CPSC 304 Project Cover Page

Milestone #: _4	_	
Date: Apr. 5		
Group Number:	57	

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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

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Project Summary:

Our project involves developing a job application portal that serves two key user groups: employers (companies) and applicants (users). The domain of our application is recruiting for employers and job searching for general users. Users are able to create a profile, search and apply to job postings, and filter jobs based on location, salary, and posted date. Users can also view the number of applicants who have applied to a specific job, as well as search for companies based on their ratings and job posting date. The application also recommends companies with higher average ratings and salaries than others and provides a list of these "top rated companies" in a banner. Companies can post job openings, update or delete company information, and track the users who have applied to all of their jobs.

For the database, we will use Oracle, with the programming language Java. Furthermore, our frontend will be built using ReactJS as the framework, with the programming languages of JavaScript and HTML/CSS.

Final Schema vs Schema in Milestone 2:

In general, all tables/attributes have been renamed from PascalCase/camelCase to snake_case. Also, all ON UPDATE CASCADE are removed because it is not supported in Oracle.

Other changes include:

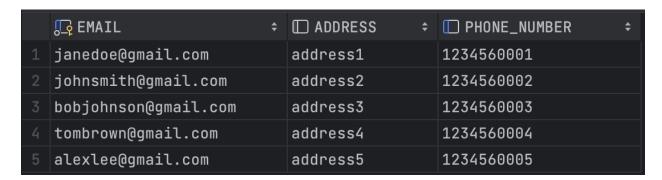
- User table renamed to USER_ACCOUNT because User is a reserved word in Oracle
- recommends attribute in SCORE table has datatype changed from BOOLEAN to INTEGER because BOOLEAN is not a supported datatype in Oracle
- score attribute in RATES table renamed to value to not clash with SCORE table
- comment attribute in RATES table renamed to r_comment because comment is a reserved word in Oracle
- Added position attribute to POSTED_JOB table to specify the job position this job posting is for
- session attribute in TRANSCRIPT_CONTAINS table renamed to year_session because session is a reserved word in Oracle

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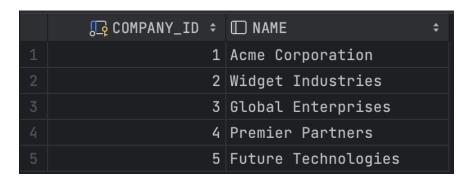
Schema:

Note: PK = Primary Key, FK = Foreign Key, CK = Candidate Key.

USER_ACCOUNT(<u>email</u> (PK): VARCHAR, address: VARCHAR, phone_number (CK - UNIQUE): VARCHAR)

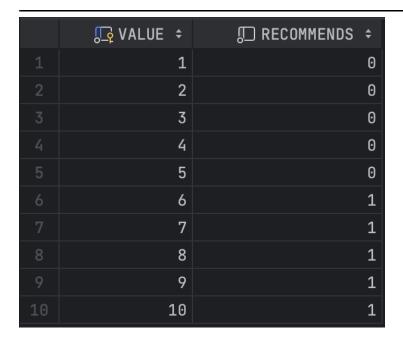


• COMPANY(company id (PK): INTEGER, name: VARCHAR)

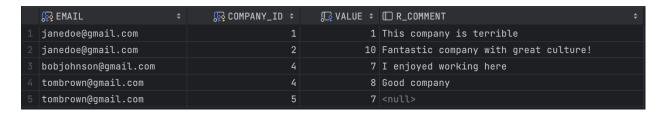


• SCORE(<u>value</u> (PK): INTEGER, recommends (NOT NULL): INTEGER)

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RATES(<u>email</u> (PK, FK - ON DELETE CASCADE): VARCHAR, <u>company_id</u> (PK, FK - ON DELETE CASCADE): INTEGER, value (FK - ON DELETE CASCADE, NOT NULL): INTEGER, r_comment: VARCHAR)

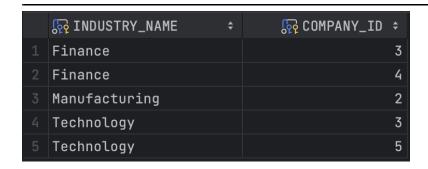


• INDUSTRY(<u>name</u> (PK): VARCHAR)

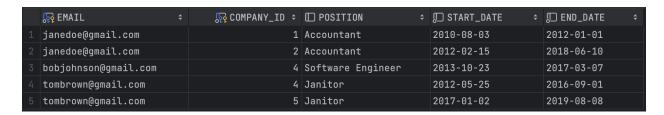


 OPERATES_IN(<u>industry_name</u> (PK, FK - ON DELETE CASCADE): VARCHAR, <u>company_id</u> (PK, FK - ON DELETE CASCADE): INTEGER)

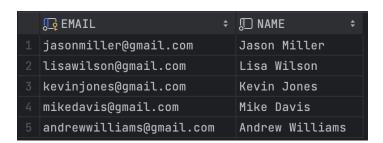
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WORKED_AT(email (PK, FK - ON DELETE CASCADE): VARCHAR, company_id (PK, FK - ON DELETE CASCADE): INTEGER, position: VARCHAR, start_date (NOT NULL): DATE, end date (NOT NULL): DATE)



• RECRUITER(<u>email</u> (PK): VARCHAR, name (NOT NULL): VARCHAR)



POSTED_JOB(job_id (PK): INTEGER, company_id (FK, NOT NULL, ON DELETE CASCADE): INTEGER, posted_date (NOT NULL): DATE, position (NOT NULL): VARCHAR, location (NOT NULL): VARCHAR, description (NOT NULL): VARCHAR, salary: INTEGER, recruiter_email (FK - ON DELETE SET NULL): VARCHAR)

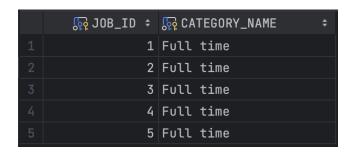


CATEGORY(<u>name</u> (PK): VARCHAR)

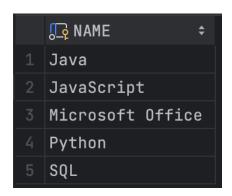
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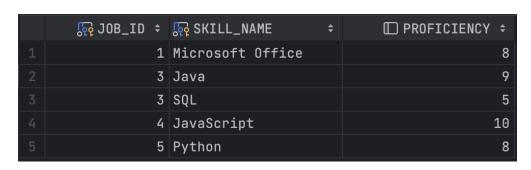
 JOB_BELONGS_IN(<u>category_name</u> (PK, FK - ON DELETE CASCADE): VARCHAR, <u>job_id</u> (PK, FK - ON DELETE CASCADE): INTEGER)



• SKILL(<u>name</u> (PK): VARCHAR)



• JOB_REQUIRES(<u>skill_name</u> (PK, FK - ON DELETE CASCADE): VARCHAR, <u>job_id</u> (PK, FK - ON DELETE CASCADE): INTEGER, proficiency: INTEGER)



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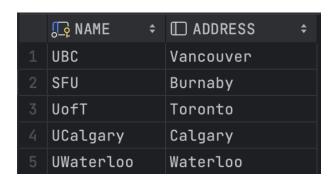
USER_APPLIES_TO(<u>email</u> (PK, FK - ON DELETE CASCADE): VARCHAR, <u>job_id</u> (PK, FK - ON DELETE CASCADE): INTEGER, applied_date: DATE)



 RESUME(email (PK, FK - ON DELETE CASCADE): VARCHAR, document_id (PartialK): INTEGER, url (CK - UNIQUE): VARCHAR)



• SCHOOL(name (PK): VARCHAR, address: VARCHAR)

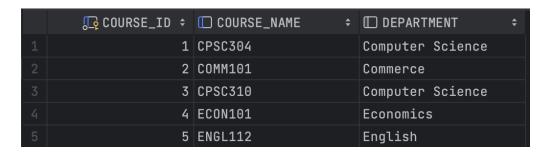


 TRANSCRIPT(<u>email</u> (PK, FK - ON DELETE CASCADE): VARCHAR, <u>document_id</u> (PartialK): INTEGER, school_name (FK - ON DELETE CASCADE, NOT NULL): VARCHAR)

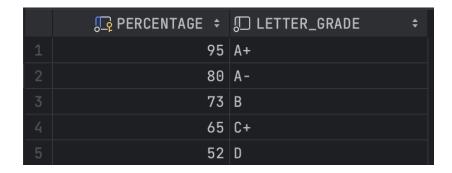
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	ু EMAIL	‡	<u> </u>	∏ SCHOOL_NAME ÷
1	janedoe@gmail.com		6	UWaterloo
2	johnsmith@gmail.com		7	UBC
3	bobjohnson@gmail.com		8	UBC
4	tombrown@gmail.com		9	UofT
5	alexlee@gmail.com		10	SFU

 COURSE(<u>course_id</u> (PK): INTEGER, course_name (CK - UNIQUE): VARCHAR, department: VARCHAR)



• GRADE(percentage (PK): INTEGER, letter_grade (NOT NULL): VARCHAR)



 TRANSCRIPT_CONTAINS(<u>course_id</u> (FK, PK - ON DELETE CASCADE): INTEGER, <u>documentId</u> (FK, PK - ON DELETE CASCADE): <u>email</u> (FK, PK - ON DELETE CASCADE): VARCHAR, percentage (FK - ON DELETE CASCADE, NOT NULL): INTEGER, year session: VARCHAR)

	ুকু EMAIL ÷	ৣক DOCUMENT_ID ÷	ুকু COURSE_ID ÷	<u> </u>	☐ YEAR_SESSION ÷
1	bobjohnson@gmail.com	8	1	95	2015W
2	bobjohnson@gmail.com	8	2	80	2014W
3	bobjohnson@gmail.com	8	3	95	2015W
4	bobjohnson@gmail.com	8	4	73	2013W
5	bobjohnson@gmail.com	8	5	80	2013W

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A list of all SQL queries used and where it can be found in the code (i.e., file name and line number(s)). For SQL query requirements, check the rubric listed on Canvas for Milestone 4

1. INSERT Operation

```
INSERT INTO POSTED_JOB VALUES (?, ?, ?, ?, ?, ?, ?)
```

PostedJobDao.java, Line 30

2. DELETE Operation

```
DELETE FROM COMPANY WHERE COMPANY_ID = ?
```

CompanyDao.java, Line 44

3. UPDATE Operation

```
StringBuilder sql = new StringBuilder("UPDATE POSTED_JOB SET ");
for (UpdatePostedJob.toUpdateFields field : updatePostedJob.toUpdate()) {
    if (field.attribute().equals("job_id")) {
        throw new IllegalArgumentException("Cannot update job_id");
    }
    sql.append(field.attribute()).append(" = ?, ");
}
sql.delete(sql.length() - 2, sql.length());
sql.append(" WHERE job_id = ?");
```

PostedJobDao.java, Line 123-131

4. Selection

```
String query = "SELECT * FROM POSTED_JOB WHERE " + attribute;
if (attribute.equals("salary") || attribute.equals("posted_date")) {
    query = query + " >= ?";
} else {
    query = query + " = ?";
}
```

PostedJobDao.java, Line 72-77

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5. Projection

```
String query = "SELECT" + String.join( delimiter ", ", columns.stream().map(String::toUpperCase).toList()) +

"FROM" + tableName.toUpperCase();
```

MigrationHandler.java, Line 73-74

6. Join

```
"SELECT DISTINCT C.COMPANY_ID, NAME, AVG_VALUE FROM " +

"(SELECT COMPANY_ID, AVG(VALUE) AS AVG_VALUE " +

"FROM Rates " +

"GROUP BY COMPANY_ID) T " +

"RIGHT OUTER JOIN COMPANY C ON T.COMPANY_ID = C.COMPANY_ID " +

"INNER JOIN (SELECT COMPANY_ID FROM POSTED_JOB WHERE POSTED_DATE >= ?) P " +

"ON C.COMPANY_ID = P.COMPANY_ID ";
```

CompanyDao.java, Line 86-92

7. Aggregation with GROUP BY

```
"SELECT P.JOB_ID AS JOB_ID, COMPANY_ID, POSTED_DATE, " +

"POSITION, LOCATION, DESCRIPTION, SALARY, RECRUITER_EMAIL, NUM_APPLICANTS FROM " +

"(SELECT JOB_ID, COUNT(email) AS NUM_APPLICANTS " +

"FROM USER_APPLIES_TO " +

"GROUP BY JOB_ID) T RIGHT OUTER JOIN POSTED_JOB P ON T.JOB_ID = P.JOB_ID " +

"WHERE P.JOB_ID = ?";
```

PostedJobDao.java Line 95-100

8. Aggregation with HAVING

```
"SELECT C.COMPANY_ID, NAME, AVG_VALUE FROM " +

"(SELECT COMPANY_ID, AVG(VALUE) AS AVG_VALUE " +

"FROM Rates " +

"GROUP BY COMPANY_ID " +

"HAVING AVG(VALUE) >= ?) T INNER JOIN COMPANY C ON T.COMPANY_ID = C.COMPANY_ID";
```

CompanyDao.java Line 106-110

9. Nested Aggregation with GROUP BY

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```
"SELECT COMPANY_ID, NAME, AVG_VALUE, AVG_SALARY FROM " +

"(SELECT R.COMPANY_ID AS COMPANY_ID, AVG(R.VALUE) AS AVG_VALUE, AVG(P.SALARY) AS AVG_SALARY " +

"FROM RATES R, POSTED_JOB P " +

"WHERE R.COMPANY_ID = P.COMPANY_ID " +

"GROUP BY R.COMPANY_ID " +

"HAVING AVG(R.VALUE) > (SELECT AVG(R2.VALUE) FROM RATES R2) " +

"AND AVG(R.VALUE) > ? " +

"AND AVG(P.SALARY) > (SELECT AVG(P2.SALARY) FROM POSTED_JOB P2)) NATURAL JOIN COMPANY";
```

CompanyDao.java, Line 124-131

10. Division

```
"SELECT * FROM USER_ACCOUNT U " +
"WHERE NOT EXISTS " +
"((SELECT JOB_ID FROM POSTED_JOB WHERE COMPANY_ID = ?) " +
"MINUS " +
"(SELECT JOB_ID FROM USER_APPLIES_TO UA WHERE UA.EMAIL = U.EMAIL)) " +
"AND EXISTS (SELECT COMPANY_ID FROM POSTED_JOB WHERE COMPANY_ID = ?)";
```

UserAccountDao.java, Line 23-28

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Screenshots demonstrating the functionality of each query using the GUI

1.__INSERT Operation

• We choose to insert to the table POSTED_JOB. This is the DB before:

LOCATION	POSITION	JOB_ID	SALARY	DESCRIPTION	POSTED_DATE	RECRUITER_EMAIL	COMPANY_ID
Toronto	Chef	532000046	25000	Make some amazing food!	2023-04-04 00:00:00		5
Vancouver	Accountant	1	130000	We are seeking a highly motivated and experienced accountant to join our finance team.	2019-01-01 00:00:00	jasonmiller@gmail.com	2
Burnaby	Investment Banker	2	200000	Investment bankers will be responsible for providing strategic financial advice to clients.	2019-01-02 00:00:00	lisawilson@gmail.com	3
Burnaby	Software Engineer	3	93000	The ideal candidate will have strong programming skills.	2019-01-03 00:00:00	lisawilson@gmail.com	3
Vancouver	Software Engineer	5	150000	We are looking for a talented and passionate software engineer to join our development team	n. 2019-01-05 00:00:00 a	andrewwilliams@gmail.com	5
Burnaby	Career Coach	351569472	40000	You will help students get into their dream college!	2023-04-04 00:00:00	mikedavis@gmail.com	5
Alberta	QA Engineer	663816590	40000	You will help test code and validate it!	2023-04-04 00:00:00		3
Vancouver	UI/UX Designer	101310597	30000	Help us create beautiful frontends	2023-04-04 00:00:00		3

• This is achieved through the GUI by visiting the Post Job page in the Company View, inputting values and pressing the SUBMIT button.



POSTED_JOB after. Inserted value can be seen:

				_			
LOCATION	POSITION	JOB_ID	SALARY	DESCRIPTION	POSTED_DATE	RECRUITER_EMAIL	COMPANY_ID
Toronto	Chef	532000046	25000	Make some amazing food!	2023-04-04 00:00:00		5
Vancouver	Accountant	1	130000	We are seeking a highly motivated and experienced accountant to join our finance team.	2019-01-01 00:00:00	jasonmiller@gmail.com	2
Burnaby	Investment Banker	2	200000	Investment bankers will be responsible for providing strategic financial advice to clients.	2019-01-02 00:00:00	lisawilson@gmail.com	3
Burnaby	Software Engineer	3	93000	The ideal candidate will have strong programming skills.	2019-01-03 00:00:00	lisawilson@gmail.com	3
Vancouver	Software Engineer	5	150000	We are looking for a talented and passionate software engineer to join our development team	. 2019-01-05 00:00:00 a	andrewwilliams@gmail.com	5
Burnaby	Career Coach	351569472	40000	You will help students get into their dream college!	2023-04-04 00:00:00	mikedavis@gmail.com	5
Alberta	QA Engineer	663816590	40000	You will help test code and validate it!	2023-04-04 00:00:00		3
Vancouver	UI/UX Designer	101310597	30000	Help us create beautiful frontends	2023-04-04 00:00:00		3
Vancouver	Course Instructor	798090673	70000	You will teach students	2023-04-04 00:00:00	kevinjones@gmail.com	5

2. DELETE Operation

We choose to delete a company from the COMPANY table, which cascades deleting any
job posted by the company in the POSTED_JOB table. This is the DB before:

COMPANY -

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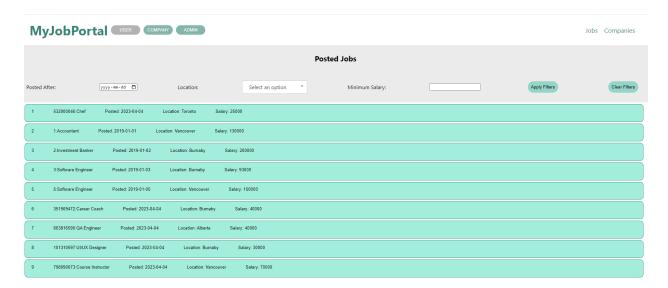
COMPANY_ID NAME

- 1 Acme Corporation
- Widget Industries Global Enterprises 2
- 3
- 5 Future Technologies

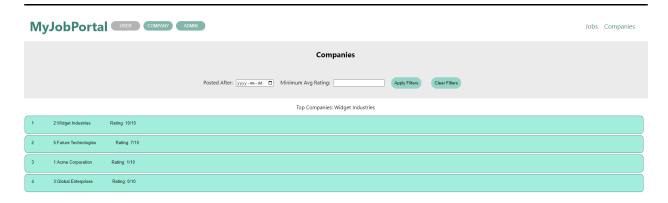
POSTED_JOB -

LOCATION	POSITION	JOB_ID	SALARY	DESCRIPTION	POSTED_DATE	RECRUITER_EMAIL	COMPANY_ID
Toronto	Chef	532000046	25000	Make some amazing food!	2023-04-04 00:00:00		5
Vancouver	Accountant	1	130000	We are seeking a highly motivated and experienced accountant to join our finance team.	2019-01-01 00:00:00	jasonmiller@gmail.com	2
Burnaby	Investment Banker	2	200000	Investment bankers will be responsible for providing strategic financial advice to clients.	2019-01-02 00:00:00	lisawilson@gmail.com	3
Burnaby	Software Engineer	3	93000	The ideal candidate will have strong programming skills.	2019-01-03 00:00:00	lisawilson@gmail.com	3
Vancouver	Software Engineer	5	150000	We are looking for a talented and passionate software engineer to join our development team	. 2019-01-05 00:00:00 a	ndrewwilliams@gmail.com	5
Burnaby	Career Coach	351569472	40000	You will help students get into their dream college!	2023-04-04 00:00:00	mikedavis@gmail.com	5
Alberta	QA Engineer	663816590	40000	You will help test code and validate it!	2023-04-04 00:00:00		3
Burnaby	UI/UX Designer	101310597	30000	Help us create beautiful frontends	2023-04-04 00:00:00 a	ndrewwilliams@gmail.com	3
Vancouver	Course Instructor	798090673	70000	You will teach students	2023-04-04 00:00:00	kevinjones@gmail.com	5

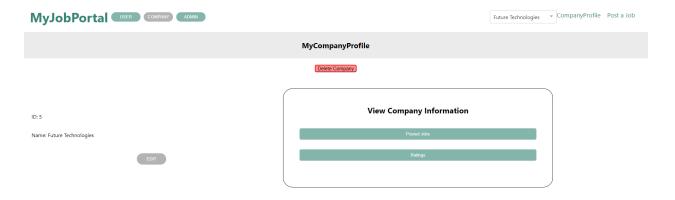
• Before, in the GUI, from the User View you can see the Company in the Companies Page and its Jobs on the Jobs page



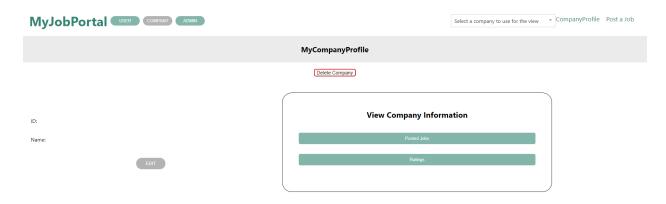
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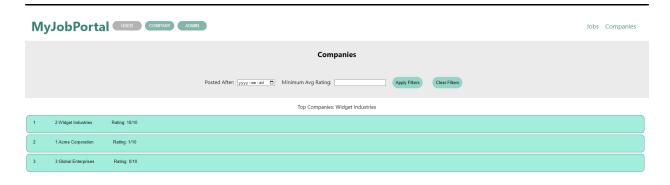
 Now let us delete COMPANY Future Technologies with COMPANY_ID 5. This can be achieved by visiting the Company Profile page through the Company View, selecting this company (see the dropdown in the menu bar). The query can be run by selecting the Delete Company button.

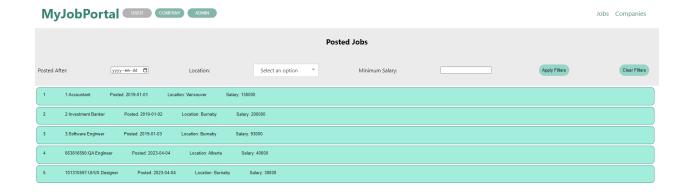


 After the query is run, the Company Profile page will contain blank info till another company is selected in the dropdown. The company can no longer be seen on the Companies Page and all its jobs vanish from the Jobs page.



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• Here is the DB After

COMPANY -

COMPANY_ID NAME

- 1 Acme Corporation
- 2 Widget Industries
- 3 Global Enterprises

POSTED_JOB -

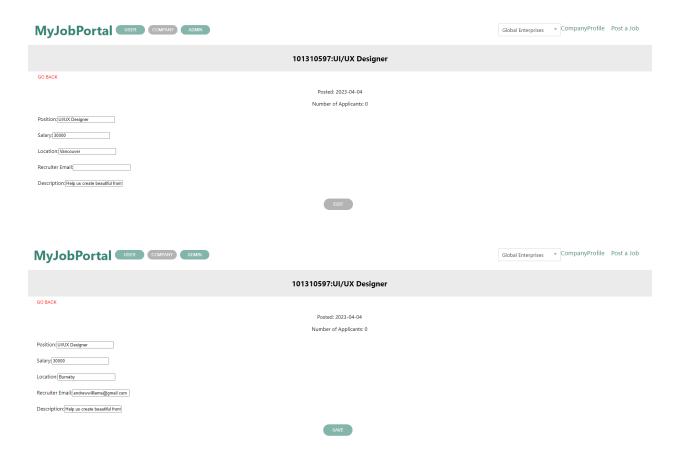
LOCATION	POSITION	JOB_ID	SALARY	DESCRIPTION	POSTED_DATE	RECRUITER_EMAIL	COMPANY_ID
Vancouver	Accountant	1	130000	We are seeking a highly motivated and experienced accountant to join our finance team.	2019-01-01 00:00:00	jasonmiller@gmail.com	2
Burnaby	Investment Banker	2	200000	Investment bankers will be responsible for providing strategic financial advice to clients.	2019-01-02 00:00:00	lisawilson@gmail.com	3
Burnaby	Software Engineer	3	93000	The ideal candidate will have strong programming skills.	2019-01-03 00:00:00	lisawilson@gmail.com	3
Alberta	QA Engineer	663816590	40000	You will help test code and validate it!	2023-04-04 00:00:00		3
Burnaby	UI/UX Designer	101310597	30000	Help us create beautiful frontends	2023-04-04 00:00:00 a	ndrewwilliams@gmail.com	ı 3

3.__UPDATE Operation

• We choose to update a POSTED_JOB. This is the DB before:



 This is achieved through the GUI by visiting the Open Posting Page from the Company View. A user will press the Edit button to edit the details. On pressing submit, the query is run



 This is POSTED_JOB DB After. Notice the change of location to 'Burnaby' and recruiter email to 'andrewwilliams@gmail.com' for the UI/UX Designer job.

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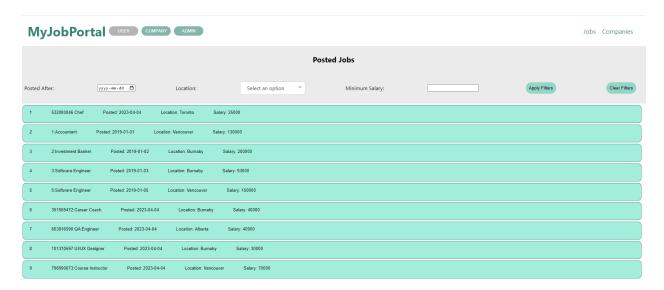
LOCATION	POSITION	JOB ID	SALARY	DESCRIPTION	POSTED DATE	RECRUITER EMAIL	COMPANY ID
Toronto		532000046			2023-04-04 00:00:00		5
Vancouver	Accountant	1	130000	We are seeking a highly motivated and experienced accountant to join our finance team.	2019-01-01 00:00:00	jasonmiller@gmail.com	2
Burnaby	Investment Banker	2	200000	Investment bankers will be responsible for providing strategic financial advice to clients.	2019-01-02 00:00:00	lisawilson@gmail.com	3
Burnaby	Software Engineer	3	93000	The ideal candidate will have strong programming skills.	2019-01-03 00:00:00	lisawilson@gmail.com	3
Vancouver	Software Engineer	5	150000	We are looking for a talented and passionate software engineer to join our development team	n. 2019-01-05 00:00:00 a	ndrewwilliams@gmail.com	n 5
Burnaby	Career Coach	351569472	40000	You will help students get into their dream college!	2023-04-04 00:00:00	mikedavis@gmail.com	5
Alberta	QA Engineer	663816590	40000	You will help test code and validate it!	2023-04-04 00:00:00		3
Burnaby	UI/UX Designer	101310597	30000	Help us create beautiful frontends	2023-04-04 00:00:00 a	ndrewwilliams@gmail.com	3
Vancouver	Course Instructor	798090673	70000	You will teach students	2023-04-04 00:00:00	kevinjones@gmail.com	5

4.__Selection

We choose to select from POSTED_JOB. This is the DB:



• GUI before the query is called

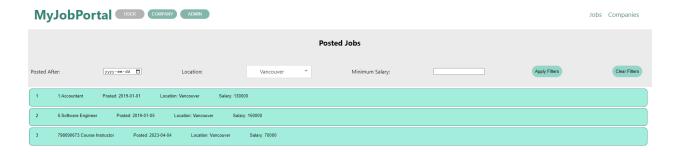


• To select where POSTED_DATE > 2022-06-04. Press the Apply Filters button to run the query.

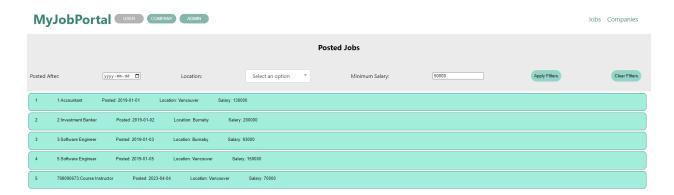
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• On selecting where Location = "Vancouver". Press the Apply Filters button to run the query.



On selecting where SALARY >= 50000. Press the Apply Filters button to run the query.



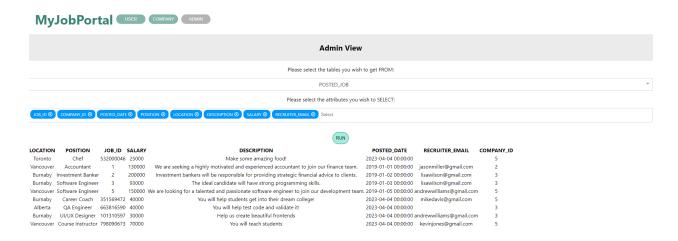
5. Projection

 For this example, we will use the POSTED_JOB relation for demonstration. This is the table before

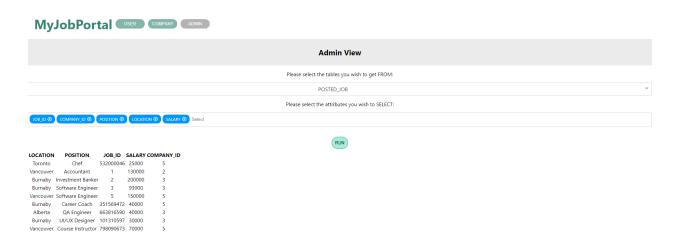
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LOCATION	POSITION	JOB_ID	SALARY	DESCRIPTION	POSTED_DATE	RECRUITER_EMAIL	COMPANY_ID
Toronto	Chef	532000046	25000	Make some amazing food!	2023-04-04 00:00:00		5
Vancouver	Accountant	1	130000	We are seeking a highly motivated and experienced accountant to join our finance team.	2019-01-01 00:00:00	jasonmiller@gmail.com	2
Burnaby	Investment Banker	2	200000	Investment bankers will be responsible for providing strategic financial advice to clients.	2019-01-02 00:00:00	lisawilson@gmail.com	3
Burnaby	Software Engineer	3	93000	The ideal candidate will have strong programming skills.	2019-01-03 00:00:00	lisawilson@gmail.com	3
Vancouver	Software Engineer	5	150000	We are looking for a talented and passionate software engineer to join our development team	. 2019-01-05 00:00:00	andrewwilliams@gmail.com	n 5
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Alberta	QA Engineer	663816590	40000	You will help test code and validate it!	2023-04-04 00:00:00		3
Burnaby	UI/UX Designer	101310597	30000	Help us create beautiful frontends	2023-04-04 00:00:00 a	andrewwilliams@gmail.com	3
Vancouver	Course Instructor	798090673	70000	You will teach students	2023-04-04 00:00:00	kevinjones@gmail.com	5

 This is the GUI with all attributes selected. The user can choose which attributes of the table to select. This can be accessed through the Admin View. The query is run on clicking the run button



This is the GUI with fewer than all attributes selected.



6. Join

 We join COMPANY and POSTED_JOB to select which companies have posted a job after a user inputted date. Here are the COMPANY and POSTED_JOB DBs before

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COMPANY -

COMPANY_ID NAME 1 Acme Corporation 2 Widget Industries 3 Global Enterprises 5 Future Technologies

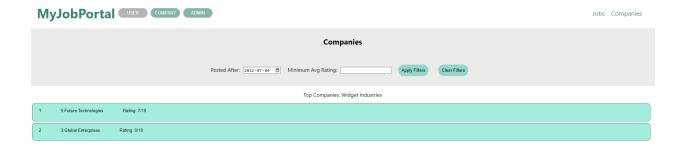
POSTED_JOB -

				_			
LOCATION	POSITION	JOB_ID	SALARY	DESCRIPTION	POSTED_DATE	RECRUITER_EMAIL	COMPANY_ID
Toronto	Chef	532000046	25000	Make some amazing food!	2023-04-04 00:00:00		5
Vancouver	Accountant	1	130000	We are seeking a highly motivated and experienced accountant to join our finance team.	2019-01-01 00:00:00	jasonmiller@gmail.com	2
Burnaby	Investment Banker	2	200000	Investment bankers will be responsible for providing strategic financial advice to clients.	2019-01-02 00:00:00	lisawilson@gmail.com	3
Burnaby	Software Engineer	3	93000	The ideal candidate will have strong programming skills.	2019-01-03 00:00:00	lisawilson@gmail.com	3
Vancouver	Software Engineer	5	150000	We are looking for a talented and passionate software engineer to join our development team	. 2019-01-05 00:00:00	andrewwilliams@gmail.com	n 5
Burnaby	Career Coach	351569472	40000	You will help students get into their dream college!	2023-04-04 00:00:00	mikedavis@gmail.com	5
Alberta	QA Engineer	663816590	40000	You will help test code and validate it!	2023-04-04 00:00:00		3
Burnaby	UI/UX Designer	101310597	30000	Help us create beautiful frontends	2023-04-04 00:00:00	andrewwilliams@gmail.com	n 3
Vancouver	Course Instructor	798090673	70000	You will teach students	2023-04-04 00:00:00	kevinjones@gmail.com	5

• The GUI contains a Posted After filter on the Companies page in the User View. GUI Before:



The query is run on clicking the Apply Filters Button. GUI after.



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7. Aggregation with GROUP BY

• We run the query on the table USER_APPLIES_TO grouped by jobld to get the count or number of users that have applied to a given jobld. This is the table.

JOB_ID	EMAIL	APPLIED	DATE
1	janedoe@gmail.com	2019-01-03	00:00:00
2	tombrown@gmail.com	2019-01-03	00:00:00
3	bobjohnson@gmail.com	2019-01-07	00:00:00
5	bobjohnson@gmail.com	2019-01-07	00:00:00
5	janedoe@gmail.com	2019-01-08	00:00:00

 In the GUI this query is automatically run when the page is rendered. It can be viewed on the job posting page from the Company View. Please notice the "Number of Applicants" text for the jobID 5 shown below.



8. Aggregation with HAVING

• We run the query on the table RATES grouped by COMPANY_ID having an avg(score) higher than the user inputted value. Here is the RATES table.

VALUE	EMAIL	COMPANY_ID	R_COMMENT
1	janedoe@gmail.com	1	This company is terrible
10	janedoe@gmail.com	2	Fantastic company with great culture!
7	tombrown@gmail.com	5	

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 This query can be accessed on the Companies page of the User View by using the Minimum Avg Rating Filter. The query is run on pressing the Apply Filters button. Here is the GUI before.



This is the GUI after running the query



9. Nested Aggregation with GROUP BY

 We choose to obtain the companies with avg(rating value) higher than the avg of all companies, and also have jobs with avg(salary) higher than avg(salary) of all jobs. For this we use the COMPANY, RATES and POSTED_JOB tables.

COMPANY -

COMPANY_ID	NAME
1	Acme Corporation
2	Widget Industries
3	Global Enterprises
5	Future Technologies

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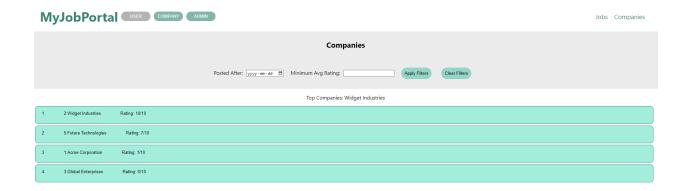
RATES -

VALUE	EMAIL	COMPANY_ID	R_COMMENT
1	janedoe@gmail.com	1	This company is terrible
10	janedoe@gmail.com	2	Fantastic company with great culture!
7	tombrown@gmail.com	5	

POSTED_JOB-

POSITION	JOB_ID	SALARY	DESCRIPTION	POSTED_DATE	RECRUITER_EMAIL	COMPANY_ID
Chef	532000046	25000	Make some amazing food!	2023-04-04 00:00:00		5
Accountant	1	130000	We are seeking a highly motivated and experienced accountant to join our finance team.	2019-01-01 00:00:00	jasonmiller@gmail.com	2
Investment Banker	2	200000	Investment bankers will be responsible for providing strategic financial advice to clients.	2019-01-02 00:00:00	lisawilson@gmail.com	3
Software Engineer	3	93000	The ideal candidate will have strong programming skills.	2019-01-03 00:00:00	lisawilson@gmail.com	3
Software Engineer	5	150000	We are looking for a talented and passionate software engineer to join our development team	n. 2019-01-05 00:00:00	andrewwilliams@gmail.con	n 5
Career Coach	351569472	40000	You will help students get into their dream college!	2023-04-04 00:00:00	mikedavis@gmail.com	5
QA Engineer	663816590	40000	You will help test code and validate it!	2023-04-04 00:00:00		3
UI/UX Designer	101310597	30000	Help us create beautiful frontends	2023-04-04 00:00:00	andrewwilliams@gmail.con	n 3
Course Instructor	798090673	70000	You will teach students	2023-04-04 00:00:00	kevinjones@gmail.com	5
					nernyenese gmameem	
	Chef Accountant Investment Banker Software Engineer Software Engineer Career Coach QA Engineer UI/UX Designer	Chef 53200046 Accountant 1 Investment Banker 2 Software Engineer 3 Software Engineer 5 Career Coach 351569472 QA Engineer 663816590 UI/UX Designer 101310597	Chef 53200046 25000 Accountant 1 130000 Investment Banker 2 200000 Software Engineer 3 93000 Software Engineer 5 150000 Career Coach 351569472 40000 QA Engineer 663816590 40000	Chef 53200046 25000 Make some amazing food! Accountant 1 130000 We are seeking a highly motivated and experienced accountant to join our finance team. Investment Banker 2 200000 Investment bankers will be responsible for providing strategic financial advice to clients. Software Engineer 3 93000 The ideal candidate will have strong programming skills. Software Engineer 5 150000 We are looking for a talented and passionate software engineer to join our development team Career Coach 351569472 40000 We are looking for a talented and passionate software engineer to join our development team QA Engineer 663816590 40000 You will help students get into their dream college! UI/UX Designer 101310597 30000 Help us create beautiful frontends	Chef 53200046 2500 Make some amazing food! 2023-04-04 00:00:00 Accountant 1 130000 We are seeking a highly motivated and experienced accountant to join our finance team. 2019-01-01 00:00:00 Investment Banker 2 200000 Investment bankers will be responsible for providing strategic financial advice to clients. 2019-01-02 00:00:00 Software Engineer 3 93000 The ideal candidate will have strong programming skills. 2019-01-03 00:00:00 Software Engineer 5 150000 We are looking for a talented and passionate software engineer to join our development team. 2019-01-05 00:00:00 Career Coach 351569472 40000 You will help students get into their dream college! 2023-04-04 00:00:00 QA Engineer 663816590 40000 You will help test code and validate it! 2023-04-04 00:00:00 UI/UX Designer 101310597 30000 Help us create beautiful frontends 2023-04-04 00:00:00	Chef 53200046 25000 Make some amazing food! 2023-04-04 00:00:00 jasonmiller@gmail.com Accountant 1 130000 We are seeking a highly motivated and experienced accountant to join our finance team. 2019-01-01 00:00:00 jasonmiller@gmail.com Investment Banker 2 200000 Investment bankers will be responsible for providing strategic financial advice to clients. 2019-01-02 00:00:00 lisawilson@gmail.com Software Engineer 3 93000 The ideal candidate will have strong programming skills. 2019-01-03 00:00:00 lisawilson@gmail.com Software Engineer 5 150000 We are looking for a talented and passionate software engineer to join our development team. 2019-01-03 00:00:00 and rewwilliams@gmail.com Career Coach 351569472 40000 You will help students get into their dream college! 2023-04-04 00:00:00 mikedavis@gmail.com QA Engineer 663816590 40000 You will help test code and validate it! 2023-04-04 00:00:00 2023-04-04 00:00:00 UI/UX Designer 101310597 30000 Help us create beautiful frontends 2023-04-04 00:00:00 and rewwilliams@gmail.com

• In the GUI this query is automatically run when the page is rendered. It can be viewed on the companies page from the User View. Please notice the "Top Companies" banner shown below.



10.__Division

 We choose to find all users that have applied to all jobs in a company. For this we use the POSTED_JOB and USER_APPLIES_TO tables

POSTED_JOB -

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LOCATION	POSITION	JOB_ID	SALARY	DESCRIPTION	POSTED_DATE	RECRUITER_EMAIL	COMPANY_ID
Toronto	Chef	532000046	25000	Make some amazing food!	2023-04-04 00:00:00		5
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Burnaby	Software Engineer	3	93000	The ideal candidate will have strong programming skills.	2019-01-03 00:00:00	lisawilson@gmail.com	3
Vancouver	Software Engineer	5	150000	We are looking for a talented and passionate software engineer to join our development team	. 2019-01-05 00:00:00 a	andrewwilliams@gmail.com	5
Burnaby	Career Coach	351569472	40000	You will help students get into their dream college!	2023-04-04 00:00:00	mikedavis@gmail.com	5
Alberta	QA Engineer	663816590	40000	You will help test code and validate it!	2023-04-04 00:00:00		3
Burnaby	UI/UX Designer	101310597	30000	Help us create beautiful frontends	2023-04-04 00:00:00 a	andrewwilliams@gmail.com	3
Vancouver	Course Instructor	798090673	70000	You will teach students	2023-04-04 00:00:00	kevinjones@gmail.com	5

USER_APPLIES_TO -

JOB_ID	EMAIL	APPLIED	DATE
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2	tombrown@gmail.com	2019-01-03	00:00:00
3	bobjohnson@gmail.com	2019-01-07	00:00:00
5	bobjohnson@gmail.com	2019-01-07	00:00:00
5	ianedoe@amail.com	2019-01-08	00:00:00

• In the GUI this query is automatically run when the page is rendered. It can be viewed on the Open Posting page from the Company View. Please notice the "Users that have applied to all jobs" banner shown below. The current company who's account we are viewing the portal through is Widget Industries with a COMPANY_ID of 2

