CSE 503

Introduction to Computer Science for Non-Majors

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Day 28
Databases (part 2)

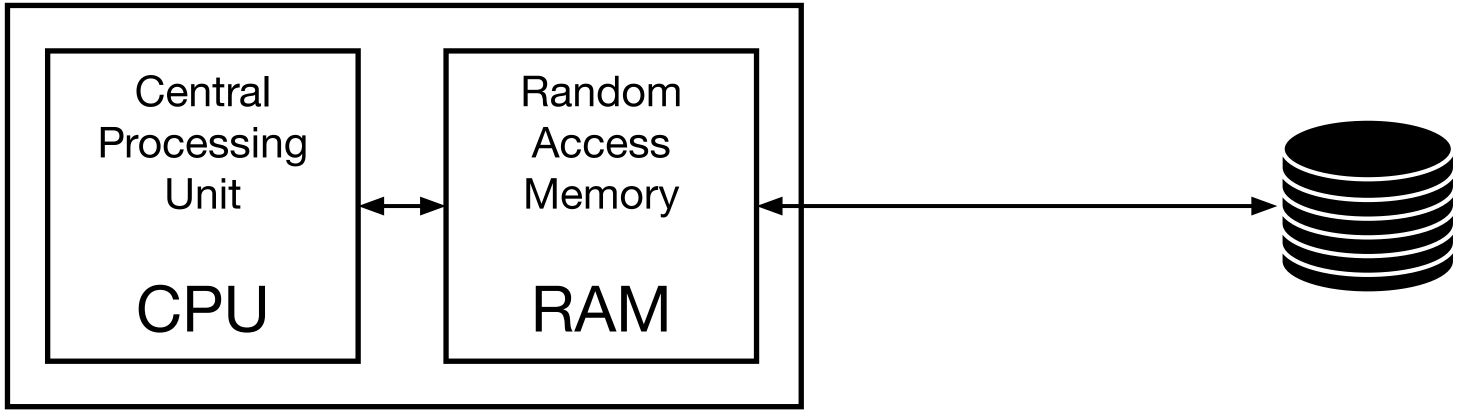
Storing Data

In Memory/CPU

- Transient (exists while program is running)
- Limited size

On Disk

- Persistent
- Larger capacity
- Text files, csv files, databases, etc



Storing Data

Text Files: Streams of characters

CSV Files: Comma separated values

Databases: Tables of data supporting highly efficient operations

(CSE 560 Data Models and Query Languages; CSE 562 Database Systems)

SQLite - Creating and Storing a DB

```python
import sqlite3

conn = sqlite3.connect('test.db')
cur = conn.cursor()

# do things to database

conn.commit()
conn.close()
```

1. Import the SQLite library
2. Open a connection to a DB
   (creates the DB if necessary)
3. Create a cursor object
   (this is how we interact with the DB)
4. Do stuff…
5. Commit our changes and close the DB
   (without commit, changes are lost)

Example Commands

```
cur.execute('CREATE TABLE IF NOT EXISTS movies (title, director, year)')

cur.execute('INSERT INTO movies VALUES ("Jaws", "Spielberg", 1975)')

results = cur.execute('SELECT * FROM movies')

results = cur.execute('SELECT * FROM movies WHERE year = 1975')
```

Parameterized Commands

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SQLite let us parameterize our commands!

Parameterized Commands

```
def insert(title, director, year):
  cur.execute('INSERT INTO movies VALUES (?,?,?)', (title,director,year))

def get_all_by_year(year):
    return cur.execute('SELECT * FROM movies WHERE year=?',(year,))
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? indicates values that will be filled in

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We pass a tuple with the specific values

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```

Tuples in Python:

```
(x,)    ← Tuples of size one (notice the comma)
(x,y)   ← Tuples of size two
(x,y,z) ← Tuples of size three (or more…as many values as we want)
```

Big Example - Music Rating App

MusicRater1.0

- Python server and JS/HTML client for rating songs
- Songs and ratings stored in CSV files

MusicRater2.0

- Python server and JS/HTML client for rating songs
- Songs and ratings stored in SQLite Database