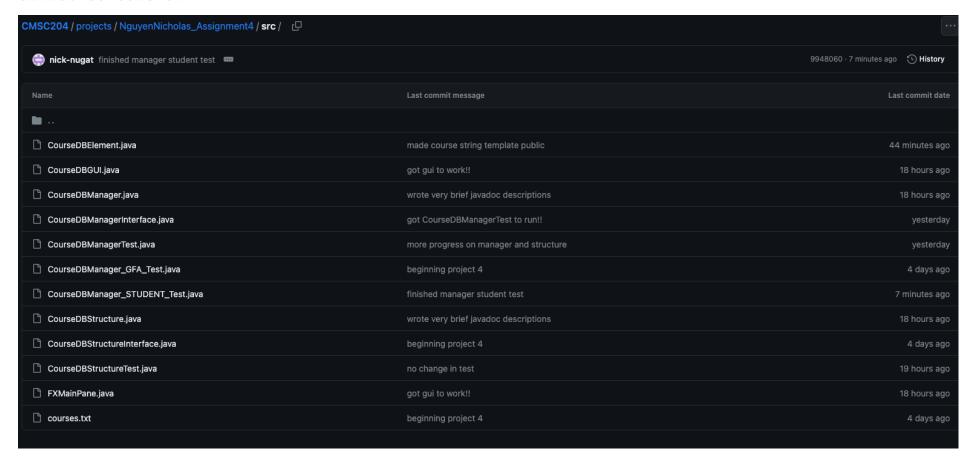# Final Assignment 4 Design

- Nicholas Nguyen
- CMSC204 GitHub Repository

GitHub screenshot

Learning experience

I enjoyed working on this project. I learned a good bit about concepts to use when implementing a database and especially about hashing and more about how it works.
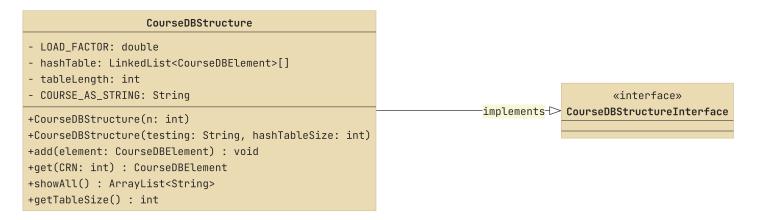
I struggled with getting some tests to pass, as well as knowing what fields, methods, and constructors to have. Since there was no JavaDoc provided to follow like usual, I was a little thrown off, but I eventually got through it and found it to be nicer to learn by reading through the interfaces and figuring out how I may implement the methods listed in them.
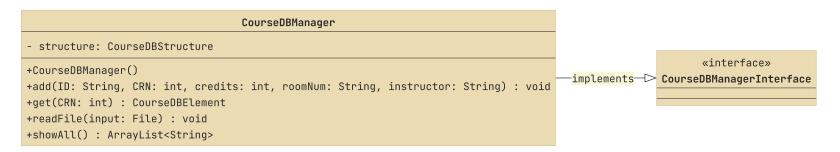
I wouldn't really do anything differently next project; I feel like I did pretty well on this one.

UML diagram

Course Database

```
            CourseDBElement
  ─────────────────────────────────
   - ID: String
   - CRN: int
   - credits: int                          «interface»
   - roomNum: String        implements     Comparable
   - instructorName: String  ──────────▷
  ─────────────────────────────────
   +compareTo(o: Object) : int
```

```
                CourseDBStructure
  ──────────────────────────────────────────
   - LOAD_FACTOR: double
   - hashTable: LinkedList<CourseDBElement>[]
   - tableLength: int
   - COURSE_AS_STRING: String
  ──────────────────────────────────────────
   +CourseDBStructure(n: int)
   +CourseDBStructure(testing: String, hashTableSize: int)          «interface»
   +add(element: CourseDBElement) : void     implements  CourseDBStructureInterface
   +get(CRN: int) : CourseDBElement           ─────────▷
   +showAll() : ArrayList<String>
   +getTableSize() : int
```

```
                         CourseDBManager
  ────────────────────────────────────────────────────────────────────
   - structure: CourseDBStructure
  ────────────────────────────────────────────────────────────────────
   +CourseDBManager()
   +add(ID: String, CRN: int, credits: int, roomNum: String, instructor: String) : void    implements       «interface»
   +get(CRN: int) : CourseDBElement                                             ─────────▷  CourseDBManagerInterface
   +readFile(input: File) : void
   +showAll() : ArrayList<String>
```

Pseudocode

- CourseDBElement
  - blueprint for a course with attributes for the course id, crn number, room number, and instructor name
  - getters and setters for each attribute

- `CourseDBStructure`
  - represents a hash table with buckets
  - each hash code is based on the crn since unique to every course
- `CourseDBManager`
  - data manager class that allows users to read courses from a text file
  - uses `CourseDBStructure` quite a bit
    - calls some of its methods
  - can be used to enter data manually