

实验完成度：功能全部完成，包括加分项undo/redo状态的恢复

1. 层次划分

整个设计

1. 垂直尺度划分为三层，由上至下分别为Editor, Workspace, Fileholder
 - I. Editor: 作为session层，控制所有的workspace，及其对应的操作
 - II. Workspace维护单个工作区的所有状态和对应工作区内部操作
 - III. FileHolder维护对应操作文件的内容和对应文件操作
2. 横向尺度也共划分为三个平行层：FileOperator, Command, log
 1. FileOperater: 维护文件信息的类的总体
 2. Command: 对应不同级别的指令包括Editor级(如切换workspace等)，workspace级(undo/redo等)，fileHolder级(save等)

2. 自动化测试

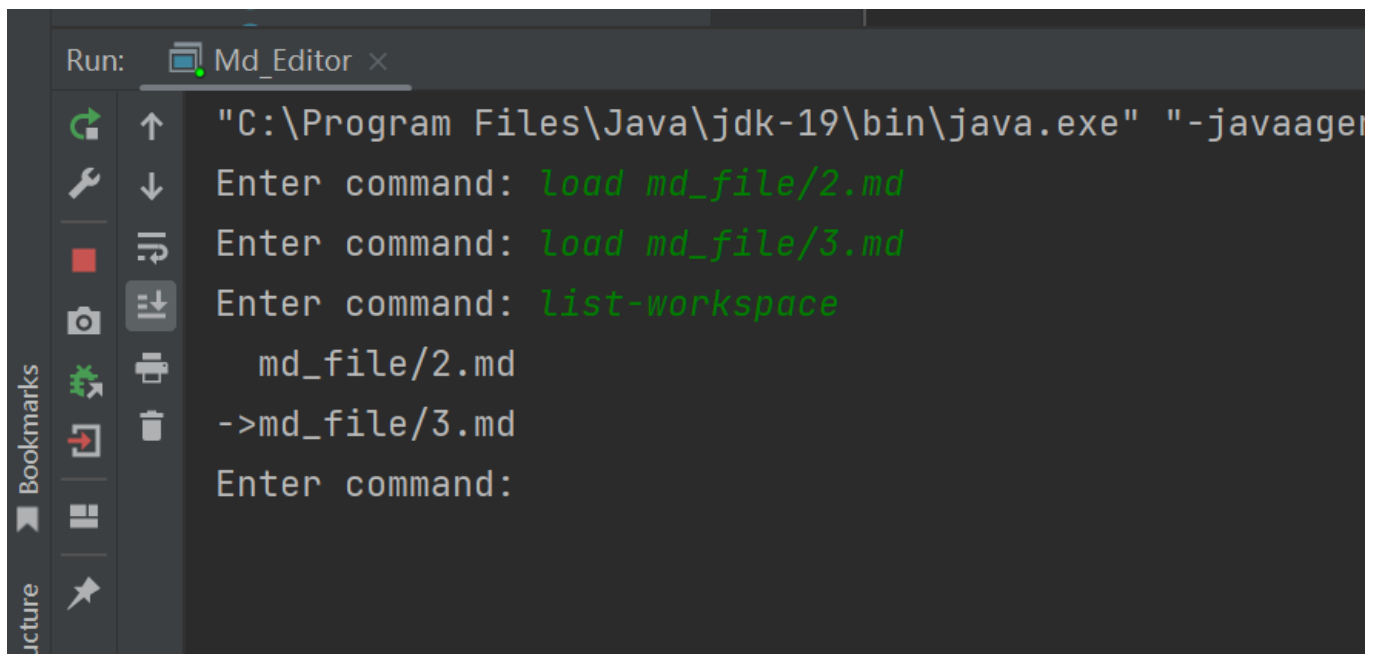
见markdown_editor/test目录下分级测试

1. EditorTest
2. WorkspaceTest
3. CommandTest
4. FileHolderTest

其中统计模块设计的多为文件写入，故直接测试stats命令即可判断是否写入时间；

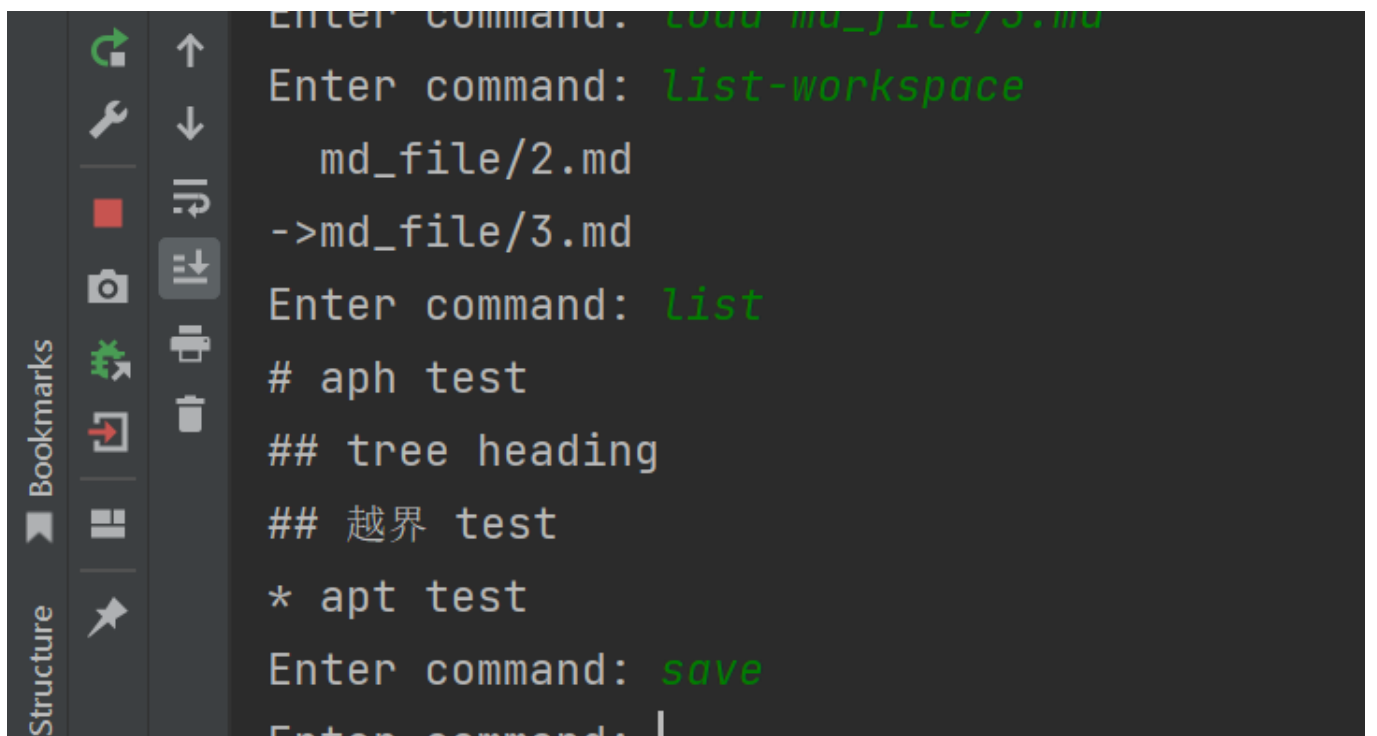
3. 支持多个workspace

3-1 load 文件路径 #完成



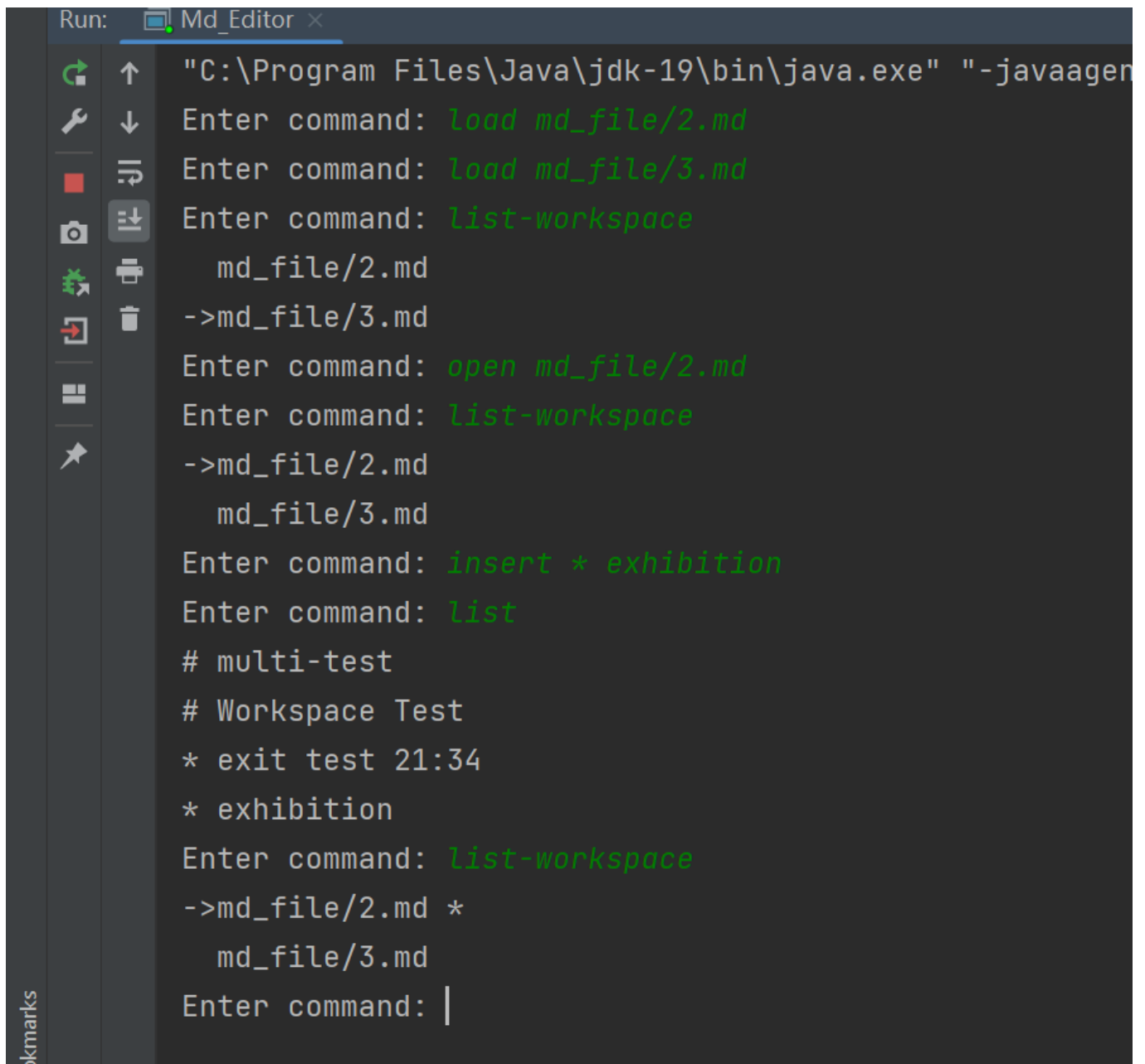
```
Run: Md_Editor x
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent
Enter command: load md_file/2.md
Enter command: load md_file/3.md
Enter command: list-workspace
md_file/2.md
->md_file/3.md
Enter command:
```

3-2 save #完成



```
Enter command: load md_file/3.md
Enter command: list-workspace
md_file/2.md
->md_file/3.md
Enter command: list
# aph test
## tree heading
## 越界 test
* apt test
Enter command: save
Enter command:
```

3-3 list-workspace #完成



```
Run: Md_Editor ×
↑ "C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagen
↓ Enter command: load md_file/2.md
↺ Enter command: load md_file/3.md
⇅ Enter command: list-workspace
  md_file/2.md
  ->md_file/3.md
  Enter command: open md_file/2.md
  Enter command: list-workspace
  ->md_file/2.md
  md_file/3.md
  Enter command: insert * exhibition
  Enter command: list
  # multi-test
  # Workspace Test
  * exit test 21:34
  * exhibition
  Enter command: list-workspace
  ->md_file/2.md *
  md_file/3.md
  Enter command: |
```

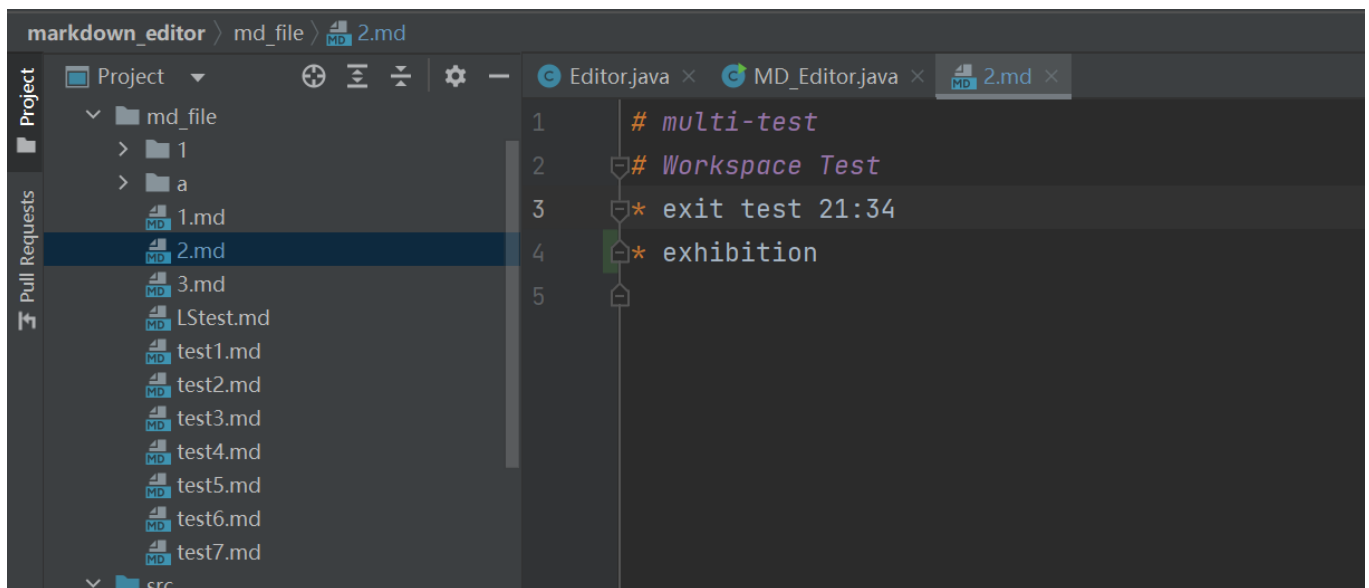
3-4 open #完成

```
Run: Md_Editor x
C:\Program Files\Java\jdk-19\bin\java.exe - java

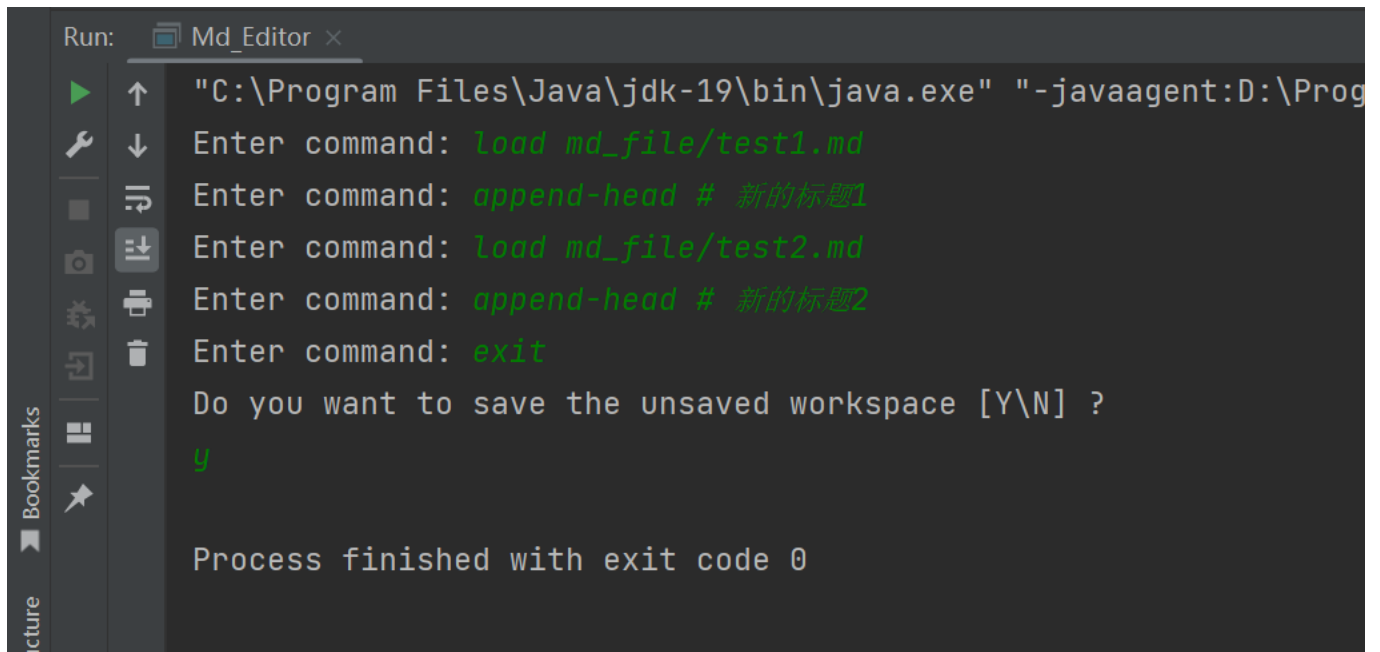
Enter command: load md_file/2.md
Enter command: load md_file/3.md
Enter command: list-workspace
    md_file/2.md
->md_file/3.md
Enter command: open md_file/2.md
Enter command: list-workspace
->md_file/2.md
    md_file/3.md
Enter command:
```

3-5 close #完成

```
# multi-test
# Workspace Test
* exit test 21:34
* exhibition
Enter command: list-workspace
->md_file/2.md *
    md_file/3.md
Enter command: close
Do you want to save the current workspace [Y\N] ?
y
Enter command: list-workspace
->md_file/3.md
Enter command:
```



3-6 exit #完成



```
Run: Md_Editor x
↑ "C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:D:\Pro
↓ Enter command: load md_file/test1.md
↶ Enter command: append-head # 新的标题1
↷ Enter command: load md_file/test2.md
Enter command: append-head # 新的标题2
Enter command: exit
Do you want to save the unsaved workspace [Y\N] ?
y
Process finished with exit code 0
```

4. 显示当前工作目录

ls #完成

```
Run: Md_Editor ×
↑ "C:\Program Files\Java\jdk-19\bin\java.exe" "-javaag
↓ Enter command: ls
├─1
│  └─1test.md
├─1.md
├─2.md
├─3.md
├─a
│  └─atest.md
├─LStest.md
├─test1.md
├─test2.md  *
├─test3.md
├─test4.md
├─test5.md
├─test6.md
└─test7.md
Enter command: A|
```

5. 工作区恢复

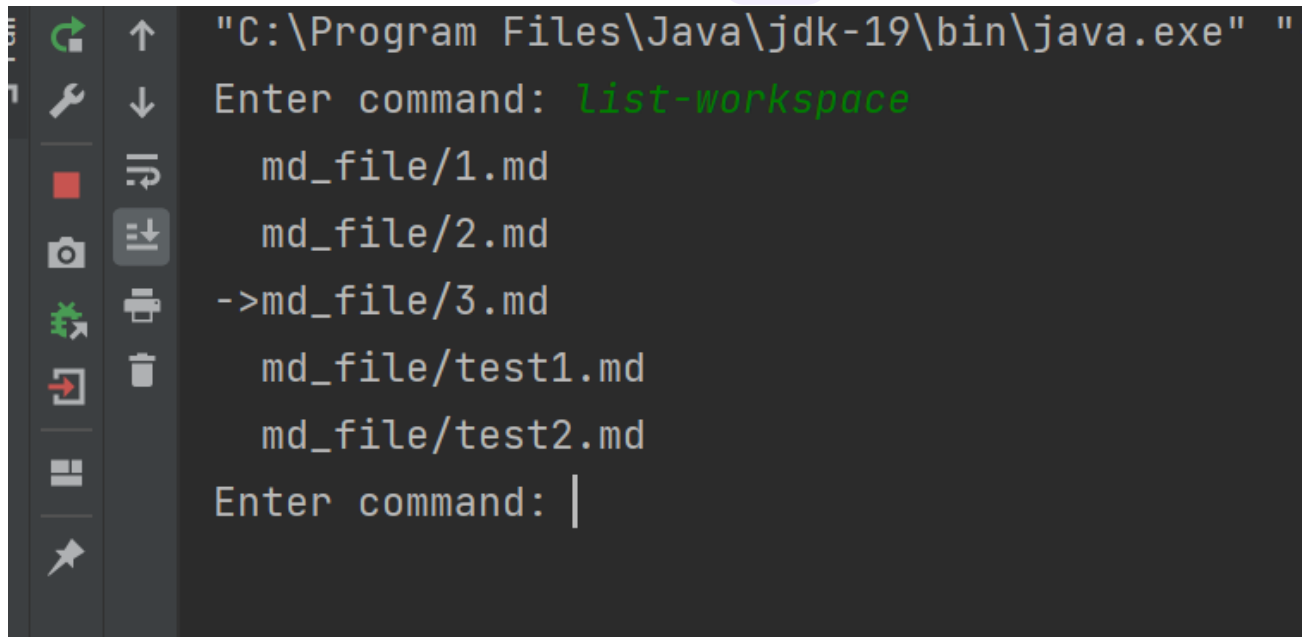
退出程序前

```
un: Md_Editor x
↑ Enter command: list-workspace
↓ md_file/test1.md
↶ ->md_file/test2.md
↷ Enter command: load md_file/2.md
Enter command: load md_file/3.md
Enter command: load md_file/1.md
Enter command: list-workspace
md_file/test1.md
md_file/test2.md
md_file/2.md
md_file/3.md
->md_file/1.md
Enter command: open md_file/2.md
Enter command: insert * restore test
Enter command: open md_file/3.md
Enter command: insert * 3md test
Enter command: undo
Enter command: list-workspace
md_file/test1.md
md_file/test2.md
md_file/2.md *
->md_file/3.md *
md_file/1.md
Enter command: exit
Do you want to save the unsaved workspace [Y\N] ?
y

Process finished with exit code 0
```

恢复后

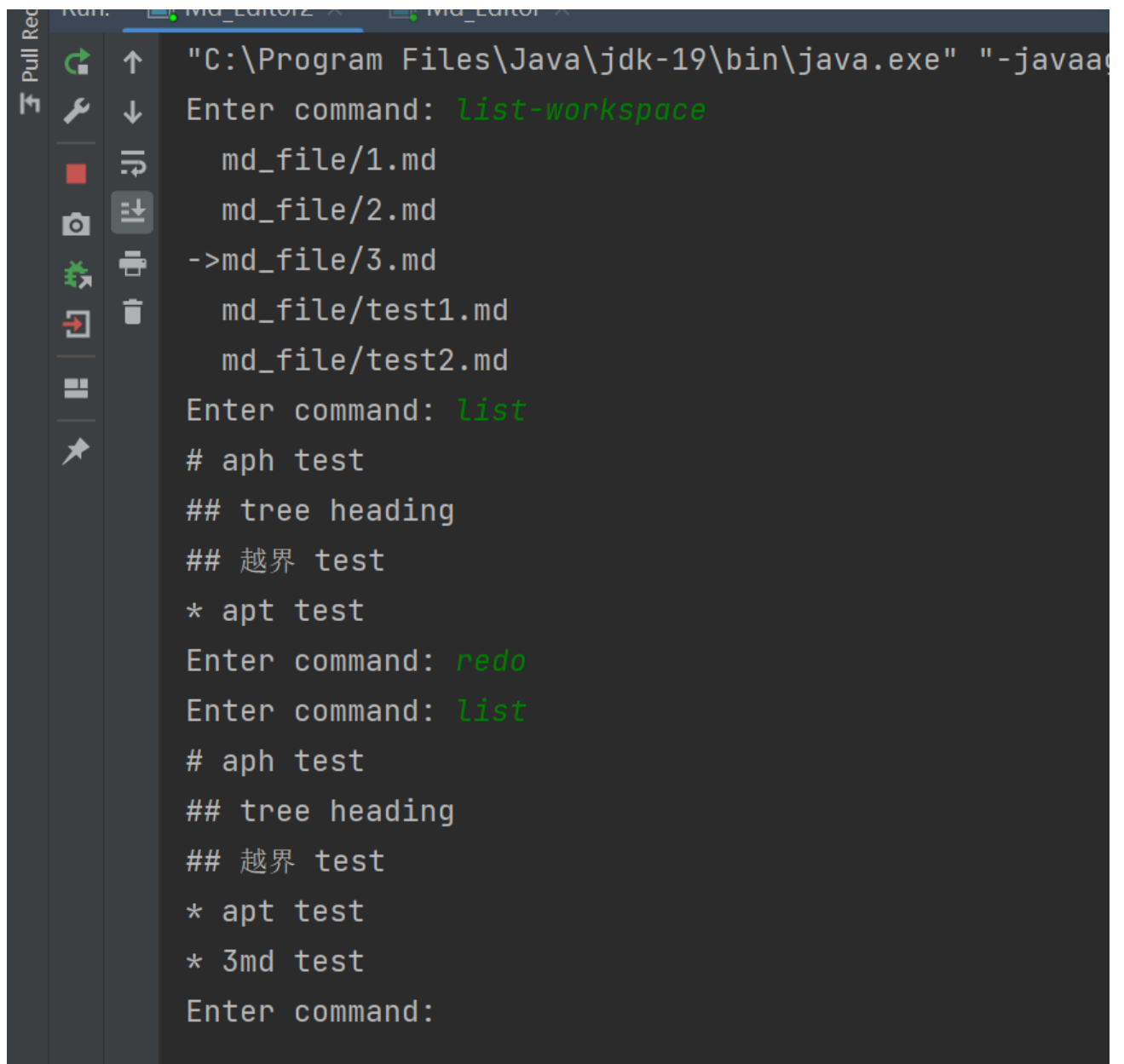
1. 打开上次恢复的所有工作区 #完成
2. 将上次退出所在的活动区，设为当前的活动工作区 #完成



```
"C:\Program Files\Java\jdk-19\bin\java.exe" "  
Enter command: list-workspace  
md_file/1.md  
md_file/2.md  
->md_file/3.md  
md_file/test1.md  
md_file/test2.md  
Enter command: |
```

3. 恢复redo/undo状态

Redo #完成



```
Run: "C:\Program Files\Java\jdk-19\bin\java.exe" "-javaag
Enter command: list-workspace
md_file/1.md
md_file/2.md
->md_file/3.md
md_file/test1.md
md_file/test2.md
Enter command: list
# aph test
## tree heading
## 越界 test
* apt test
Enter command: redo
Enter command: list
# aph test
## tree heading
## 越界 test
* apt test
* 3md test
Enter command:
```

Undo #完成

```
* 3md test
Enter command: open md_file/2.md
Enter command: list
# multi-test
# Workspace Test
* exit test 21:34
* exhibition
* restore test
Enter command: undo
Enter command: list
# multi-test
# Workspace Test
* exit test 21:34
* exhibition
Enter command: |
```