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OBJECT - ORIENTED PROGRAMMING PROJECT REPORT

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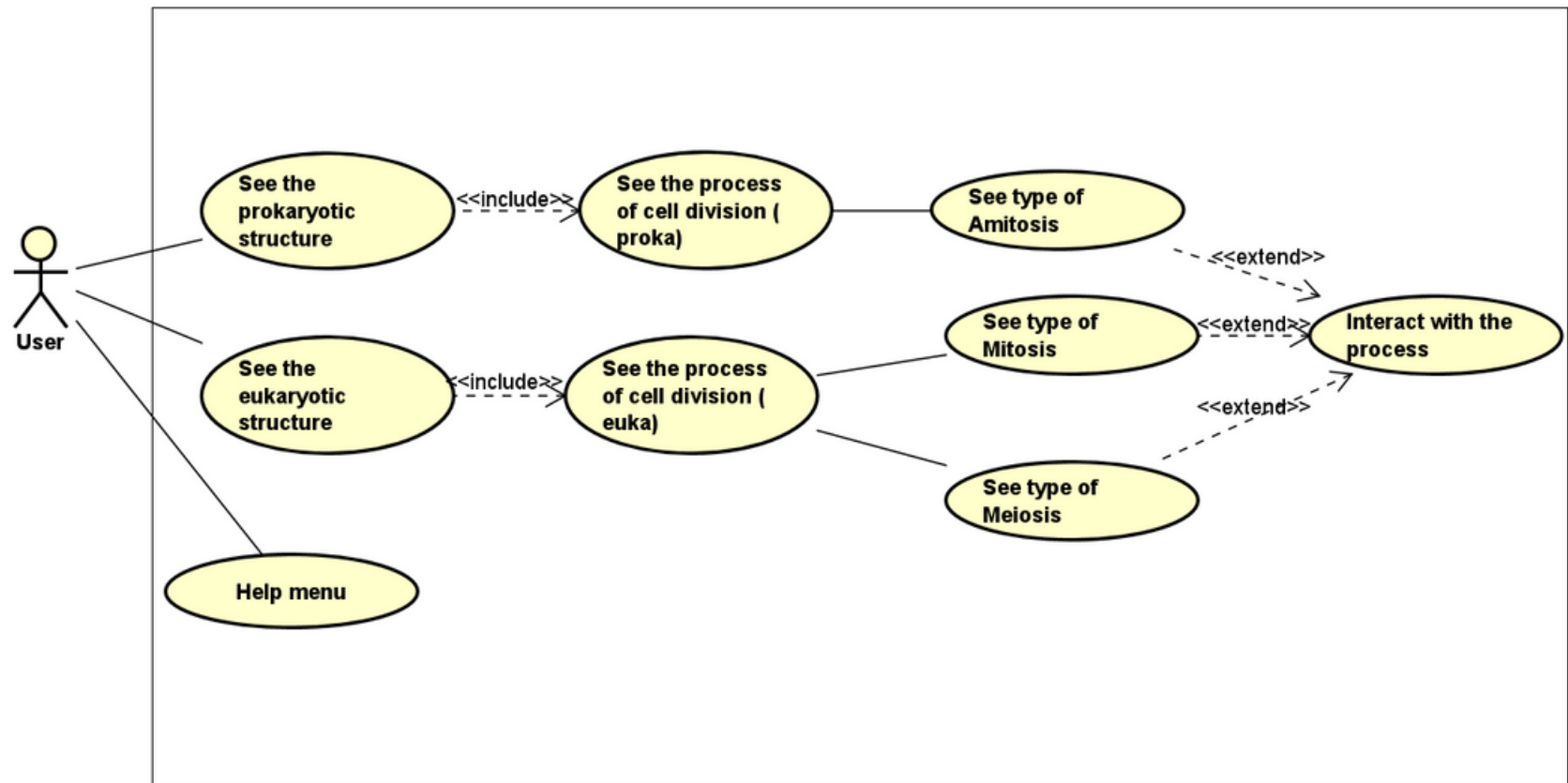**Pham Dinh Hai   20215043**
Pham Cong Hao   20215045
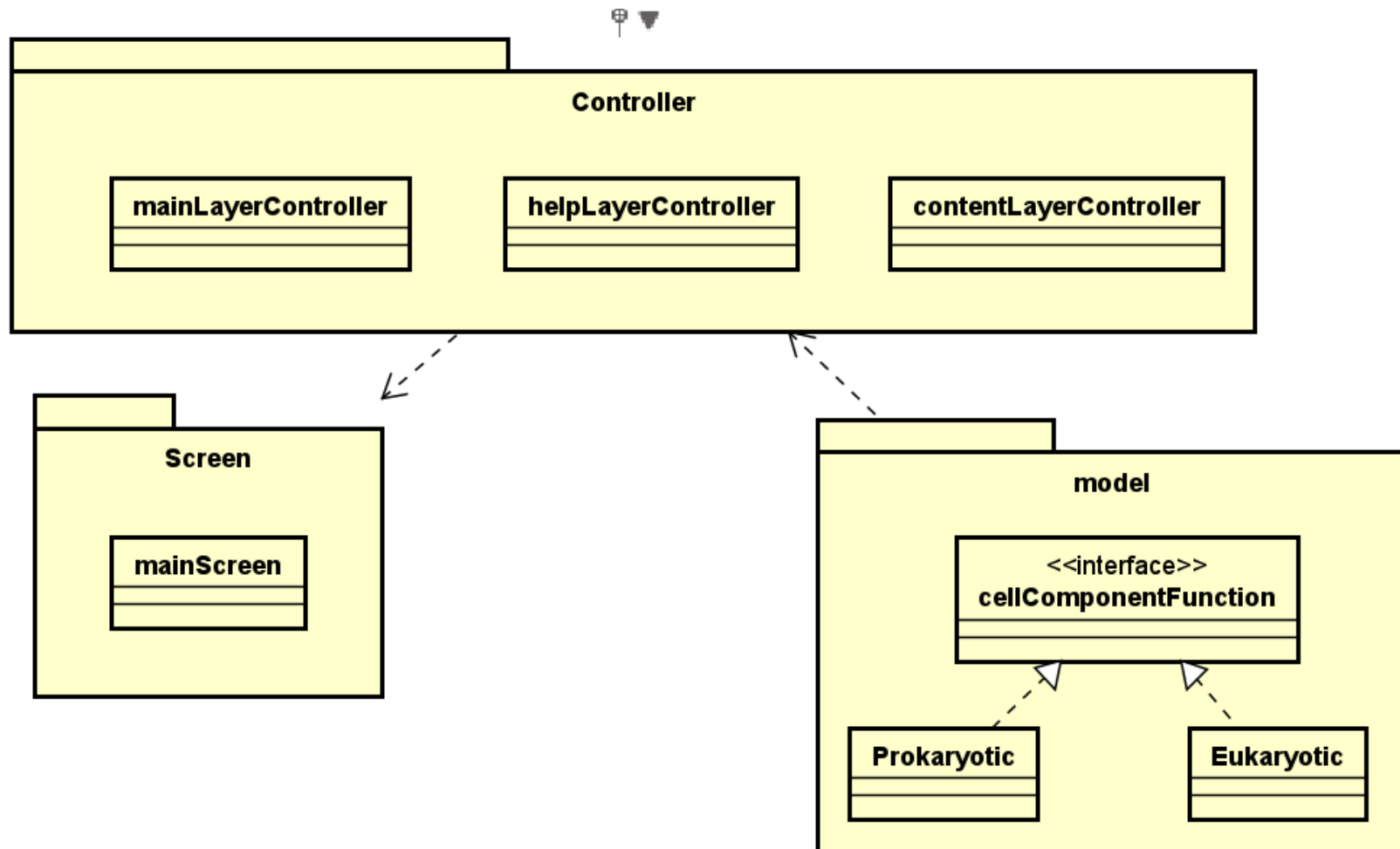
1.TOPIC: DEMONSTRATION OF TYPES OF CELL DIVISION

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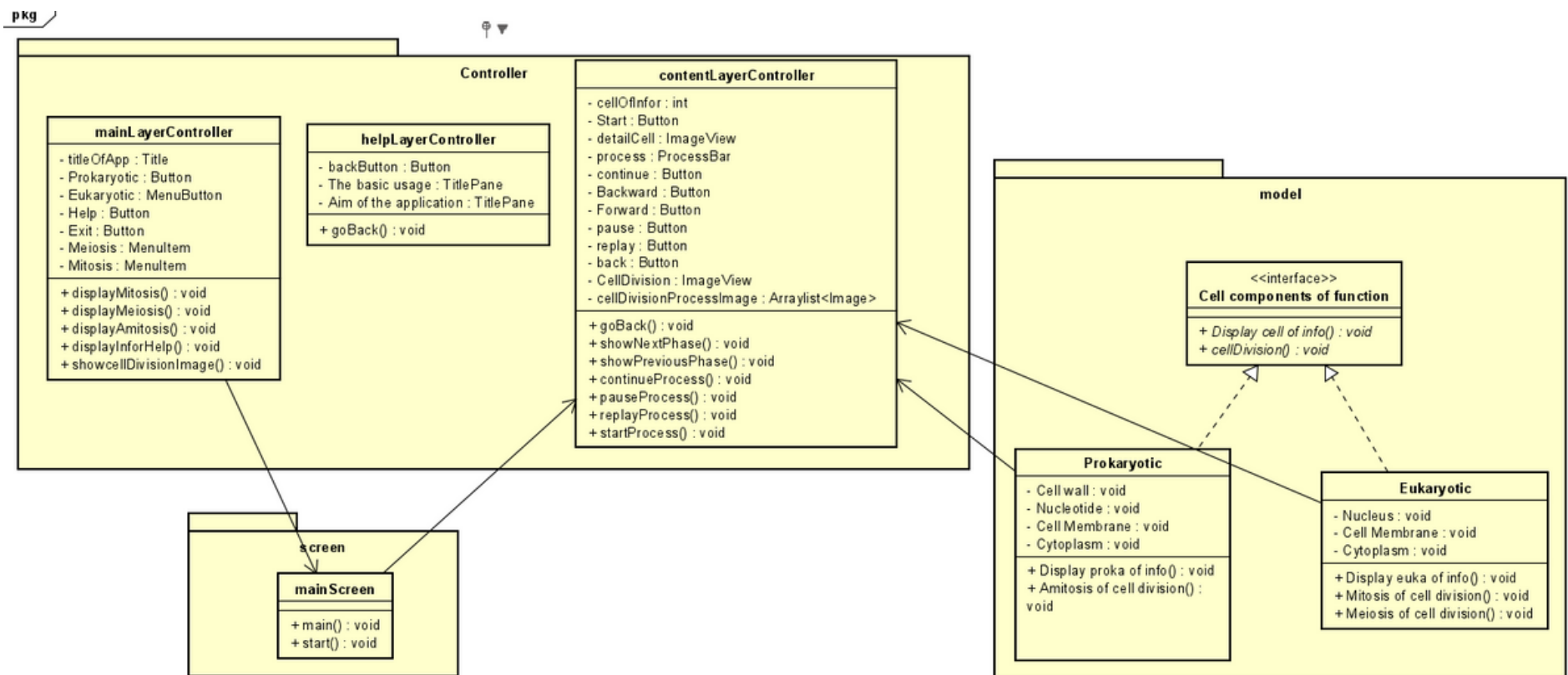
-Langue: Java

2.USE CASE DIAGRAM:

3.GENERAL CLASS DIAGRAM:

4.CLASS DIAGRAMS FOR PACKAGES:

-Two main parts of program: **Saving** and **Exporting** images

-Four main packages: **Controller**, **Image**, **Model** and **Screen**

4.CLASS DIAGRAMS FOR PACKAGES:

5.OOP TECHNIQUES:

5.1.Encapsulation

-Encapsulation is used to hide the internal data of an object.
-Applying encapsulation, private data is only used in **contentLayerController()** function.

```
24  ∨    public class contentLayerController {
25       |
26           Timer timer = new Timer();
27           private boolean started = false;
28           @FXML
29           private Button BackButton;
30
31           @FXML
32           private ImageView detailCell;
33
34           @FXML
35           private ImageView CellDivision;
36
37           @FXML
38           private Button nextbutton;
39
40           @FXML
41           private Button previousButton;
42
43           @FXML
44           private VBox Vbox;
```

5.OOP TECHNIQUES:

5.2.Inheritance

-Inheritance is defined as the process in which a class (class) has get the properties of another class.
-The inherited class will be called the parent class and the derived class will be called.

```java
13    public class main extends Application {
14        @Override
15        public void start(Stage stage) throws Exception {
16
17            try {
18                Parent root = FXMLLoader.load(getClass().getResource("main.fxml"));
19                Scene scene = new Scene(root);
20                stage.setTitle("Cell Division");
21                stage.setScene(scene);
22                stage.show();
```

5.OOP TECHNIQUES:

5.3.Abstraction

- Abstraction help to hide the actual implementation of an application from users. Therefore, we can reduce the complexity and increase the efficiency of the software.

```
1       package model;
2
3   v   public interface cellOfFuntion {
4           void DisplayCellOfInfor();
5
6           void cellDivision();
7       }
```

6.DEMO SCENARIO:

-Program displays the cell components.
-Program has "Help" button for the users to read guidline.
-The users can choose which type of cell they want to demonstrate.
-The users press "Start" button to begin the progress of cell division through separate phases.
-On bottom bar, the users can choose to Pause, Continue, or Go backward or forward a step in the execution.
-Program also has "Replay" button.
-Program has a "Back" button for the users to return to the main menu at any time.

Video demo: https://youtu.be/XUkywcprLps?si=jK1qE7qb1-yXwEqu