Week 3

Advanced part

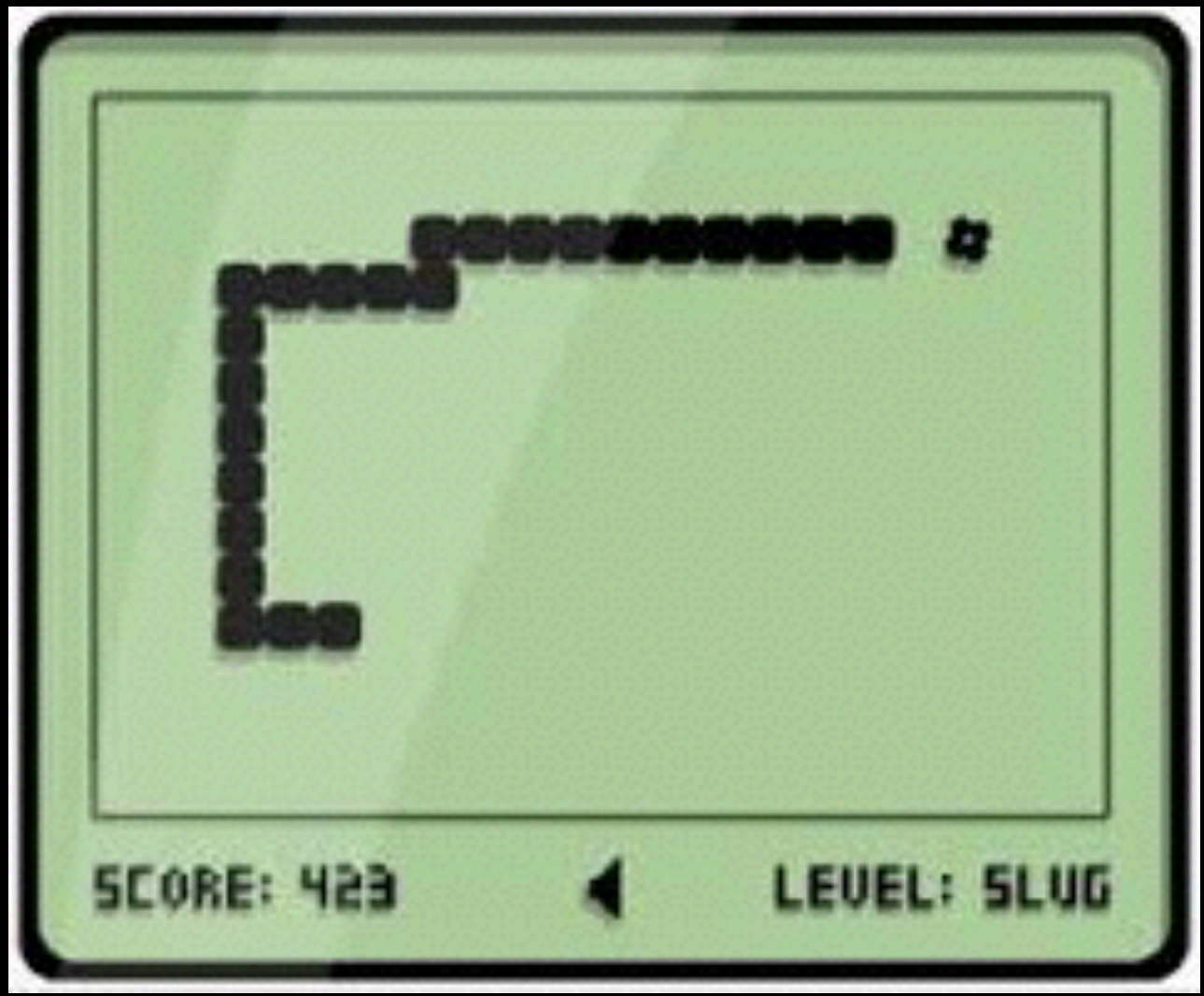
Project

1. Each student one project.
2. Each student one facilitator.
3. Scope must be modest.
4. Deadline on Friday 4th of Nov.

Your project plan

1. See the PDF on the course repository for instructions.

Example snake game



Example snake game

Snake:
- attr: position
- attr: length
- move(self)

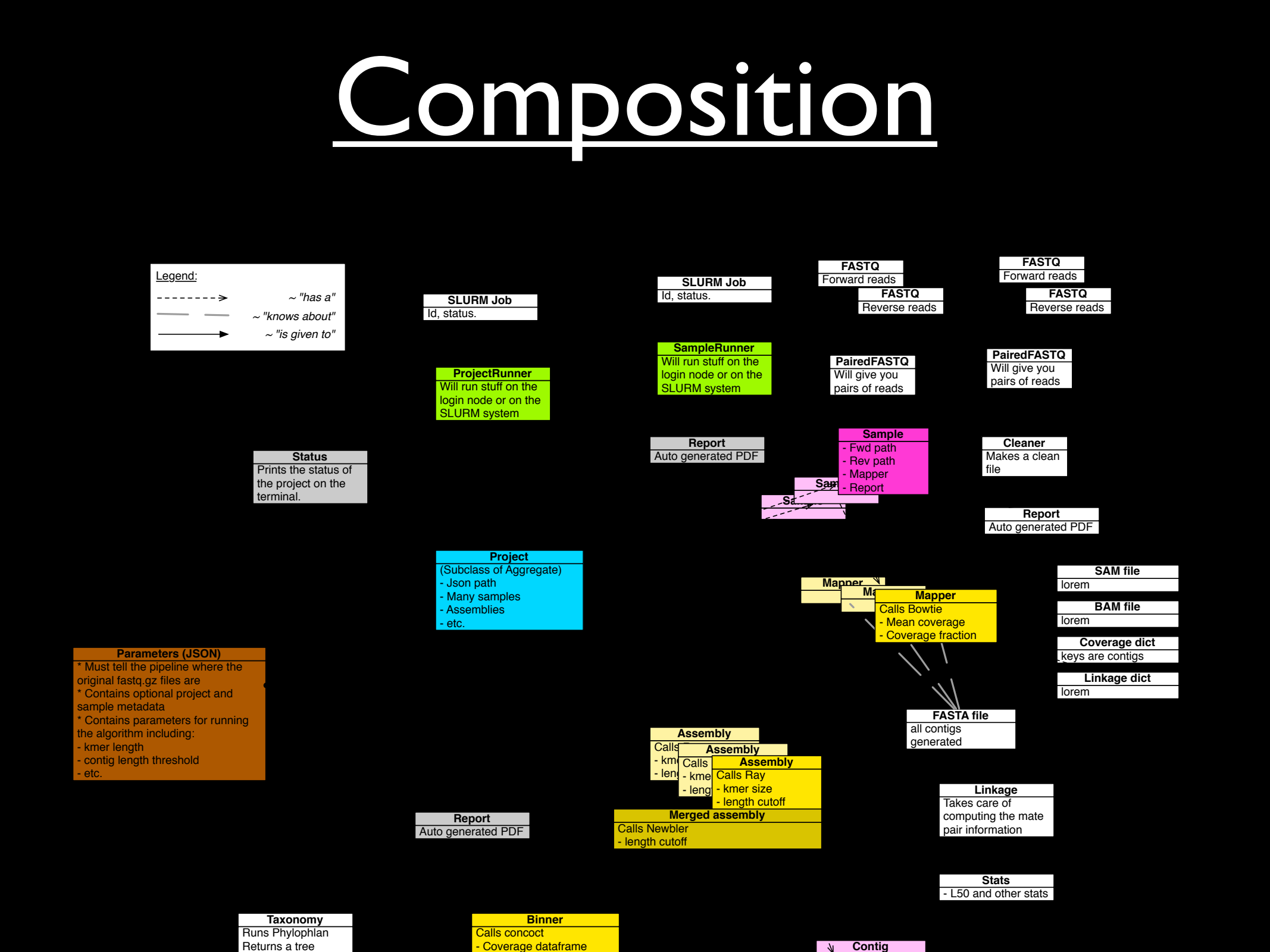
World:
- attr: food_pos
- attr: size
- new_food(self)

Input:
- attr: current_key
- attr: last_key

Display:
- attr: last_update
- draw(self)

15 minutes break

Composition



Composition

Live demo

Databases

Databases

1. You can query data in a database (ask it questions).
2. You can look up data from a database relatively rapidly (index).
3. You can relate data from two different tables together using JOINs.
4. You can create meaningful reports from data in a database.
5. Your data has a built-in structure to it.
6. Information of a given type is always stored only once.
7. Databases are ACID.
8. Databases are fault-tolerant.
9. Databases can handle very large data sets.
10. Databases are concurrent
11. Databases scale well.

When to use files

- You have unstructured data in reasonable amounts that the file system can handle
- You don't care about structure, relationships
- You don't care about scalability or reliability (although these can be done, depending on the file system)
- You don't want or can't deal with the overhead a database will add
- You are dealing with structured binary data that belongs in the file system, for example: images, PDFs, documents, etc.

Technology

1. SQLite 3
2. MySQL.
3. postgresql
4. MongoDB.

....

Live demo

Exercise

1. Get the file "test.db" from the repo.
2. Make a script that connects to that file (It's an SQLite 3 database file).
3. Get a list of all the tables in that file.
4. Print that list on the screen.

Solution

```
1  # Use the sqlite3 library #
2  import sqlite3
3  # Absolute path #
4  input_path = 'test.db'
5  # Open the database #
6  connection = sqlite3.connect(input_path)
7  cursor = connection.cursor()
8  # Make an SQL statement #
9  query = "SELECT name FROM sqlite_master WHERE type='table'"
10 # Execute it #
11 cursor.execute(query)
12 # Fetch the results #
13 tables = cursor.fetchall()
14 # Display #
15 for t in tables: print t[0]
16
```

Exercise

1. Get the file "lulu_mix_16.csv".
2. Make a script that writes the contents of that file to a database.
3. You should make one table called "songs" that has three columns.

Solution

```
# Use the sqlite3 library #
import sqlite3
# Load the whole text file in memory #
input_path = "lulu_mix_16.csv"
features = [l.strip('\n').split(',') for l in open(input_path) if not l.startswith('#')]
# Create database #
output_path = "lulu_mix_16.db"
connection = sqlite3.connect(output_path)
connection.text_factory = str
cursor = connection.cursor()
# Create table #
columns = ('title', 'artist', 'duration')
cursor.execute("CREATE TABLE 'songs' " + str(columns))
# Insert everything #
cursor.executemany("INSERT INTO 'songs' VALUES (?,?,?)", features)
# Save changes #
connection.commit()
connection.close()
```

15 minutes break