Csci 5105 PA2

Group Member: Yichun Yan 5502194

Group Member: Ziwei Jiang 5508818

System Achitecture

The book finder system consist of following 3 components:

Super Node

This system has only one super node which plays a role as a coordinator. All nodes in this system is known by the super node. But the super node only stores the IP addresses, port and node key of nodes. The super node is mainly responsible for 2 jobs, one is node joining and one is assign node to the client. After all nodes are joined this system, the super node can provide node assignment service for the client.

Node

A node is a actual worker in this system. Each node contains information(IP address, port, key) of its predecessor and its successor and a finger table.

Once a node wants to joint this system, it first sends request to the super node and super node will return an existing node in this system to help the node join this system. A node can use the assigned node to find its predecessor and its successor and initialize its finger table. Then it sends notification to some nodes which might be affected to ask them to update their finger tables.

After all nodes joined this system, they can provide get book genre and set book genre service to the client.

Client

A client requests service from this system. A client first sends requests to the super node and gets an assigned node. Then sends requests to the node to get set book genre or get book genre service.

User Guide

- **re-generate java files using thrift (optional)**

To avoid the error caused by difference between thrift version, you can re-generate the java files using thrift. And then copy them to the */code* directory.

```
cd DHT/thrift
thrift --gen java NodeInterface.thrift
thrift --gen java SNodeInterface.thrift
cp -a ./gen-java/. ./code
```

- **compile java files (optional)**

  You can also re-compile java file.

```
cd DHT/code
javac -cp ".:/usr/local/Thrift/*" SNode.java -d .
javac -cp ".:/usr/local/Thrift/*" Node.java -d .
javac -cp ".:/usr/local/Thrift/*" Client.java -d .
```

- **Run super node**

  1. Run the java file.

```
java -cp ".:/usr/local/Thrift/*" SNode
```

  2. Then in your terminal, the following message will display:

```
Please enter the node number of the DHT:
```

  You can enter a number not larger than 32.

  3. Then in your terminal, the following message will display:

```
Now the super node has ip [your machine ip].
Please enter the port of the super node:
```

  You can enter a valid port number.

  4. Now you successfully set up your super node, then each time a node join the DHT, if the number of nodes in the DHT does not meet the number you set in step 2, in your terminal, the following message will display:

```
Still need [number] nodes to finish the DHT.
```

If the number is met, in your terminal, the following message will display:

```
All nodes have been joined in to the DHT, you can do get or set
operation in the client node now.
```

- **Run nodes**

  1. Run the java file.

     ```
     java -cp ".:/usr/local/Thrift/*" Node
     ```

  2. Then in your terminal, the following message will display:

     ```
     The current ip address of this computer is [your machine ip].
     Please enter super node's ip:
     ```

     You can enter the ip address of the super node.

  3. Then in your terminal, the following message will display:

     ```
     Plese enter super node's port:
     ```

     You can enter the port number of the super node.

  4. Then in your terminal, the following message will display:

     ```
     Please enter your port:
     ```

     You can enter a valid port number.

  5. If your node join the DHT successfully, in your terminal, the following message will display:

     ```
     Calling the post joining function now to end joining.
     You can type 'show' any time to see the information of the node
     ```

  6. After the message displayed in step 5, you can enter show any time to display the current node state.

     ```
     show
     ```

- **Run client**

  1. Run the java file

     ```
     java -cp ".:/usr/local/Thrift/*" Client
     ```

  2. Then in your terminal, the following message will display:

     ```
     Please enter super node's ip:
     ```

     You can enter the ip address of the super node.

  3. Then in your terminal, the following message will display:

     ```
     Plese enter super node's port:
     ```

     You can enter the port number of the super node.

  4. Then in your terminal, the following message will display:

     ```
     The starting node that super node assigned to you has ip: [node ip]
     and the port is [node port].
     Select you operation (set/get):
     ```

     You can enter set for setting book's genre. Or you can enter get for getting book's genre.

     If you enter others, in your terminal, the following message will display:

     ```
     Wrong operation mode, please select again(set/get)
     ```

     Then you can enter operation mode again, until correct operation mode is entered.

  5. Then in your terminal, the following message will display:

     ```
     Do you want to print the log file of your set/get operation? (enter
     'y' if you want the log file)
     ```

     You can enter **y** if you want the log file. Or you can enter any other if you don't.

  6. If you enter **set**, then in your terminal, the following message will display:

```
In set mode.
Select you set mode (file/input)
```

You can enter file, which stands for using a file as input. Or you can enter input, which stands for entering input in terminal.

If you enter others, in your terminal, the following message will display:

```
Wrong set mode, please select again(file/input)
```

7. If you enter **set** and **file**, then in your terminal, the following message will display:

```
In file mode of setting.
Please enter the location of your file:
```

You can enter a valid file path. If you enter wrong file path, in your terminal, the following message will display:

```
what you have just entered is not a file, please enter again:
```

Then you can enter file path again until correct path is entered.

- We assume that the book information saved in the file has format of "book title: book genre". If the ":" is missing in one line of the input file, the command line will print:

  ```
  The genre part of book <[book name]> is missing
  ```

  And the genre part of the book information will be set to "missing".

- If you choose to display the log file previously, the client will print the log information about what nodes are visited during the setting.

  ```
  This is the log information of setting <[book name]> of genre
  [genre] to the DHT is:
  This set operation has visited these nodes: node with key x node
  with key y...
  Setting finished.
  ```

8. If you enter **set** and **input**, then in your terminal, the following message will display:

```
In input mode of setting.
Please enter the book's name you are setting:
```

You can enter the book name.

Then in your terminal, the following message will display:

```
Please enter the book's genre you are setting:
```

You can enter the book genre.

The output in this case is the same as step 7.

9. If you enter **get**, then in your terminal, the following message will display:

```
In get mode.
Please enter the book name
```

If you choose to display the log file previously, the client will print the log information as mentioned in step 7.

If the book is found, then in your terminal, the following message will display:

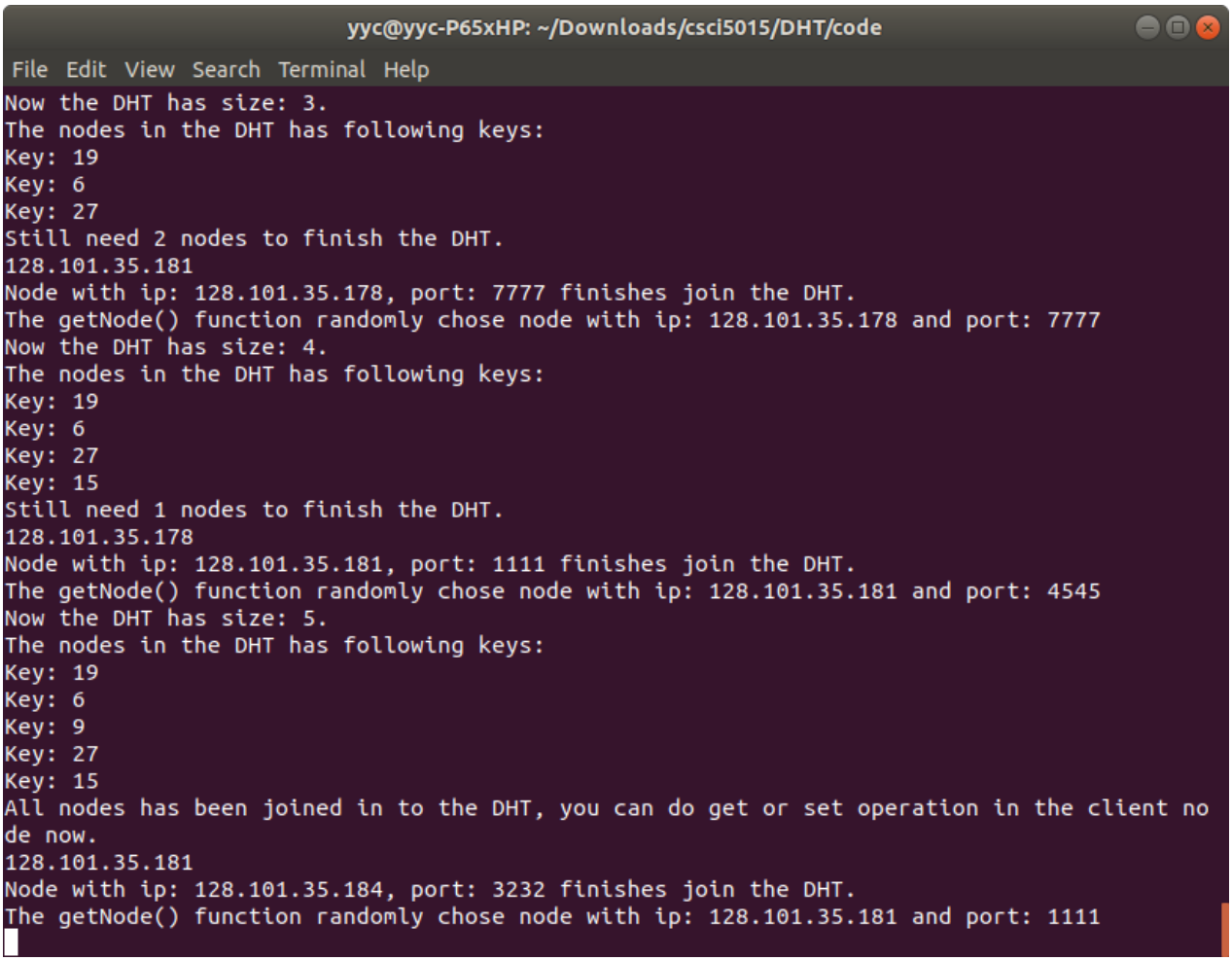
```
The genre of <[book name]> is [genre].
```

Otherwise, it will display

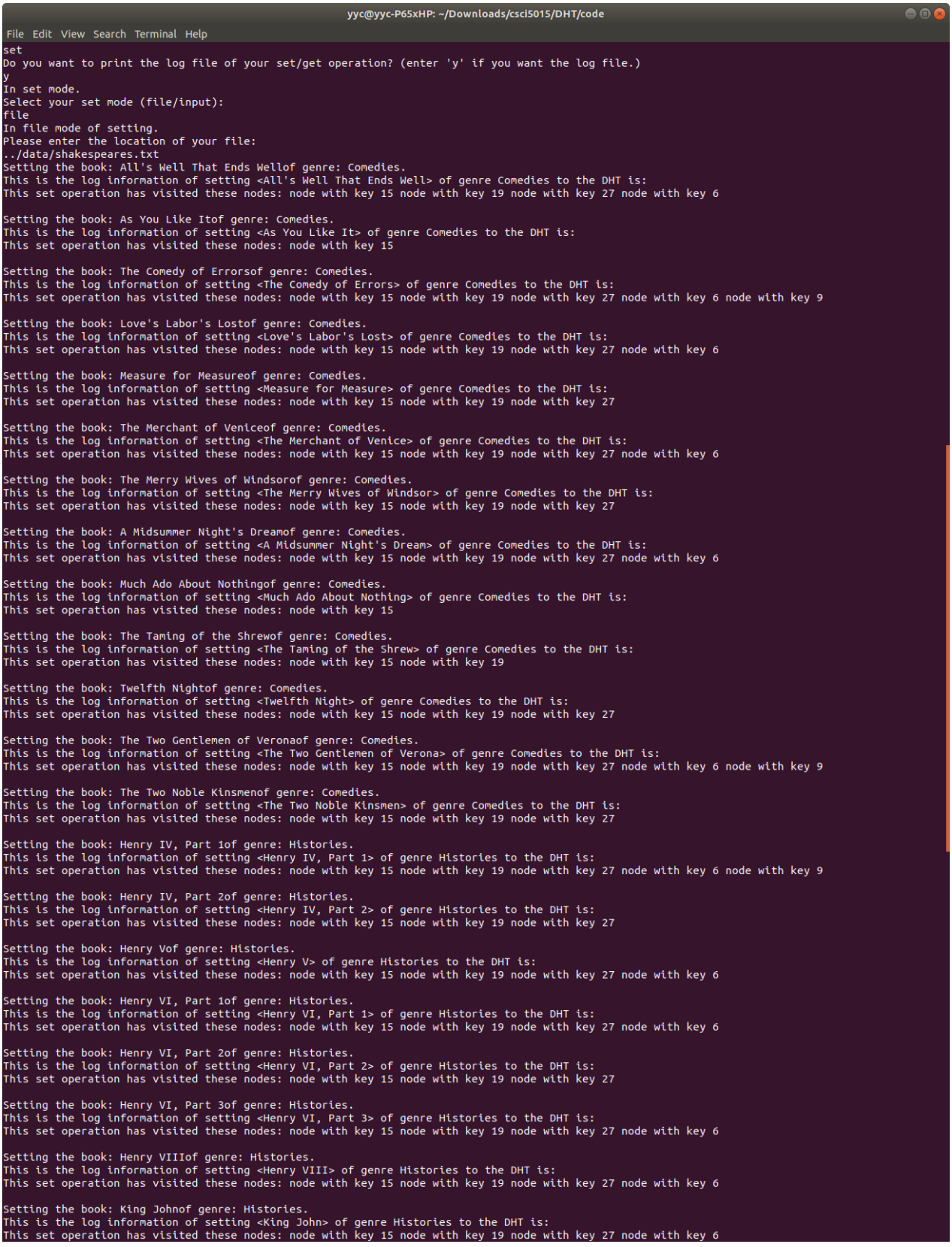
```
Sorry, not find the genre of <[book]>.
```

Testing Description

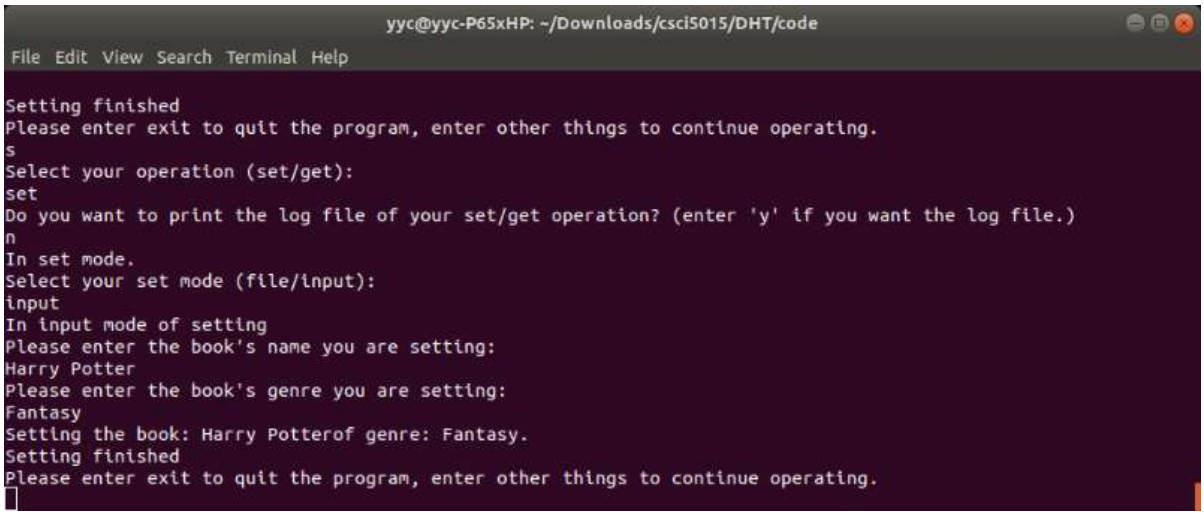
- Screenshot of super node. It displays the current number of nodes and their keys. Also it display how many nodes needed for this DHT.



- Set operation & file mode. It displays book name, book genre, and log file(visited nodes) for each book-genre pair in the input file.



- Set operation & input mode. It display the message to guide the user enter the book and genre.



- Set operation & file mode & genre is missing. It display the book name and set the genre to 'missing'.

- Get operation. It guides the user to enter the book name and display the genre retrieved and log file(visited nodes).

- Get operation & inexistent book name. It displays sorry, not found the genre of book and the log file(visited nodes).


yyc@yyc-P65xHP: ~/Downloads/csci5015/DHT/code
File Edit View Search Terminal Help
The grene of book <in the golden dust of the air.> is missing.
Set this book's genre to' missing'.
Setting the book: in the golden dust of the air.of genre: missing.
Setting finished
Please enter exit to quit the program, enter other things to continue operating.
s
Select your operation (set/get):
get
Do you want to print the log file of your set/get operation? (enter 'y' if you want the log file.)
y
In get mode.
Please enter the book's name:
Foundation
The genre of the book <Foundation> is: Sorry, not found the genre of the book <Foundation>..
This is the log information of getting <Foundation>'s genre out of the DHT is:
This get operation has visited these nodes: node with key 15 node with key 19 node with key 27 node with key
6 node with key 9
Please enter exit to quit the program, enter other things to continue operating.