



Introduction to Database Systems: CS312

Building Larger Database systems

A discussion of code

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Let's Consider This ...

From last time

Consider This

Example Code

Automate
Data Entry

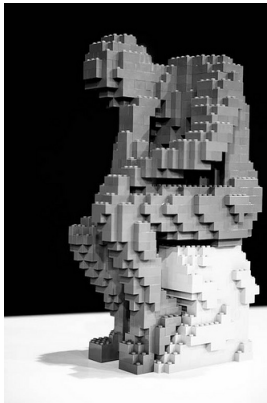
CSV files

Populating

Create some
tables

Queries

Consider This
...



(Rodin's *Thinker*)

- Can you design and populate a database? **YES!!!**
- Can you run queries to access particular attributes? **YES!!!**

Example Code Department Table

Consider This

Example Code

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Queries

Consider This

...

Create

```
DROP TABLE Department;  
CREATE TABLE Department (  
  id VARCHAR NOT NULL PRIMARY KEY,  
  dept VARCHAR NOT NULL,  
  roomNum VARCHAR NOT NULL  
);
```

Populate

```
INSERT INTO department VALUES ("OBC","CS","104" );
```

Data

ID	Dept	RoomNum
JJ	CS	105
OBC	CS	104
AM	CS	106
GK	CS	108
PL	CS	110
DW	CS	112
MC	GEO	209
RO	GEO	203
SR	GEO	001
SS	GEO	201
KT	GEO	204

Example Code Tea Table

Consider This

Example Code

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Queries

Consider This

...

Create

```
DROP TABLE Tea;  
CREATE TABLE Tea (  
  id VARCHAR NOT NULL PRIMARY KEY,  
  tea VARCHAR NOT NULL,  
  sandwich VARCHAR NOT NULL  
);
```

Populate

```
INSERT INTO Tea VALUES ("OBC", "1", "PBJ" );
```

Data

```
ID, Tea, Sandwich  
JJ,1,Ruban  
OBC,1,PBJ  
AM,1,Chicken  
GK,1,Chicken  
PL,0,Ruban  
DW,0,PBJ  
MC,1,Ruban  
RO,0,PBJ  
SR,1,Ruban  
SS,1,Ruban  
KT,1,Ruban
```

Example Code Session Table

Consider This

Example Code

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Data Entry

CSV files

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tables

Queries

Consider This

...

Create

```
DROP TABLE Session;  
CREATE TABLE Session (  
  id VARCHAR NOT NULL PRIMARY KEY,  
  session VARCHAR NOT NULL,  
  material VARCHAR NOT NULL  
);
```

Populate

```
INSERT INTO Session VALUES ("OBC", "112", "pres" );
```

Data

```
ID, Session, Material  
JJ,101,pres  
OBC,112,pres  
AM,111,poster  
GK,109,workshop  
PL,109,poster  
DW,101,pres  
MC,112,pres  
RO,111,poster  
SR,111,poster  
SS,109,workshop  
KT,112,article
```

Importing Data: Two ideas

Consider This

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Consider This

...

- **First idea:** INSERT line-by-line
 - Slow to code and to make the insertions

Populating tables line-by-line

```
INSERT INTO Table VALUES("1","ww","xx","yy","zz");
```

- **Second Idea:** IMPORT CSV data files via a “setup” file.
 - Fast and you can easily recreate your DB if it “breaks”

Populating table-by-table

```
/*data files */  
.import data/department.csv Department
```

Automate Data Entry

How to get data into a base?

Consider This

Automate
Data Entry

CSV files

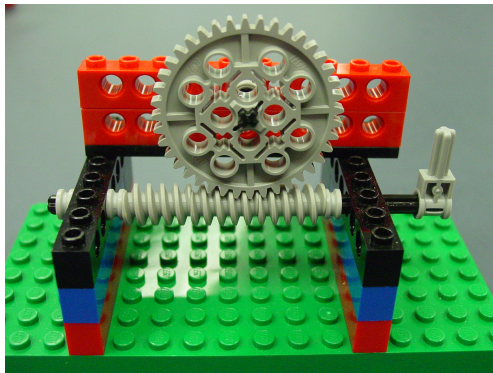
Populating

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Consider This

...



Data and CSV Files

- Most data may arrive as a spreadsheet to be made into file.
- Copy and Pasting is slow...

Making files of CSV's (Comma-separated values)...

Consider This

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CSV files

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Consider This

...



Data in Spreadsheet Form to Files

Use: "save a copy"

Consider This

Automate
Data Entry

CSV files

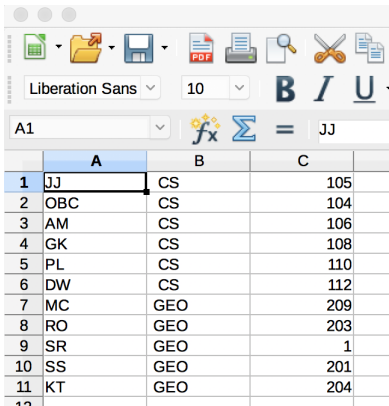
Populating

Create some
tables

Queries

Consider This

...



	A	B	C
1	JJ	CS	105
2	OBC	CS	104
3	AM	CS	106
4	GK	CS	108
5	PL	CS	110
6	DW	CS	112
7	MC	GEO	209
8	RO	GEO	203
9	SR	GEO	1
10	SS	GEO	201
11	KT	GEO	204
12			

File type: Text CSV (.csv)

☒ Automatic file name extension

☐ Save with password

☐ Edit filter settings



CSV Files

Consider This

Automate
Data Entry

CSV files

Populating

Create some
tables

Queries

Consider This

...

```
JJ,CS,105  
OBC,CS,104  
AM,CS,106  
GK,CS,108  
PL,CS,110  
DW,CS,112  
MC,GEO,209  
RO,GEO,203  
SR,GEO,001  
SS,GEO,201  
KT,GEO,204
```

```
JJ,1,Ruban  
OBC,1,PBJ  
AM,1,Chicken  
GK,1,Chicken  
PL,0,Ruban  
DW,0,PBJ  
MC,1,Ruban  
RO,0,PBJ  
SR,1,Ruban  
SS,1,Ruban  
KT,1,Ruban
```

```
JJ,101,pres  
OBC,112,pres  
AM,111,poster  
GK,109,workshop  
PL,109,poster  
DW,101,pres  
MC,112,pres  
RO,111,poster  
SR,111,poster  
SS,109,workshop  
KT,112,article
```

- Tables: Department, Tea, Session
- Be sure to use an editor (i.e., Atom) to remove spaces!
- Once your file is in this CSV format, it can be easily loaded into the database

Bring the data!

Consider This

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Consider This

...

- **CREATE Tables:** Build your create tables code before you load the data.
- **.separator:** tells SQLite3 how the entries in the files are separated.
- **.import file.csv tableName:** Each file must be placed into a specific table.

Check sandbox for builder file

```
/*Table Creation Above in This File*/  
.separator ","  
  
/*data files */  
.import data/department.csv Department  
.import data/tea.csv Tea  
.import data/session.csv Session
```

Consider This

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Consider This
...

Compile Your Persistent Database

```
cat buildFile.txt | sqlite3 mydb.sqlite3
```

- `cat buildFile.txt` : pull the contents of the text file
- Typically this command would send contents to the screen
- “|” means to *pipe* the contents to next function in bash command
- `sqlite3 mydb.sqlite3` : Have `sqlite3` create a file (called, `mydb.sqlite3`) to contain the database and data.

Connecting the Tables

Consider This

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Data Entry

CSV files

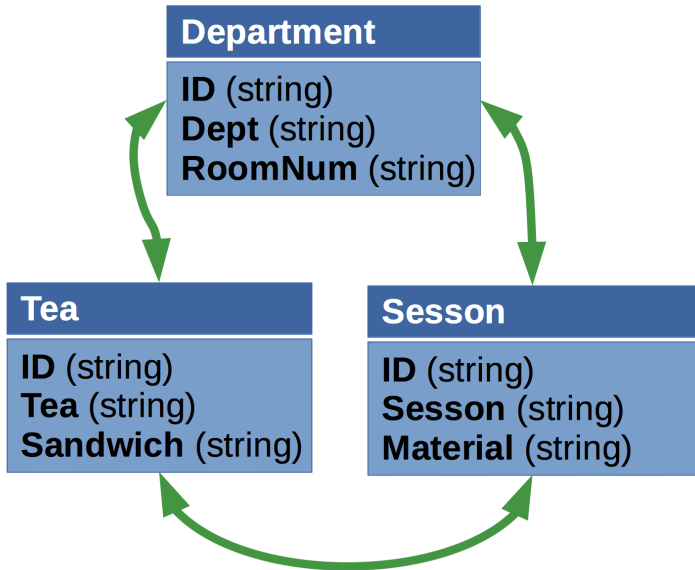
Populating

Create some
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Create some
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Queries

Consider This
...





Try This: Create and Link Tables

You have previous example code to guide you

Consider This

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Create some
tables

Queries

Consider This

...

Department		
ID	Dept	RoomNum
JJ	CS	105
OBC	CS	104
AM	CS	106
GK	CS	108
PL	CS	110
DW	CS	112
MC	GEO	209
RO	GEO	203
SR	GEO	001
SS	GEO	201
KT	GEO	204

Tea		
ID	Tea	Sandwich
JJ	1	Ruban
OBC	1	PBJ
AM	1	Chicken
GK	1	Chicken
PL	0	Ruban
DW	0	PBJ
MC	1	Ruban
RO	0	PBJ
SR	1	Ruban
SS	1	Ruban
KT	1	Ruban

Session		
ID	Session	Material
JJ	101	pres
OBC	112	pres
AM	111	poster
GK	109	workshop
PL	109	poster
DW	101	pres
MC	112	pres
RO	111	poster
SR	111	poster
SS	109	workshop
KT	112	article

Example code

Two tables

Consider This

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Data Entry

CSV files

Populating

Create some
tables

Queries

Consider This

...

Query for two tables

```
Select
    Department.roomNum, Tea.sandwich
From
    Department, Tea
WHERE
    Department.id == Tea.id;
```

- Two tables!
- All tables must be connected
- Modify it for your own query!

Queries, Part 1

Types of queries

Consider This

Automate
Data Entry

CSV files

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Create some
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Queries

Consider This

...

Single table

Show me all rows from each of the tables, individually.

Two tables

Show me the name, dept and whether the person will have tea.

Show me the name and dept of each person who will have a Ruban.

Three tables

Show me the sandwich type and the session room number of each person.

Queries, Part 2

Consider This

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Queries

Consider This

...

Show the ID, sandwich type, session material and department room number.

Hint

```
SELECT
    tea.id, tea.sandwich,
    session.material,
    department.roomNum
FROM
    tea, session, department
WHERE
    tea.ID == Session.id
AND
    tea.ID == department.ID
AND
    Session.ID == Department.ID;
```

Queries, Part 2

Consider This

Automate
Data Entry

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Create some
tables

Queries

Consider This
...

Three tables

Show the ID, sandwich type, session material and department room number.

Three tables

Show me all the ID, Material, Tea and Sandwich and department room number.

Three tables

Show me the ID, Material, Tea and Sandwich and department room number for each person who will have a Ruban

Three tables

Show me the ID, Material, Tea and Sandwich and department room number for each person who will be presenting a “pres”

Consider this ...

Consider This

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Consider This
...



THINK

- Can you design and populate a database of three tables?
- Can you run queries to access particular attributes in three tables?