# Project

Mahou DB

# Disclaimer

- There is no guarantee that all I will be talking about is correct. Please be critically thinking.


Comedy Central. South Park.

# General rules

- Know your responsibilities and what you are doing
- Know your teammates’ progress and tell them yours

# About Mahou DB

- A database with a few hundreds of lines of codes
- Completed during the last winter break

Aniplex. 魔法少女まどか☆マギカ

# Before the project starts…

- What you can do and what you will be able to do
  - Programming languages, algorithms, data structures, tools, etc.
- What is your objectives
  - Gaining more hands-on experience
  - Or just want to date the girl in the team
- What time will you be available
  - The length of the project
  - The frequency and specific day for meeting in a week

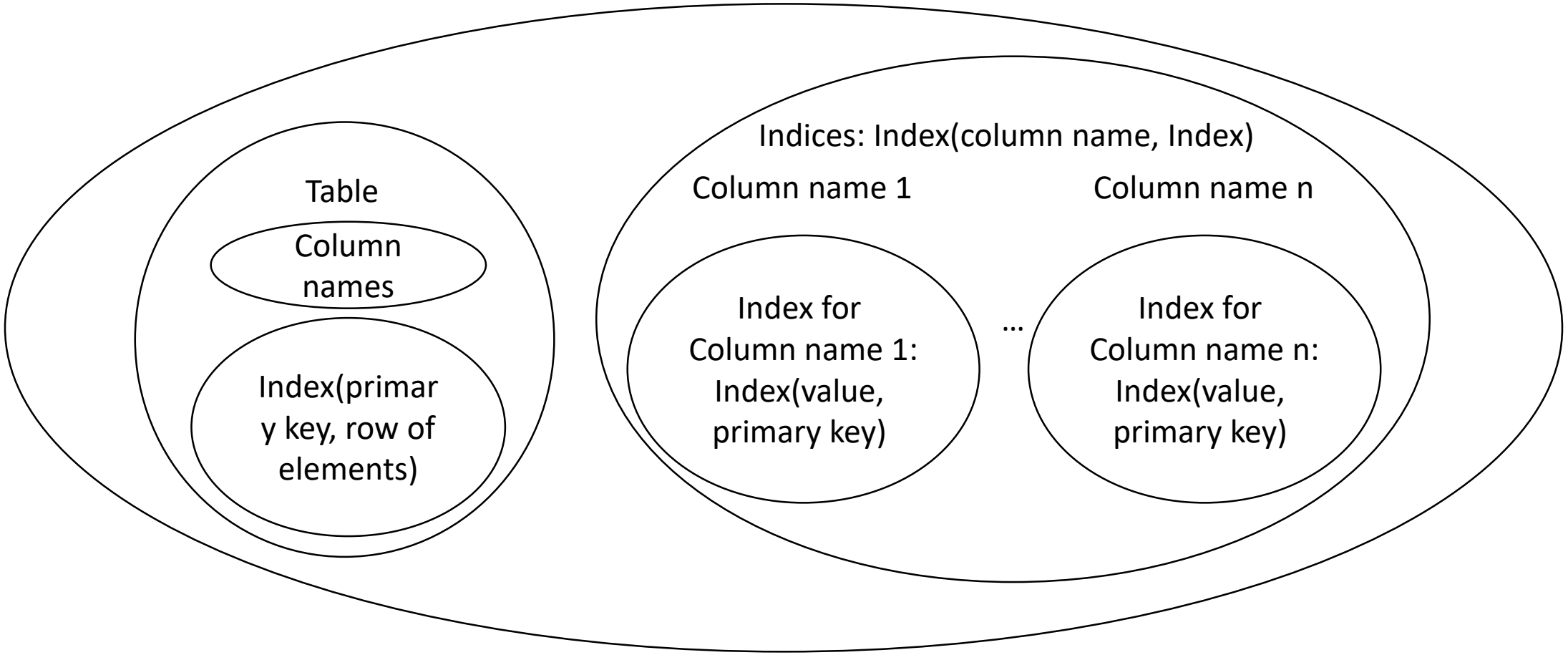
# Design

- What technologies you all will use
  - Collaboration: Git, SVN, etc.
  - Programming language
  - …
- After the expected duration of completion, what will the project look like (can be README, Javadoc, etc)
- The responsibilities of each teammate.

# Design for Mahou DB

- Python
- Collaborate with Git
- With two components
  - Table
  - Index based on Red-Black Tree

# Design for Mahou DB




- Index: Equivalent to Map in Java, or Dict in Python

| primary_key | name | age | gender | favorite programming language |
| --- | --- | --- | --- | --- |
| 1 | foo1 | 35 | male | Lisp |
| 2 | foo4 | 40 | male | Visual Basic |
| 3 | foo2 | 16 | female | Python |
| 4 | foo3 | 35 | male | doesn't code |

# Implementation and Debugging

- Again, who will be responsible for implementation or debugging
  - More specifically, who will be implementing or testing a specific function/method
- This process should follow the design to achieve the expected result
- Detecting the design defects

# implementation for Mahou DB

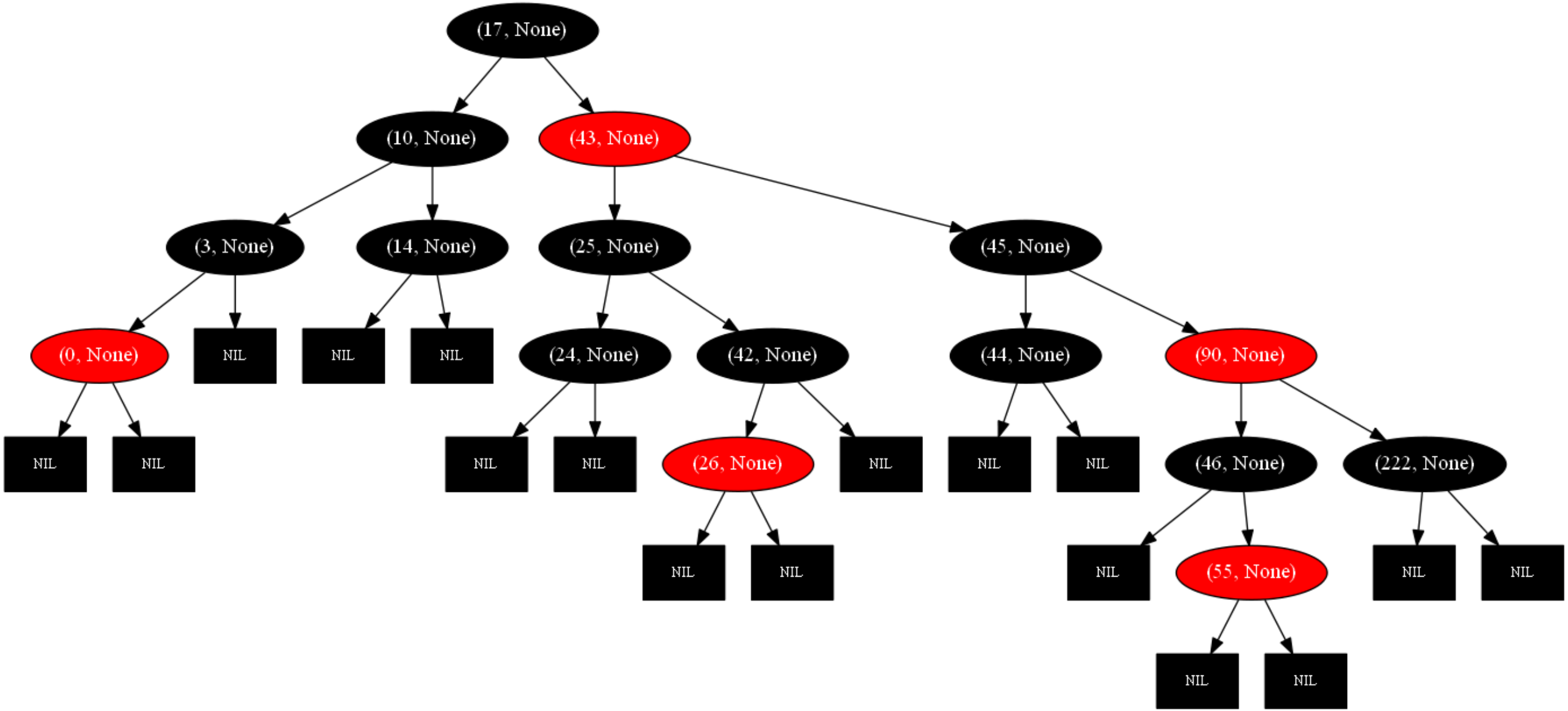
- Responsibility of implementation and debugging: Lok and Jimmy
  - More specifically: Lok implements add method, Jimmy implements remove method; or each of the members come up with a solution if it is an easy job

- PS; It can be decided right before that corresponding task is to be completed

# implementation for Mahou DB

- Following the guideline
  - The properties should be maintained
  - Make sure that you are not doing duplicate tasks.

- Debugging
  - A efficient way to debug: graph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(43, None)
(3, None)
(14, None)
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# implementation for Mahou DB

- Following the guideline
  - The properties should be maintained
  - Make sure that you are not doing duplicate tasks.

- Debugging
  - A efficient way to debug: graph
  - If the program crashes
  - If the properties can be maintained
    - Properties of the designated data structures
    - Behaviors of the functions
    - Tricky input

# implementation for Mahou DB

- It may also requires new ideas on design during the process of implementation:

- Read/Write file: How to separate items when stored in the drive

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- Read/Write file: How to separate items when stored in the drive
  - Naïve approach: use a space (0x20) to separate every element

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- Read/Write file: How to separate items when stored in the drive
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  - What if within the strings the users stored, there are space characters?

# implementation for Mahou DB

- It may also requires new ideas on design during the process of implementation

- Read/Write file: How to separate items when stored in the drive
  - ~~Naïve approach: use a space (0x20) to separate every element~~
  - What if within the strings the users stored, there are space characters?
  - Find something the users do not use

# implementation for Mahou DB

- UTF-8: Using 0xff (11111111)
- Store table only

**FSS-UTF (1992) / UTF-8 (1993)**[3]

| Number of bytes | Bits for code point | First code point | Last code point | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | U+0000 | U+007F | 0xxxxxxx | | | | | |
| 2 | 11 | U+0080 | U+07FF | 110xxxxx | 10xxxxxx | | | | |
| 3 | 16 | U+0800 | U+FFFF | 1110xxxx | 10xxxxxx | 10xxxxxx | | | |
| 4 | 21 | U+10000 | U+1FFFFF | 11110xxx | 10xxxxxx | 10xxxxxx | 10xxxxxx | | |
| 5 | 26 | U+200000 | U+3FFFFFF | 111110xx | 10xxxxxx | 10xxxxxx | 10xxxxxx | 10xxxxxx | |
| 6 | 31 | U+4000000 | U+7FFFFFFF | 1111110x | 10xxxxxx | 10xxxxxx | 10xxxxxx | 10xxxxxx | 10xxxxxx |

Wikipedia

# implementation for Mahou DB

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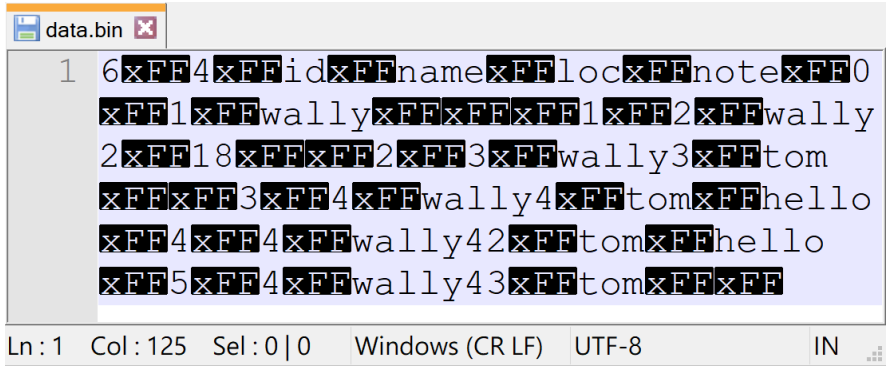

# implementation for Mahou DB

- Detecting the defects of the design example
  - Redundant methods
  - Useful methods but designed with useless of insufficient parameters
  - …

# Result

- The database was built
- Only the most fundamental functions are available
- Many advanced functions were not implemented
  - Mixed storing in memory and drive
  - …

# Conclusion

- Life may not be perfect

# Any Questions?

Thank you