Assignment 3, mobile programming

Put all deliverables into github repository in your profile. Share link to google form according to teams deadline. Defend by explaining deliverables and answering questions. There should be proof that you did yourself.
Deliverables: report in pdf
Google form:
https://docs.google.com/forms/d/e/1FAIpQLSe0GyNdOYlvM1tX_I_CtlPod5jBf-ACLGdHYZq1gVZbUeBzIg/viewform?usp=sf_link

1. Fragments and Fragment Lifecycle

Exercise 1: Creating a Basic Fragment

- Create a new Fragment that displays a simple message ("Hello from Fragment!").
- Implement the fragment lifecycle methods (`onCreateView`, `onStart`, `onResume`, `onPause`, `onStop`, `onDestroyView`) to log lifecycle events.

Exercise 2: Fragment Communication

- Create two Fragments: one for input (EditText) and one for output (TextView).
- Implement communication between these Fragments using a shared ViewModel to display the input text in the output Fragment.

Exercise 3: Fragment Transactions

- Design an Activity that hosts two Fragments.
- Implement buttons to switch between the two Fragments using Fragment transactions (add, replace, remove).

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2. RecyclerView and Adapters

Exercise 4: Building a RecyclerView

- Create a RecyclerView that displays a list of items (e.g., a list of favorite movies).
- Implement a basic Adapter to populate the RecyclerView with data.

Exercise 5: Item Click Handling

- Extend the RecyclerView from Exercise 4 to handle item clicks.
- Display a Toast message showing the clicked item's name.

Exercise 6: ViewHolder Pattern

- Implement a ViewHolder class within your Adapter for the RecyclerView.
- Optimize your RecyclerView implementation by applying the ViewHolder pattern properly.

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3. ViewModel and LiveData

Exercise 7: Implementing ViewModel

- Create a ViewModel that stores a list of items (e.g., a list of users).
- Observe LiveData from the ViewModel in your Activity or Fragment to update the UI when the data changes.

Exercise 8: MutableLiveData for Input Handling

- Extend your ViewModel from Exercise 7 to handle user input via MutableLiveData.
- Implement an input field in your UI that updates the ViewModel, and observe changes to reflect them in the UI.

Exercise 9: Data Persistence

- Create a ViewModel that retrieves data from a local database (e.g., Room).
- Use LiveData to observe changes in the database and update the UI accordingly.

Report Structure

1. **Title Page**
    - Title of the report
    - Student name
    - Date
    - Course details
2. **Table of Contents**
    - Sections and page numbers
3. **Introduction**
    - Brief overview of the topics covered (Fragments, RecyclerView, ViewModel, LiveData)
    - Importance of these components in Android development
4. **Exercise Descriptions**
    - For each exercise, include:
        - Exercise title
        - Objective
        - Description of the implementation steps
        - Expected outcome

5. **Code Snippets**
    - Provide relevant code snippets for key parts of the implementation.
    - Include comments to explain important lines.
6. **Results**
    - Describe the results of each exercise.
    - Discuss any challenges faced and how they were resolved.
7. **Conclusion**
    - Summarize the learning experience.
    - Reflect on the importance of Fragments, RecyclerView, ViewModel, and LiveData in building modern Android applications.
8. **References**
    - Cite any resources used for the exercises (documentation, tutorials, articles).
9. **Appendix**
    - Include any additional material (like screenshots of the app, if applicable).