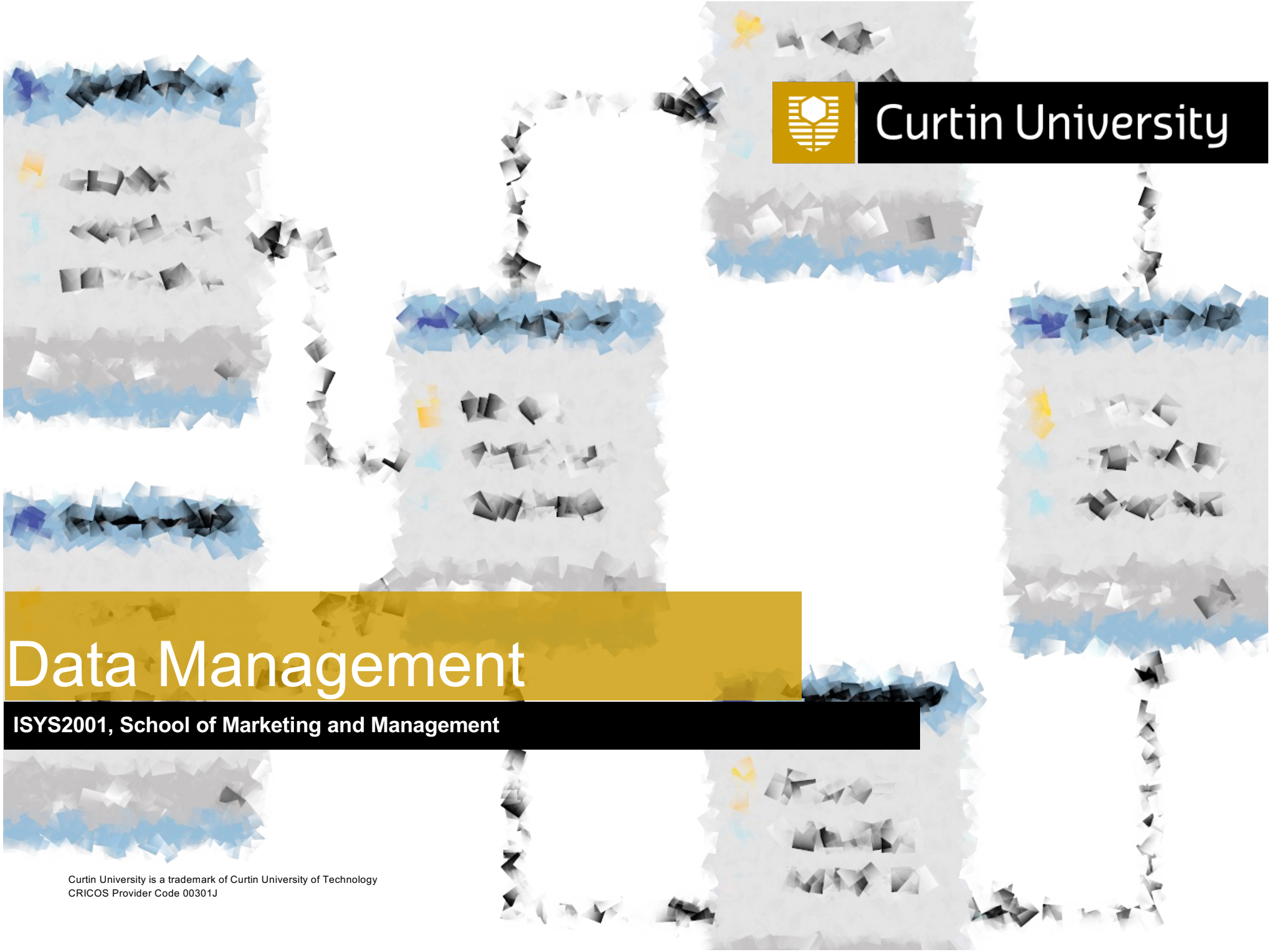

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Data Management

ISYS2001, School of Marketing and Management

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I acknowledge the traditional custodians of the land on which I work and live, and recognise their continuing connection to land, water and community. I pay respect to elders past, present and emerging.

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Today

- Data Persistence
- Databases
- Python Options

Flat Files

- Contain Data
- No internal hierarchy
- Human readable (usually)
- **CSV – comma-separated value**
- Use for data interchange
- Large files can be problem
- Relationships not explicit

Database

- Consists of Tables, Table consists of rows
- Tables can be ‘releated’
- DBMS – System to Manage Tables and Relationships
- Reduce Redundancy
- Relational Database
- Query Language
- Multi-user

SQL Databases

- SQLite
- PostgresSQL
- MYSQL
- MS SQL
- Oracle
- Many more
- Non-Relational (NoSQL)
- MongoDB

No SQL

- Document
- Key-Value Stores
- Column-Oriented
- Graph
- Examples
  - MongoDB
  - Apache Cassandra

SQLite

- Included with Python
- Single file based
- Relational Database
- Uses SQL
- Standard CRUD Operations
- GUIs
    - SQLiteStudio
    - DB Browser for SQLite

SQLite - Pattern

```
import sqlite3


conn = slqite3.connect("filename.db")
conn.execute("CREATE TABLE myTable (name text);")
conn.execute("INSERT myTable VALUE ('Josh');")
rows = conn.execute("SELECT * FROM myTable;")
for row in rows:
        print(row)
```

SQLAlchemy

- Object Relations Mapper
- Map a Python model to database
- Use object model in Python
- Connect to many databases
- Abstract underlying data

SQLAlchemy – Abstract Database

from sqlalchemy import create_engine

engine = create_engine('sqlite:///filename.db')

conn = engine.connect()

... then Pythonic Way (Objects)

Object Serialisation (Alternative)

- Object Persistence
- Pickle library
- Object converted into bitstream
- Pickling -> saves to file
- Unpickling <- reads form file
- Maintain state across sessions

Can you?

- Explain Data Persistence
- Describe different databases
- Outline the options in Python