ĐẠI HỌC BÁCH KHOA HÀ NỘI
TRƯỜNG CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN THÔNG

LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG
ĐỀ TÀI: Demonstration of types of cell division

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Nội dung

1. Assignment of members

Nguyễn Hữu Đức – 20210192

+ Design project

+ Write source code (almost the project)

(Claim: use the idea of project organization from this [public repository](#))

Evaluation: Completed on time

Đàm Trần Ngọc Đức - 20210208

+ Make Slide

+ Design UI (DemoScreen, ComponentsTab)

Evaluation: Completed on time

Hồ Văn Đức – 20215037

+ Test and debug (DivisionController)

+ Record Demo Video

Evaluation: Completed on time

Bùi Mạnh Dũng – 20215010

+ Write Report

+ Design UI (DemoScreen, DivisionTab)

Evaluation: Completed on time

2. Mini Project description

2.1. Requirement

Topic: Demonstration of types of cell division

Overview & gameplay: Chu kì tế bào và các hình thức phân bào - Ôn Tập Sinh Học 10 - Để học tốt

Basic knowledge: Cell cycle, Direct cell division or amitosis, Mitosis, and Meiosis

**Designs: create an applications that satisfies these following requirements**

+ **Main screen:**
● Interfaces: application title, choosing options of cell types, help, menu, quit.
● For each type of cell, the user can choose to investigate one of the cell processes (Amitosis, Mitosis, and Meiosis) for demonstration.
● The help menu shows the basic usage and aim of the application.
● The quit button exits the application. Be sure to ask for confirmation

+ **Demonstration:**
● Display the cell components. Note that each component has different functions, you should display and explain them.
● One button to start demonstrating the progress of cell division through separate phases.
● On the bottom bar, the user can see the progress bar of the executing phase and choose to pause, continue, or go backward or forward a step in the execution.
● The user can also replay the process.
● Always have a Back button for the user to return to the main menu at any time.

2.2. Use-case diagram and explanation
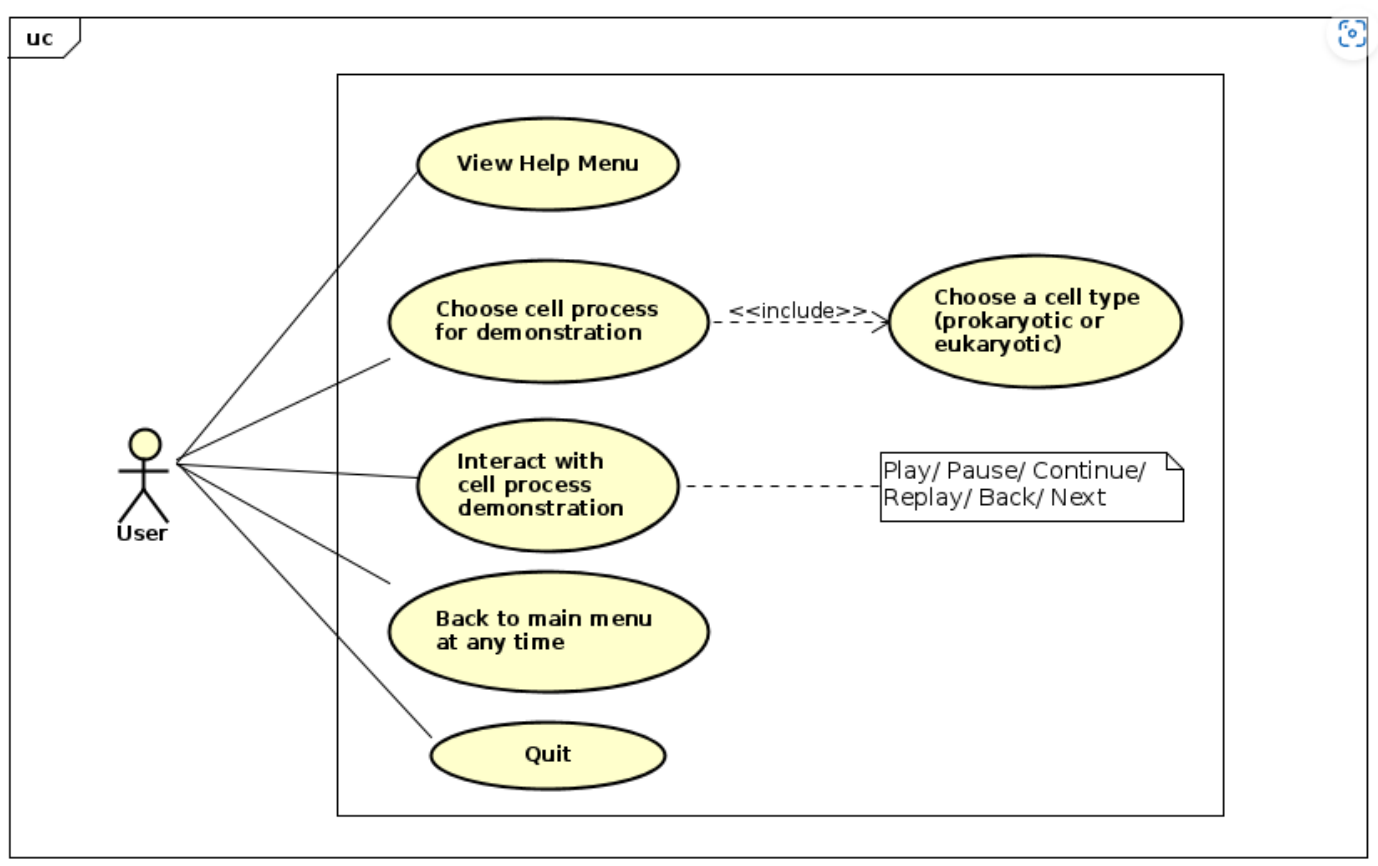
In this use-case, user interacts with the software by buttons. This use-case is performed by software, give the result value – is another interface to actors based on specific buttons the user choose, for example:

+ If the user choose "Help" button, the software will bring user to list of instructions how to use this application.

+ If the user choose "Option", then choose "Home", the software will bring user to the home screen.

+ If the user choose "Quit", the application will be shut down.
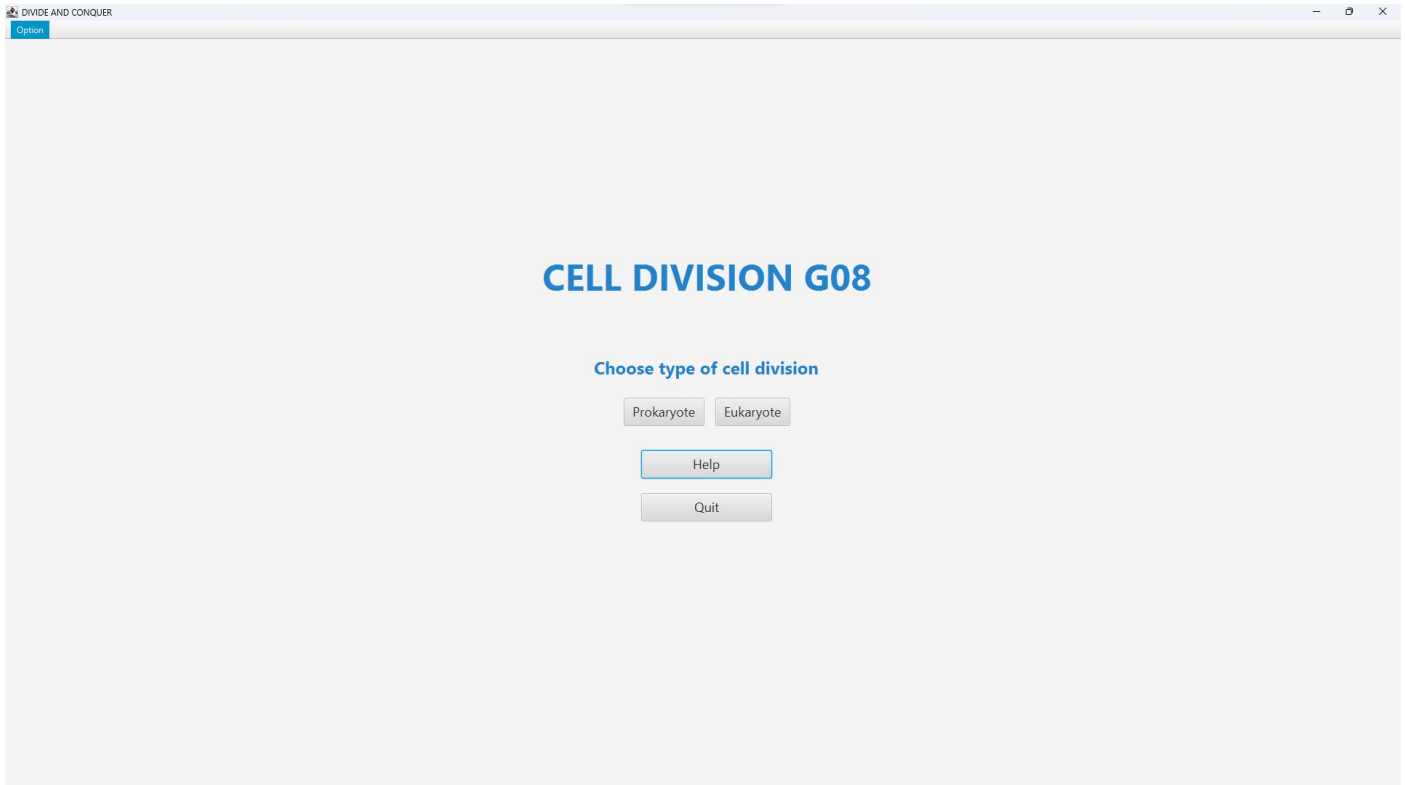
* Display cell vision category

For this use-case, the software will show two types of cell vision for the user: prokaryote and eukaryote. User interacts with the software by choosing one of them.
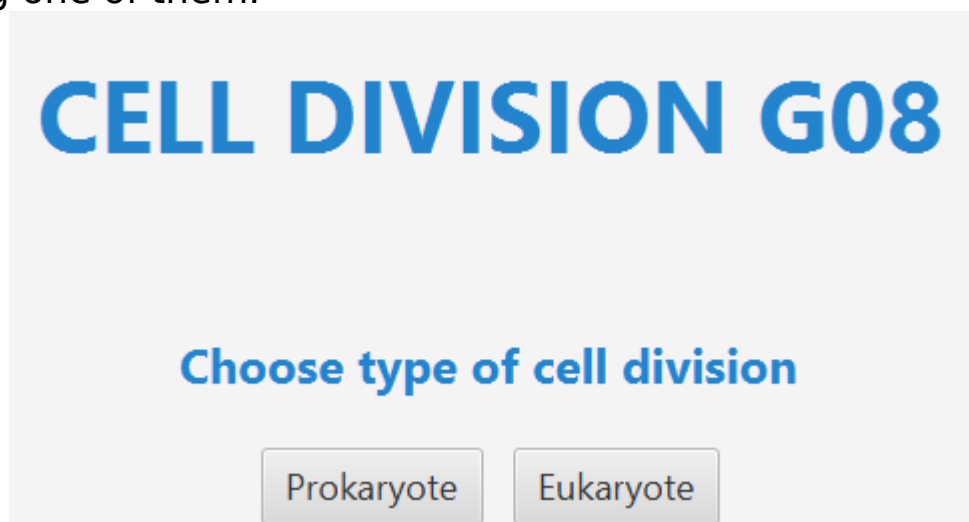

* Display structure

After choosing cell division type, the software will move to the new screen showing the Demonstration of cell division. User can click radio button to see function of cell components.
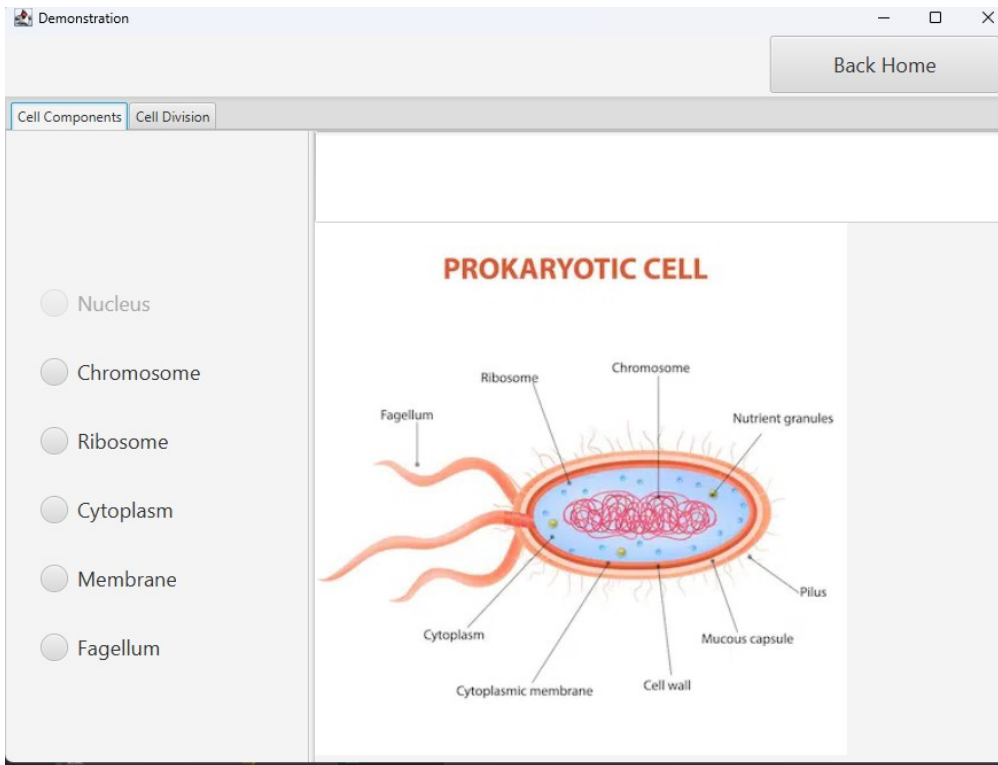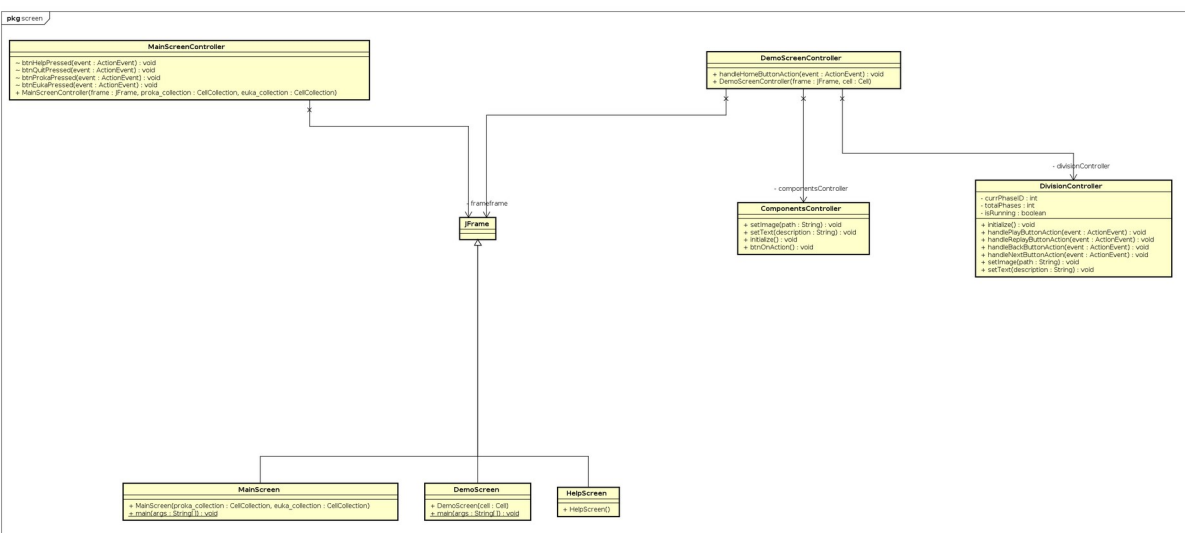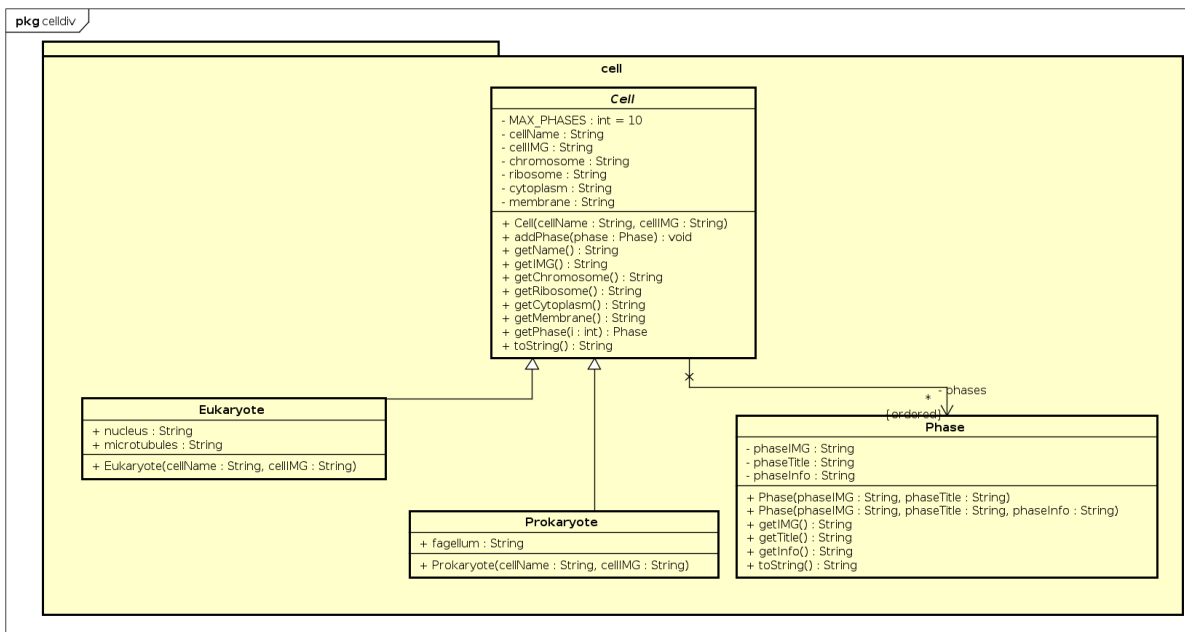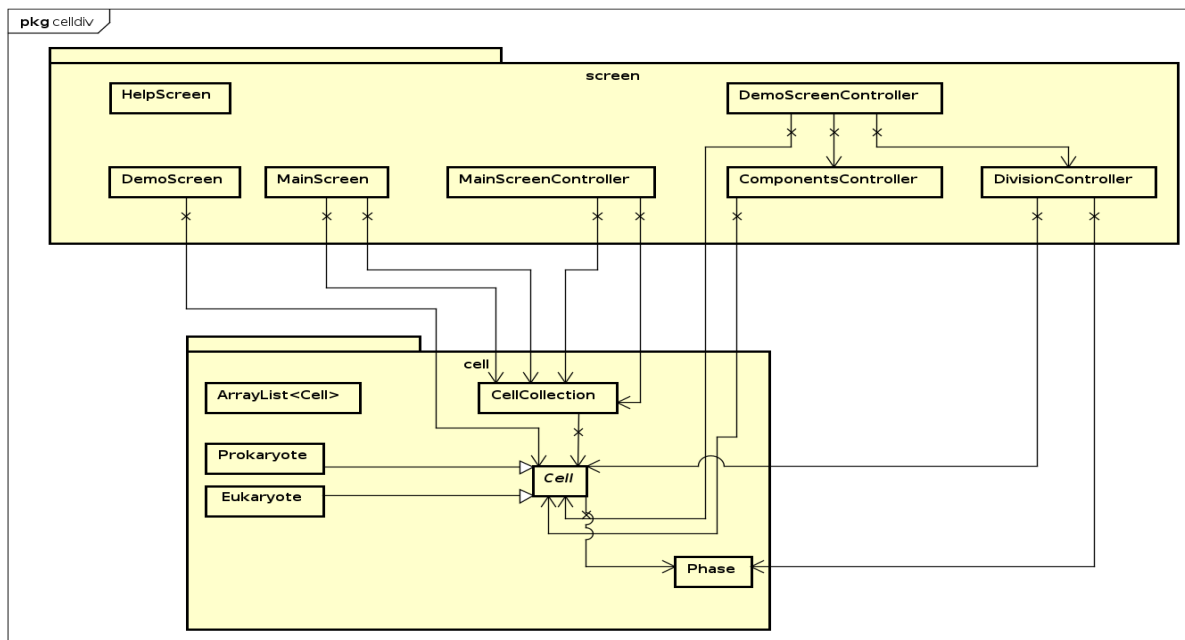
* Display cell division process

The user can also move to "Cell Division" tab. There are many cell division phases, depend on cell division type. User interacts with the software by choosing button, such as Play, Replay, Back, Next, and the software will return the result by corresponding text and image:
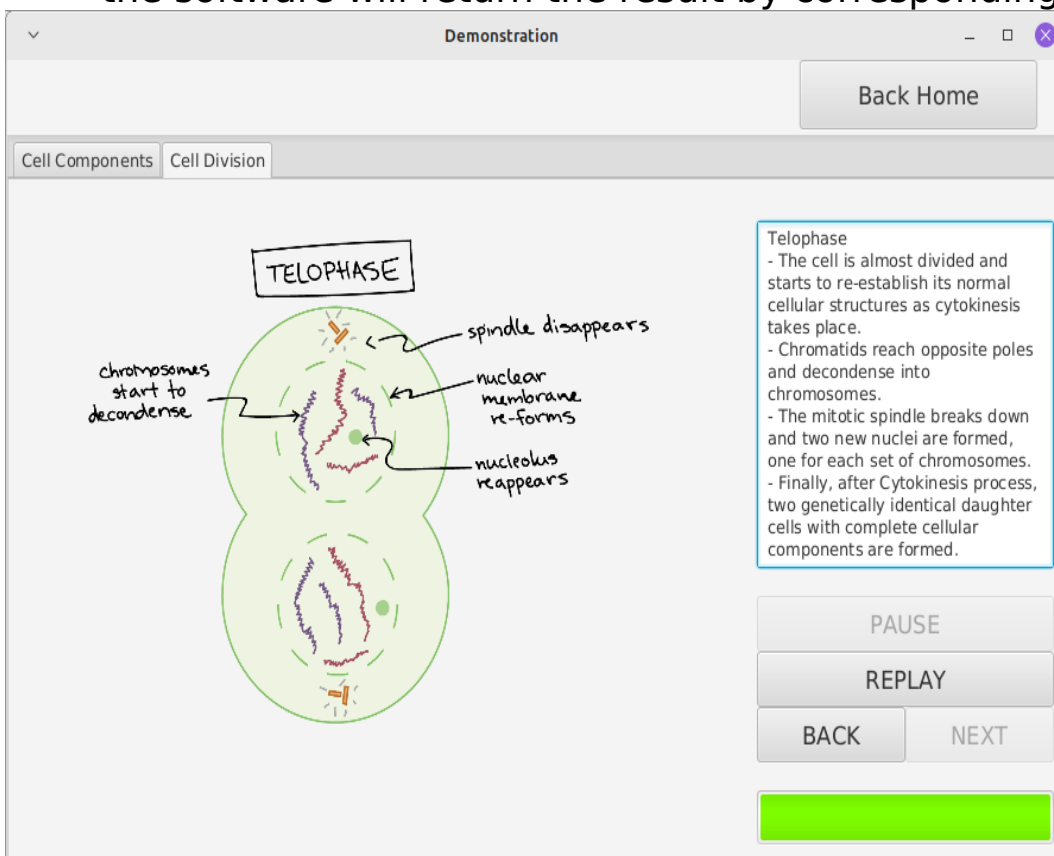
3. Design

3.1. Diagram

3.2 Explanation of the design:

Relationships between classes

Prokaryote and Eukaryote inherit from Cell.
CellCollection stores Cell objects.
Each Screen classes has its controller class.

Implementations of Important Methods

Key methods have been implemented to retrieve attributes of Cell objects and visually represent cell division progress on the Demo Screen.

Cell Class and Inherited Classes:

- Getter methods: Methods, such as getIMG() and getChromosome(), get image and component descriptions of Cell objects, including their inherited classes Prokaryote and Eukaryote.
- AddPhase() method: This method enables the addition of phases to specific Cell objects, as each type of cell division involves different phases.

Phase Class:

- Getter methods: Methods like getIMG() and toString() retrieve information related to cell division phases.

ComponentsController Class:

- btnOnAction() method: This method updates information for the selected cell component based on user interactions.

DivisionController Class:

- Button Action Handling methods: Methods such as handlePlayButtonAction() ensure that the image, information, and progress bar of the current cell phase are updated appropriately in response to user interactions. To ensure smooth GUI updates from non-GUI controller threads, Platform.runLater() is deployed. This mechanism queues updates to be handled by the GUI thread as soon as possible, maintaining responsiveness and preventing potential threading issues.