SunPy

- Python library for solar physics
- some features:
  - data structures
  - solar coordinate systems
  - plotting
  - data retrieval

The VSO package

```
>>> from sunpy.net.vso import search, get
>>> from sunpy.net.vso.attrs import Time, Instrument
>>> query_result = search(
...     Time('2013-09-27 23:00:00', '2013-09-28'),
...     Instrument('EVE'))
>>> query_result.num_records()
8
>>> paths = get(query_result).wait(progress=True)
[========================================]
>>> len(paths)
8
```

What I have done

- Problems:
  - downloaded data cannot be queried
  - each time data is requested, it must be downloaded again
- Solution:
  - a database package!
  - can be searched
  - either local or remote
  - many supported SQL dialects
  - acts as a cache
  - BONUS: undo / redo support!

My database package

```
>>> from sunpy.database import Database
>>> database = Database('sqlite:///')
>>> len(database)
0
>>> database.download(
...     Time('2013-09-27 23:00:00', '2013-09-28'),
...     Instrument('EVE'))
>>> len(database)
40
>>> database.undo()
>>> len(database)
0
```

What I have learned

- Technical:
  - SQLAlchemy
  - LRU and LFU Cache
  - undo / redo manager (command pattern)
- Non-technical
  - planning is important
  - writing docs takes more time than I thought

Plans

- support central databases
- support tar files
- support HEK query results
- a GUI?