Resolved' AND EXISTS (
  7         SELECT R.inv_number
  8         FROM Reserves_Asset R
  9         WHERE R.ticket_number = T.ticket_number
 10        AND R.inv_number = A.inv_number
 11    )
 12 );
```

INV_NUMBER	COST	NAME
------------	------	------

MODEL

30000001	19.99	Hex Spacer Standoffs
Jucoan M3		

40000001	550	Intel Core i7
12700K		

40000002	2099.99	NVIDIA GeForce RTX
RTX 4090		

INV_NUMBER	COST	NAME
------------	------	------

MODEL

2	139.99	MATLAB
R2021b		

Manage Assets

Inventory #	Cost	Name	Model	
10000001	1599.99	M1 Macbook Air	512GB	Computer Science
10000002	1399.99	M1 Macbook Air	256GB	Computer Science
20000003	139.99	MATLAB	2021B	Physics
30000001	19.99	Hex Spacer Standoffs	Jucoan M3	Computer Science
40000001	550	Intel Core i7	12700K	Psychology
40000002	2099.99	NVIDIA GeForce RTX	RTX 4090	Computer Science
2	139.99	MATLAB	R2021b	Computer Science

README

To be found in the GitHub repository under ~/README.md