

INNOVATIVE ASSIGNMENT

RELATIONAL ALGEBRA AND SQL QUERY SIMULATOR

PROJECT FEATURES -

- 1) Allows creation, deletion, updation and insertion of records in tables
- 2) Allows conversion of SQL query to Relational Algebra and vice versa
- 3) Provides for retrieving data from tables using SQL queries
- 4) Interactive GUI built using Tkinter library of python

PROJECT DEMONSTRATION –

- 1) Creating table **Department** -

SQL Query –

create table department(deptno number(10), dname varchar2(14), loc varchar2(13));

Input Screen-

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20BCE016 Arunima Barik
20BCE079 Gaurav Golchha

SQL TO RA RA TO SQL

Queries

create table department(deptno numbe:

Execute

Successful

2) Inserting data into table **Department** -

SQL Queries-

```
insert into department values(30, 'ACCOUNTING', 'NEW YORK');
```

```
insert into department values(60, 'RESEARCH', 'DALLAS');
```

```
insert into department values(90, 'SALES', 'CHICAGO');
```

```
insert into department values(110, 'MARKETING', 'BOSTON');
```

Input Screen-

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SQL TO RA RA TO SQL

Queries

insert into department values(30, 'ACC

Execute

Successful

3) Creating table **Employees** -

SQL Query –

```
CREATE TABLE employees( employee_id NUMBER(6),first_name VARCHAR2(20),last_name  
VARCHAR2(25),email VARCHAR2(25),phone_number VARCHAR2(20),hire_date DATE,job_id  
VARCHAR2(40),salary NUMBER(8,2),commission_pct NUMBER(2,2),manager_id  
NUMBER(6),department_id NUMBER(4));
```

Input Screen –

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20BCE012 Meet Amin 20BCE016 Arunima Barik 20BCE079 Gaurav Golchha	<div>SQL TO RA</div> <div>RA TO SQL</div>
<div>Queries</div> <div>CREATE TABLE employees(employe</div> <div><div>Execute</div></div> <div>Successful</div>	

4) Inserting data into table **Employees** -

SQL Queries –

```
INSERT INTO employees VALUES(106, 'Valli', 'Pataballa', 'VPATABAL', '590.423.4560',  
TO_DATE('2001-09-20', 'YYYY-MM-DD'), 'FINANCE ACCOUNTANT', 4800.00, 0.00, 103, 60);
```

```
INSERT INTO employees VALUES(114, 'Den', 'Raphaely',  
'DRAPHEAL', '515.127.4561', TO_DATE('1990-09-01', 'YYYY-MM-DD'), 'SALES  
CLERK', 11000.00, 0.00, 100, 30);
```

```
INSERT INTO employees VALUES(119, 'Karen', 'Colmenares', 'KCOLMENA', '515.127.4566',  
TO_DATE('1987-07-06', 'YYYY-MM-DD'), 'CLERK', 2500.00, NULL, 114, 30);
```

```
INSERT INTO employees VALUES(206, 'William', 'Gietz', 'WGIETZ', '515.123.8181',  
TO_DATE('2005-07-06', 'YYYY-MM-DD'), 'ACCOUNTANT', 8300.00, NULL, 205, 110);
```

Input Screen-

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SQL TO RA

RA TO SQL

Queries

INSERT INTO employees VALUES(10

Execute

Successful

5) Visualizing tables just created –

Department-

select * from department;

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SQL TO RA

RA TO SQL

Queries

Execute

select * from department;

Submit

Output –

SQL OUTPUT	
30	ACCOUNTING NEW YORK
60	RESEARCH DALLAS
90	SALES CHICAGO
110	MARKETING BOSTON

Employees –

select * from employees;

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20BCE012 Meet Amin 20BCE016 Arunima Barik 20BCE079 Gaurav Golchha	SQL TO RA	RA TO SQL
Queries	select * from employees;	
Execute	Submit	

Output-

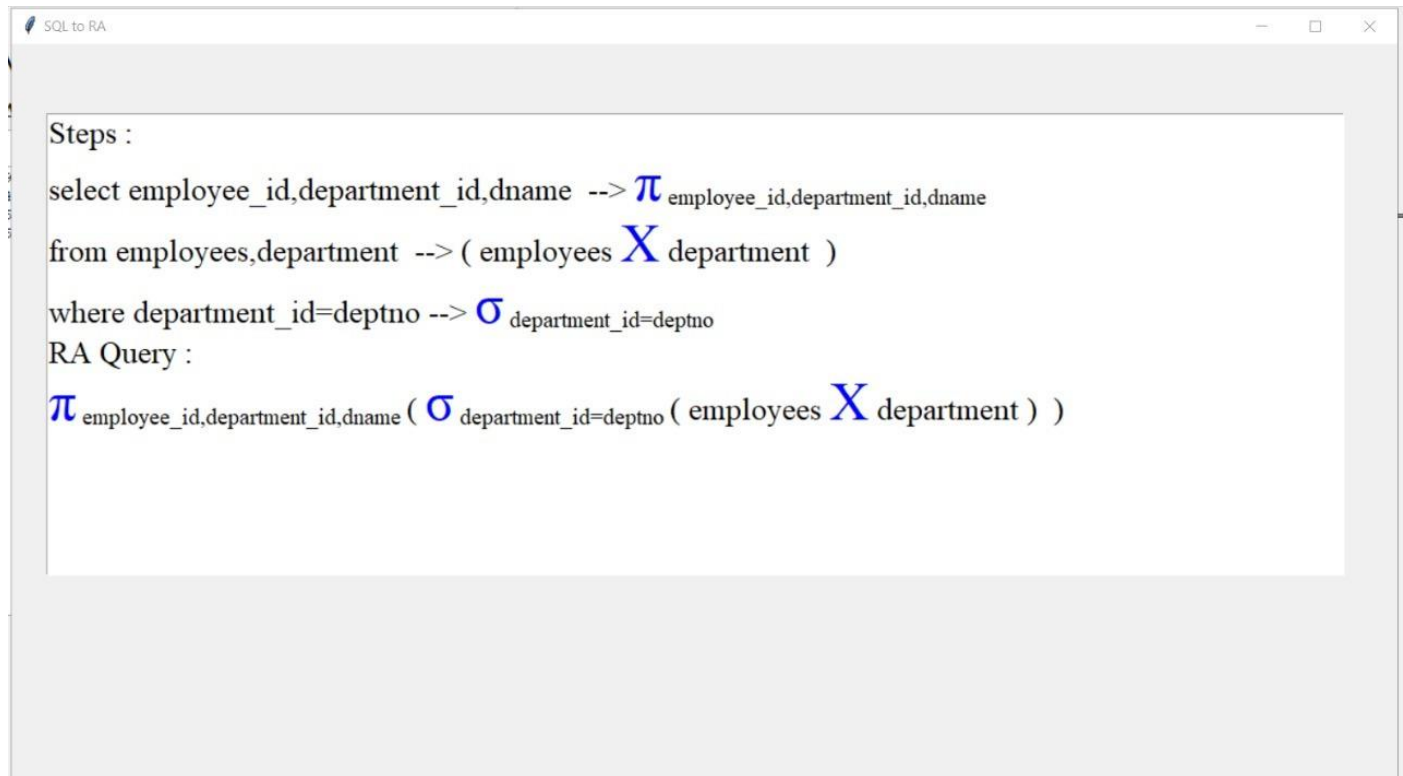
SQL OUTPUT	
106 3 60 114 119 206	Valli Fatabella VFATABAL 590.423.4560 2001-09-20 00:00:00 FINANCE ACCOUNTANT 4800.0 0.0 10 Den Raphaely DRAPHEAL 515.127.4561 1990-09-01 00:00:00 SALES CLERK 11000.0 0.0 100 30 Karen Colmenares KCOLMENA 515.127.4566 1987-07-06 00:00:00 CLERK 2500.0 None 114 30 William Gietz WGIETZ 515.123.8181 2005-07-06 00:00:00 ACCOUNTANT 8300.0 None 205 110

6) Convert an **SQL query** to **Relational Algebra** and retrieve its output –

SQL Query-

```
select employee_id,department_id,dname from employees,department where  
department_id=deptno;
```

Relational Algebra –



The screenshot shows a window titled "SQL to RA" with the following content:

Steps :

select employee_id,department_id,dname --> $\pi_{\text{employee_id,department_id,dname}}$

from employees,department --> (employees \times department)

where department_id=deptno --> $\sigma_{\text{department_id=deptno}}$

RA Query :

$\pi_{\text{employee_id,department_id,dname}} (\sigma_{\text{department_id=deptno}} (\text{employees} \times \text{department}))$

Output-



The screenshot shows a window titled "SQL OUTPUT" with the following data:

119	30	ACCOUNTING
114	30	ACCOUNTING
106	60	RESEARCH
206	110	MARKETING

7) Convert **Relational Algebra** to **SQL query** and retrieve its output –

Relational Algebra –

$\pi_{\text{deptno,dname}}(\text{department}) \cup \pi_{\text{department_id,first_name}}(\sigma_{\text{employee_id} > 100}(\text{employees}))$

SQL Query –

```
DBMS Innovative Assignment
```

Steps :

π deptno,dname --> select deptno,dname
department --> from department

\cup --> union

π department_id,first_name --> select department_id,first_name
 σ employee_id>100 --> where employee_id>100
employees --> from employees

SQL Query :
select deptno,dname from department union select department_id,first_name from employees where e
mployee_id>100;

Output –

```
SQL OUTPUT
```

30	ACCOUNTING
30	Den
30	Karen
60	RESEARCH
60	Valli
90	SALES
110	MARKETING
110	William

ROLL NUMBERS –

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