Basic SQL Commands.

The basic form of an SQL query is:

SELECT [DISTINCT] {*| column_name (, column_name,…)}
FROM table_name [alias] (, table_name,…)
[WHERE condition]
[GROUP BY column_list] [HAVING condition]
[ORDER BY column_list].

SELECT specifies which columns are to appear in the output
DISTINCT eliminates duplicates
FROM specifies the tables to be used
WHERE filters the rows according to the condition
The where condition is a boolean combination (using AND, OR, and NOT) of conditions of the form *expression op expression* where op is one of the comparison operators (<, <=, =, <>, >=, >)
GROUP BY forms groups of rows with the same column value
HAVING filters the group
ORDER BY sorts the order of the output

Aggregate Operators
In addition to retrieving data you can perform summarization or computation. SQL supports 5 aggregate operations:
1. COUNT (A) : The no. of values in the A column.
2. SUM (A) : The sum of all values in the A column.
3. AVG (A) : The average of all values in the A column.
4. MAX (A) : The maximum value in the A column.
5. MIN (A) : The minimum value in the A column

The answer to a query is itself a relation whose contents can be understood by considering the following conceptual evaluation strategy.

1. Compute the cross product of the tables in the form list.
2. Delete the rows that fail the condition test.
3. Delete all columns that do not appear in the select list.
4. If distinct is specified, eliminate duplicate rows.

Steps to writing a simple query using an example.

List the names of movies made in 1996.

1. Check the database schema. The movie table has attributes: title, production_year, country, run_time, major_genre. To determine the movies made in 1996 we need only look at the movie table.

2. Always use the select statement. Select what you want to list, in this case the title.

3. Build the statement in the form:

```
SELECT column_name FROM table_name
WHERE  condition;
```

The where statement filters the records so you get only those required.

```
SELECT title
FROM movie
WHERE production_year = 1995;
```

In this case because the year is numeric you can make a straight comparison WHERE production_year = 1996.

What year was Traffic produced?

Following the steps we get

```
SELECT production_year
FROM movie
WHERE title = 'Traffic';
```

In this case you need to use ‘single quotes’ around the name that you are looking for. If you are unsure of the exact spelling or require a more generic comparison use the wildcard % followed by the search string eg

```
WHERE title LIKE '%Traffic%';
```

Steps to writing a simple query using more than one table by example.

Who was the director of Traffic?

1. Check the database schema. The DIRECTOR table has attributes: id, title, production_year. Looking at the foreign key constraints:

[title, production_year] $\subseteq$ MOVIE [title, production_year]
[id] $\subseteq$ PERSON[id]

The PERSON table has attributes id, first_name, last_name, year_born. To determine the director of Traffic you need to access the DIRECTOR table and the PERSON table. You do not need the movie table as in this case it contains identical information.

2. Always use the select statement. Select what you want to list, in this case the name.

3. Build the statement in the form:

```
SELECT column_name [,column_name]
FROM table_name [,table_name]
WHERE  condition;
```

The WHERE statement is used to find the corresponding records based on the foreign key. In this case the id.

```
SELECT first_name, last_name
FROM person, director
WHERE person.id=director.id
and director.title = 'Traffic';
```

When you use more than one table you must specify both the table and the column name. For simplicity and to save typing use an alias, it can be anything but is commonly the initial letter of the tablename:

```
SELECT first_name, last_name
FROM person p, director d
WHERE p.id=d.id
and d.title = 'Traffic';
```

Exercises.

You will need to select the MOVIES database to work from.

1. List all movies alphabetically from Z to A.
2. List from most recent to oldest the title, genre and year of all NZ movies.
3. List all writers once only.
4. List all directors born before 1950.
5. List all Italian and German movies.
6. Who were the actors in “The Birds”?
7. What is the oldest movie?
8. How many actors are in the database?
9. List all people who have written 2 or more movies.
10. List those movies and their runtime that lie within 10% of the average length.