实验五实验报告 吴禹 2023214309

作业题一

设计思路

设计一个File_class类，可以定义所有的文件类型，将一个File_class列表作为这个类的成员变量，可以实现文件夹的效果。

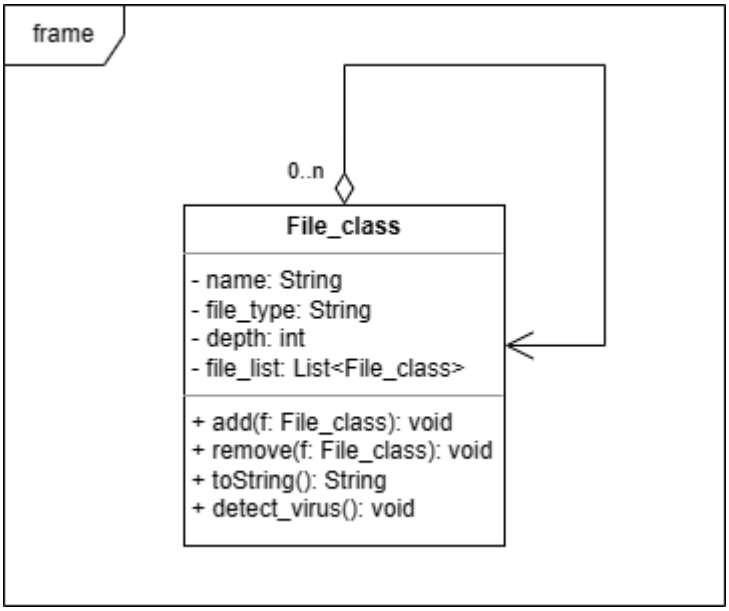
选用的设计模式

合成模式

关键类和函数的简单说明

- File_class 文件类，可以表示所有类型的文件
  - name 文件名
  - file_type 文件类型
  - deep 文件所在的层次
  - file_list 如果是文件夹，则可以用该成员变量存储
  - add() 往file_list添加文件
  - remove() 从file_list中删除文件
  - toString() 打印类的信息
  - detect_virus() 可以递归地扫描文件病毒

UML类图



测试用例

```
File_class root_folder = new File_class( name: "根文件夹",  file_type: "folder");
File_class image_folder = new File_class( name: "图片文件夹",  file_type: "folder");
File_class image = new File_class( name: "照片", file_type: "jpg");
File_class screenshot = new File_class( name: "截图", file_type: "gif");
File_class video_folder = new File_class( name: "视频文件夹",  file_type: "folder");
File_class screen_recording = new File_class( name: "录屏", file_type: "mp4");
File_class audio_folder = new File_class( name: "音频文件夹", file_type: "folder");
File_class recording = new File_class( name: "录音", file_type: "mp3");

root_folder.add(image_folder);
root_folder.add(video_folder);

image_folder.add(image);
image_folder.add(screenshot);

video_folder.add(screen_recording);
video_folder.add(audio_folder);

audio_folder.add(recording);

System.out.println("对整个文件系统扫描病毒");
root_folder.detect_virus();
System.out.println("对视频文件夹里面所有文件扫描病毒");
video_folder.detect_virus();
```

输入输出

```
对整个文件系统扫描病毒
正在杀毒File :[ FileName : 根文件夹, FileType : folder, FileDepth : 0].
正在杀毒File :[ FileName : 图片文件夹, FileType : folder, FileDepth : 1].
正在杀毒File :[ FileName : 照片, FileType : jpg, FileDepth : 2].
正在杀毒File :[ FileName : 截图, FileType : gif, FileDepth : 2].
正在杀毒File :[ FileName : 视频文件夹, FileType : folder, FileDepth : 1].
正在杀毒File :[ FileName : 录屏, FileType : mp4, FileDepth : 2].
正在杀毒File :[ FileName : 音频文件夹, FileType : folder, FileDepth : 2].
正在杀毒File :[ FileName : 录音, FileType : mp3, FileDepth : 3].
对视频文件夹里面所有文件扫描病毒
正在杀毒File :[ FileName : 视频文件夹, FileType : folder, FileDepth : 1].
正在杀毒File :[ FileName : 录屏, FileType : mp4, FileDepth : 2].
正在杀毒File :[ FileName : 音频文件夹, FileType : folder, FileDepth : 2].
正在杀毒File :[ FileName : 录音, FileType : mp3, FileDepth : 3].

进程已结束，退出代码为 0
```

作业题二

设计思路

设计一个Kerrigan类，限制只有一个实例，并且使用懒汉式创建实例。再设计一个Zerg类可以多线程运行，向Kerrigan实例请求服务。每个Zerg实例会向Kerrigan实例请求10次服务。

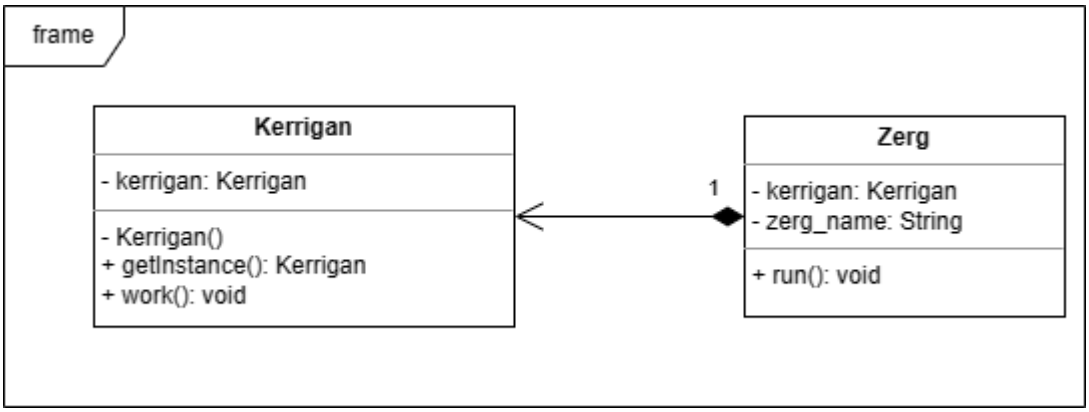
选用的设计模式

单例模式

关键类和函数的简单说明

- Zerg 虫族类
  - kerrigan 凯瑞甘实例
  - zerg_name 虫族名称
  - run() 在多线程情景下，需要执行的程序
- Kerrigan 凯瑞甘类
  - kerrigan 静态凯瑞甘实例
  - getInstance() 懒汉式获得实例函数
  - work() 服务函数

UML类图



测试用例

```
Kerrigan kerrigan = Kerrigan.getInstance();
Zerg zerg1 = new Zerg(kerrigan, zerg_name: "zerg1");
Zerg zerg2 = new Zerg(kerrigan, zerg_name: "zerg2");
Zerg zerg3 = new Zerg(kerrigan, zerg_name: "zerg3");
new Thread(zerg1).start();
new Thread(zerg2).start();
new Thread(zerg3).start();
```

输入输出

```
Kerrigan is working for zerg1. Kerrigan is 424837875
Kerrigan is working for zerg3. Kerrigan is 424837875
Kerrigan is working for zerg2. Kerrigan is 424837875
Kerrigan is working for zerg2. Kerrigan is 424837875
Kerrigan is working for zerg2. Kerrigan is 424837875
Kerrigan is working for zerg1. Kerrigan is 424837875
Kerrigan is working for zerg3. Kerrigan is 424837875
Kerrigan is working for zerg1. Kerrigan is 424837875
Kerrigan is working for zerg2. Kerrigan is 424837875
Kerrigan is working for zerg3. Kerrigan is 424837875
Kerrigan is working for zerg3. Kerrigan is 424837875
Kerrigan is working for zerg1. Kerrigan is 424837875
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Kerrigan is working for zerg3. Kerrigan is 424837875
Kerrigan is working for zerg1. Kerrigan is 424837875
Kerrigan is working for zerg2. Kerrigan is 424837875
Kerrigan is working for zerg1. Kerrigan is 424837875
Kerrigan is working for zerg3. Kerrigan is 424837875
Kerrigan is working for zerg1. Kerrigan is 424837875
Kerrigan is working for zerg2. Kerrigan is 424837875
Kerrigan is working for zerg2. Kerrigan is 424837875
Kerrigan is working for zerg2. Kerrigan is 424837875
Kerrigan is working for zerg3. Kerrigan is 424837875
```

```
Kerrigan is working for zerg1. Kerrigan is 424837875
Kerrigan is working for zerg2. Kerrigan is 424837875
Kerrigan is working for zerg3. Kerrigan is 424837875
Kerrigan is working for zerg2. Kerrigan is 424837875
Kerrigan is working for zerg3. Kerrigan is 424837875
Kerrigan is working for zerg3. Kerrigan is 424837875

进程已结束，退出代码为 0
```