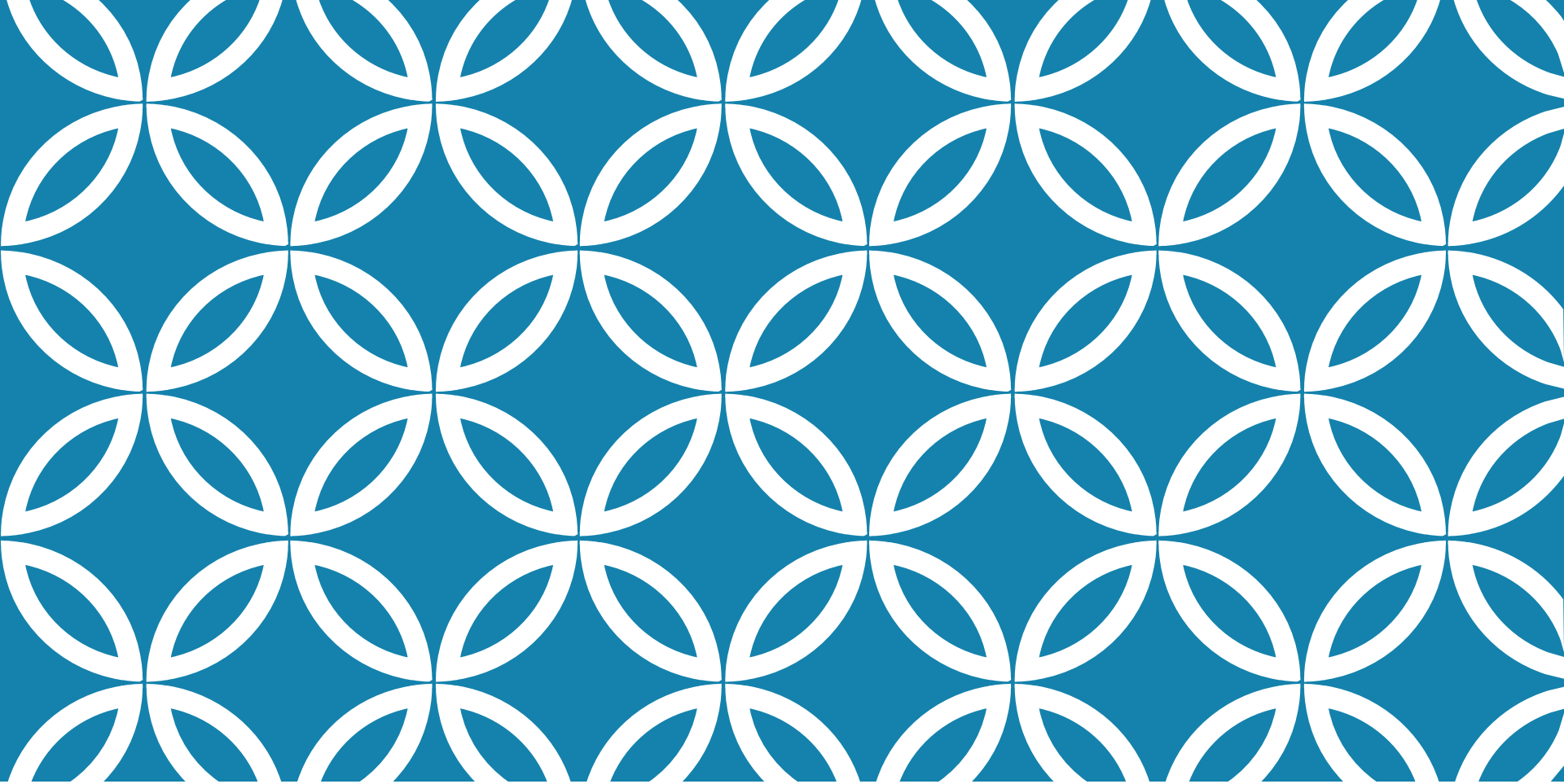


MORE SQL DATA DEFINITION

Database Systems

IN THIS LECTURE

More SQL

- DROP TABLE
- ALTER TABLE
- INSERT, UPDATE, and DELETE
- Data dictionary
- Sequences

For more information

- Connolly and Begg chapters 5 and 6

CREATING TABLES

From last lecture…

- CREATE TABLE
- Columns
  - Data types
  - [NOT] NULL, DEFAULT values
- Constraints
  - Primary keys
  - Unique columns
  - Foreign keys

```
CREATE TABLE
<name> (
  <col-def-1>,
  <col-def-2>,
        :
  <col-def-n>,
  <constraint-1>,
        :
  <constraint-k>)
```

DELETING TABLES

To delete a table use

```
DROP TABLE
   [IF EXISTS]
   <name>
```

Example:

```
DROP TABLE Module
```

BE CAREFUL with any SQL statement with DROP in it

- You will delete any information in the table as well
- You won't normally be asked to confirm
- There is no easy way to undo the changes

CHANGING TABLES

Sometimes you want to change the structure of an existing table

- One way is to DROP it then rebuild it
- This is dangerous, so there is the ALTER TABLE command instead

ALTER TABLE can

- Add a new column
- Remove an existing column
- Add a new constraint
- Remove an existing constraint

ALTERING COLUMNS

To add or remove columns use

```
ALTER TABLE <table>
 ADD COLUMN <col>

ALTER TABLE <table>
 DROP COLUMN <name>
```

Examples

```
ALTER TABLE Student
   ADD COLUMN
   Degree VARCHAR(50)

ALTER TABLE Student
   DROP COLUMN Degree
```

ALTERING CONSTRAINTS

To add or remove columns use

```
ALTER TABLE <table>
   ADD CONSTRAINT
        <definition>

ALTER TABLE <table>
   DROP CONSTRAINT
         <name>
```

Examples

```
ALTER TABLE Module
   ADD CONSTRAINT
   ck UNIQUE (title)

ALTER TABLE Module
   DROP CONSTRAINT ck
```

INSERT, UPDATE, DELETE

INSERT - add a row to a table

UPDATE - change row(s) in a table

DELETE - remove row(s) from a table

UPDATE and **DELETE** use '**WHERE** clauses' to specify which rows to change or remove

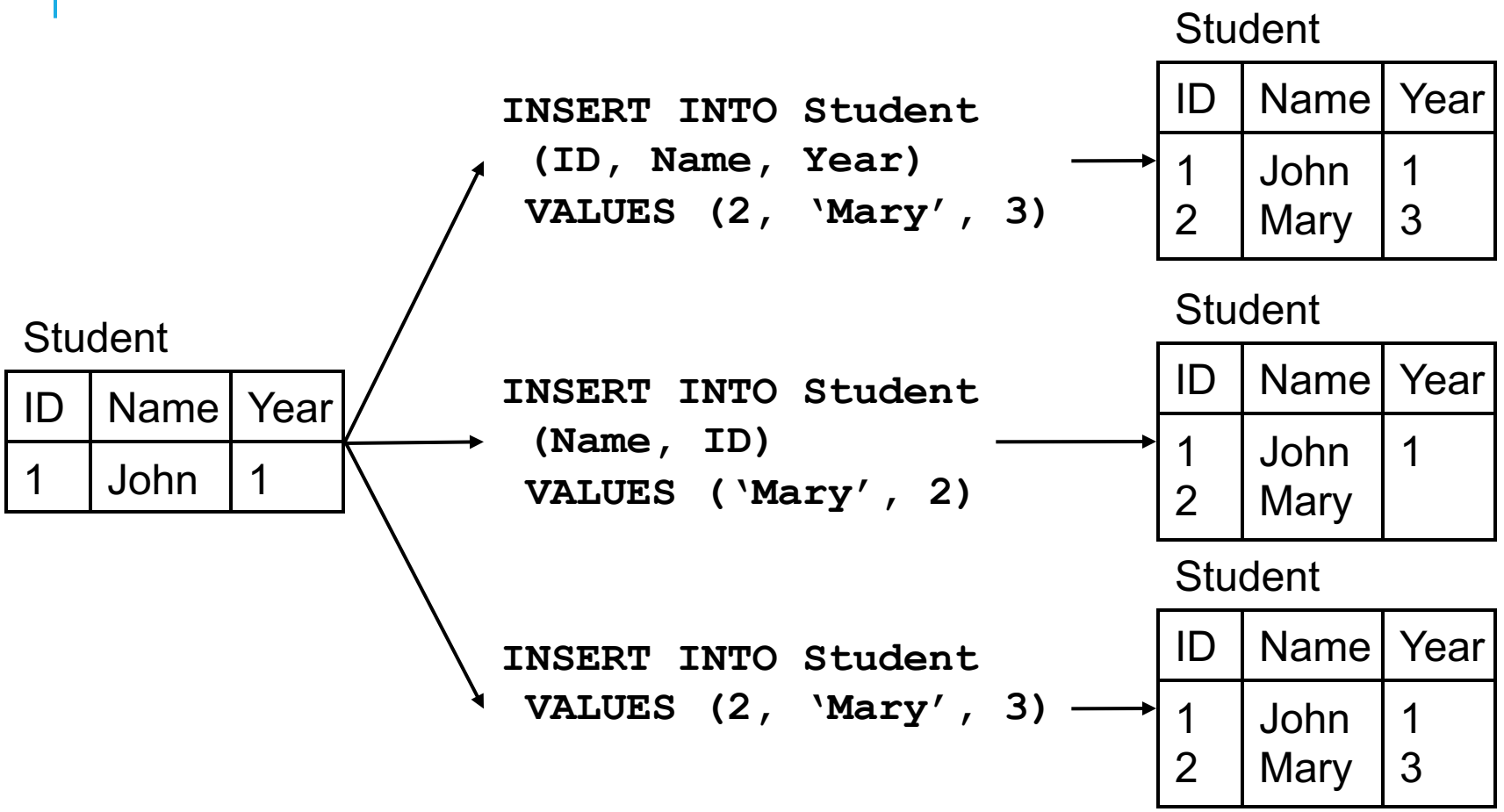
BE CAREFUL with these - an incorrect **WHERE** clause can destroy lots of data

INSERT

```
INSERT INTO
   <table>
   (col1, col2, …)
   VALUES
   (val1, val2, …)
```

- The number of columns and values must be the same
- If you are adding a value to every column, you don't have to list them
- SQL doesn't require that all rows are different (unless a constraint says so)

INSERT


Student
ID
Name
Year
1
John
1
INSERT INTO Student
(ID, Name, Year)
VALUES (2, 'Mary', 3)
INSERT INTO Student
(Name, ID)
VALUES ('Mary', 2)
INSERT INTO Student
VALUES (2, 'Mary', 3)
Student
ID
Name
Year
1
2
John
Mary
1
3
Student
ID
Name
Year
1
2
John
Mary
1
Student
ID
Name
Year
1
2
John
Mary
1
3

UPDATE

```
UPDATE <table>
SET col1 = val1
   [,col2 = val2…]
[WHERE
  <condition>]
```

- All rows where the condition is true have the columns set to the given values
- If no condition is given all rows are changed so BE CAREFUL
- Values are constants or can be computed from columns

UPDATE

Student

ID	Name	Year
1	John	1
2	Mark	3
3	Anne	2
4	Mary	2

```
UPDATE Student
SET Year = 1,
    Name = 'Jane'
WHERE ID = 4
```

Student

ID	Name	Year
1	John	1
2	Mark	3
3	Anne	2
4	Jane	1

```
UPDATE Student
SET Year = Year + 1
```

Student

ID	Name	Year
1	John	2
2	Mark	4
3	Anne	3
4	Mary	3

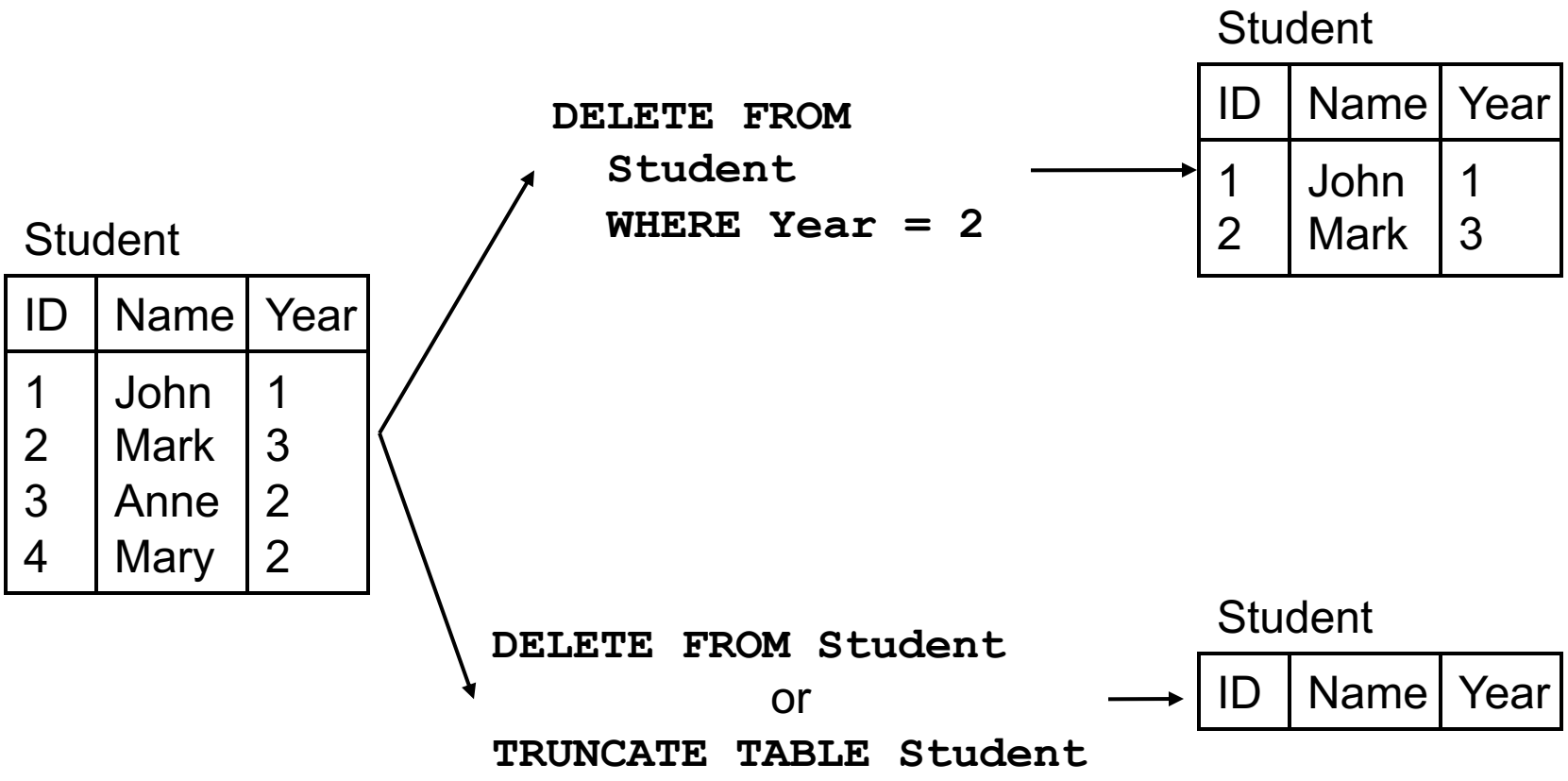
DELETE

Removes all rows which satisfy the condition

```
DELETE FROM
   <table>
   [WHERE
    <condition>]
```

- If no condition is given then ALL rows are deleted - BE CAREFUL
- Some versions of SQL also have **`TRUNCATE TABLE <T>`** which is like **`DELETE FROM <T>`** but it is quicker as it doesn't record its actions

DELETE


Student
ID Name Year
1 John 1
2 Mark 3
3 Anne 2
4 Mary 2
DELETE FROM
Student
WHERE Year = 2
Student
ID Name Year
1 John 1
2 Mark 3
DELETE FROM Student
or
TRUNCATE TABLE Student
Student
ID Name Year

SELECT

The SQL command you will use most often

- Queries a set of tables and returns results as a table
- Lots of options, we will look at many of them
- Usually more than one way to do any given query

SQL SELECT OVERVIEW

```
SELECT
 [DISTINCT | ALL] <column-list>
 FROM <table-names>
 [WHERE <condition>]
 [ORDER BY <column-list>]
 [GROUP BY <column-list>]
 [HAVING <condition>]
```

([] - optional, | - or)

SIMPLE SELECT

```
SELECT <columns>
   FROM <table>
```

<columns> can be

- A single column
- A comma-separated list of columns
- * for 'all columns'

Given a table Student with columns

- stuID
- stuName
- stuAddress
- stuYear

SAMPLE SELECTS

```
SELECT * FROM Student
```

stuID	*stuName*	*stuAddress*	*stuYear*
1	Anderson	15 High St	1
2	Brooks	27 Queen's Rd	3
3	Chen	Lenton Hall	1
4	D'Angelo	Derby Hall	1
5	Evans	Lenton Hall	2
6	Franklin	13 Elm St	3
7	Gandhi	Lenton Hall	1
8	Harrison	Derby Hall	1

SAMPLE SELECTS

```
SELECT stuName FROM Student
```

stuName
Anderson
Brooks
Chen
D'Angelo
Evans
Franklin
Gandhi
Harrison

SAMPLE SELECTS

```
SELECT stuName, stuAddress
  FROM Student
```

stuName	*stuAddress*
Anderson	15 High St
Brooks	27 Queen's Rd
Chen	Lenton Hall
D'Angelo	Derby Hall
Evans	Lenton Hall
Franklin	13 Elm St
Gandhi	Lenton Hall
Harrison	Derby Hall

BEING CAREFUL

When using DELETE and UPDATE

- You need to be careful to have the right WHERE clause
- You can check it by running a SELECT statement with the same WHERE clause first

Before running

```
DELETE FROM Student
    WHERE Year = 3
```

run

```
SELECT * FROM Student
    WHERE Year = 3
```

ORACLE DATA DICTIONARY

To find out what tables and sequences you have defined use

```
SELECT table_name
   FROM user_tables
```

- The user_tables table is maintained by Oracle
- It has *lots* of columns, so don't use

```
SELECT * FROM user_tables
```

ORACLE DATA DICTIONARY

To find the details of a table use

```
DESCRIBE <table name>
```

Example:

```
SQL> DESCRIBE Student;
 Name          Null?    Type
 ------------ -------- ----------
 STUID         NOT NULL NUMBER(38)
 STUNAME       NOT NULL VARCHAR2(50)
 STUADDRESS             VARCHAR2(50)
 STUYEAR                NUMBER(38)
```

EXERCISE

Track

cID	Num	Title	Time	aID
1	1	Reason	239	1
1	2	I love you	410	1
1	3	Breathless	217	1
1	4	I am no 4	279	1
2	1	Lion	362	1
2	2	Catman	417	2

CD

cID	Title	Price
1	Mix	19.99
2	Compilation	11.99

Artist

aID	Name
1	Jango
2	Ranna

1. Create the tables above using the create table query
2. Add the appropriate constraints.
3. Insert data using the insert query
4. Demonstrate a delete and edit query

PROVIDE THE SQL STATEMENTS FOR THE FOLLOWING

1. All tracks having the number 1.
2. Track with the title “Lion”
3. CD with the price of below 12 dollars.
4. Artist named Jango
5. Track with time range of 200 to 300