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Department of Computer Science

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Assignment # 3
Date: 7-12-2025

Program	: BSCS	Class & Section	:BSCS 6A&B
Course Name	: Android Application Development		
Instructor's Name	: Muhammad Azhar	Marks	: /4

(CLO-3)

Develop an Android application that allows users to create and manage study notes, track quiz progress, and maintain user state across OS events. The app must correctly save and restore state during rotation, configuration changes, background/foreground transitions, and low-memory process death. Students must define core features (minimum 10), map each feature to suitable resources/APIs/libraries, and select any three features to implement using one framework of choice (Java & XML, Kotlin, React Native, Flutter, Xamarin, or Kivy). The submission must include technical documentation explaining the implementation and the method used to preserve state across important Android OS events.

Deliverables:

1) List at least 10 features / functional requirements of your project
Create your own feature list relevant to the study-notes/quiz mini-app scenario.

2) Provide a feasibility study
Prepare a table mapping each requirement to available resources/APIs/packages/libraries that would help you implement.

3) Technical developer guide
Choose any three features from your feature list and provide a detailed, step-by-step technical guide on how to implement them.

4) Implementation
Using any ONE of the allowed frameworks (Java & XML / Kotlin / React Native / Flutter / Xamarin / Kivy), implement the three selected features inside a small working project.

Submission Requirements:

- Push your completed mini project to your own GitHub repository.
- Include a short README file describing the added features and navigation flow.
- Prepare screenshots of your project code from android studio, output from emulator or separate device, and your git repository along with feasibility study to include in your submission document.

Solution:

INTRODUCTION

This Android application is developed as a study-based mini app that allows users to:

- Create and save study notes
- View stored notes
- Attempt quiz questions
- Track quiz score
- Preserve app state during rotation
- Maintain stored data after closing the app

The project is implemented using **Java + XML** in Android Studio. The app uses:

- **SQLite Database** to store notes
- **SharedPreferences** to store quiz progress
- **UI state saving methodology** to handle orientation change

1. **PROJECT FEATURES (Minimum 10 Functional Requirements)**

No.	Feature Name	Description
1	Add Notes	Users can write and save notes
2	View Notes	Displays stored notes
3	Edit Notes (optional)	Notes can be modified
4	Delete Notes (optional)	Notes can be removed
5	Search Notes (optional)	Filtering search option
6	Quiz Functionality	Users attempt questions
7	Score Storage	Score saved for later view
8	Persistent Storage	Notes stored locally
9	State Preservation	UI data saved on rotation
10	User Friendly UI	Clear interface layout

2. **FEASIBILITY STUDY (REQUIREMENT → RESOURCE TABLE)**

Feature	Technology Used	Purpose
Save notes	SQLite DB	Long-term storage
View notes	SQLite cursor	Dynamic listing
Quiz score	SharedPreferences	Persistent scoring
UI display	XML layouts	Screen structure
Rotation handling	onSaveInstanceState()	State safety
Java classes	OOP logic	Feature execution
SQLiteOpenHelper	Local DB engine	CRUD operations
Toast messages	UI feedback	User interaction
ScrollView	Notes reading	Long text support
Manifest	Navigation links	App access paths

3. SELECTED 3 FEATURES FOR IMPLEMENTATION

✓ Create & Save Notes (SQLite)

✓ Display Notes List

✓ Quiz + Score Saving (SharedPreferences)

4. TECHNICAL DEVELOPER IMPLEMENTATION GUIDE

AddNoteActivity.java

```
package com.example.assignment3;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;

public class AddNoteActivity extends AppCompatActivity {

    EditText title, content;
    Button saveBtn;
    DBHelper db;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_add_note);

        title = findViewById(R.id.etTitle);
        content = findViewById(R.id.etContent);
        saveBtn = findViewById(R.id.btnSave);
        db = new DBHelper(this);

        if (savedInstanceState != null) {
            title.setText(savedInstanceState.getString("title"));
            content.setText(savedInstanceState.getString("content"));
        }

        saveBtn.setOnClickListener(v -> {
            boolean inserted = db.insertNote(
                    title.getText().toString(),
                    content.getText().toString()
            );

            if (inserted)
                Toast.makeText(this, "Note Saved", Toast.LENGTH_SHORT).show();
            else
                Toast.makeText(this, "Error", Toast.LENGTH_SHORT).show();
        });
    }

    @Override
    public void onSaveInstanceState(Bundle outState) {
        outState.putString("title", title.getText().toString());
        outState.putString("content", content.getText().toString());
        super.onSaveInstanceState(outState);
    }
}
```

MainActivity.java

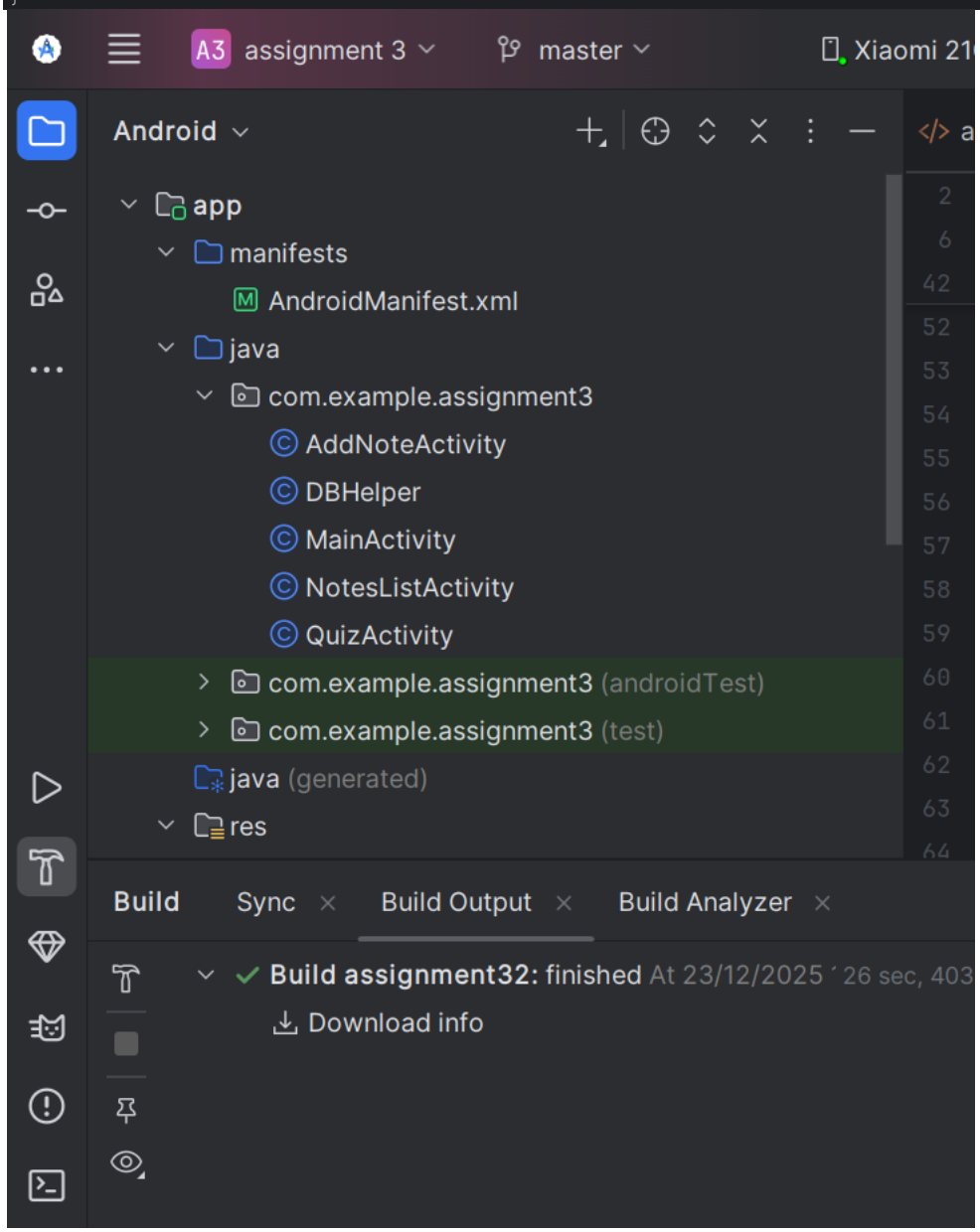
```java
package com.example.assignment3;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.content.Intent;

public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        findViewById(R.id.btnAdd).setOnClickListener(v ->
                startActivity(new Intent(this, AddNoteActivity.class)));

        findViewById(R.id.btnView).setOnClickListener(v ->
                startActivity(new Intent(this, NotesListActivity.class)));

        findViewById(R.id.btnQuiz).setOnClickListener(v ->
                startActivity(new Intent(this, QuizActivity.class)));
    }
}
```

```java
package com.example.assignment3;

import android.content.Context;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
import android.content.ContentValues;
import android.database.Cursor;

public class DBHelper extends SQLiteOpenHelper {

    public DBHelper(Context context) {
        super(context, "NotesDB.db", null, 1);
    }

    @Override
    public void onCreate(SQLiteDatabase db) {
        db.execSQL("CREATE TABLE notes(id INTEGER PRIMARY KEY AUTOINCREMENT, title TEXT,
content TEXT)");
    }

    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
        db.execSQL("DROP TABLE IF EXISTS notes");
        onCreate(db);
    }

    public boolean insertNote(String title, String content) {
        SQLiteDatabase db = this.getWritableDatabase();
        ContentValues cv = new ContentValues();
        cv.put("title", title);
        cv.put("content", content);
        long result = db.insert("notes", null, cv);
        return result != -1;
    }

    public Cursor getNotes() {
        SQLiteDatabase db = this.getReadableDatabase();
        return db.rawQuery("SELECT * FROM notes", null);
    }
}
```

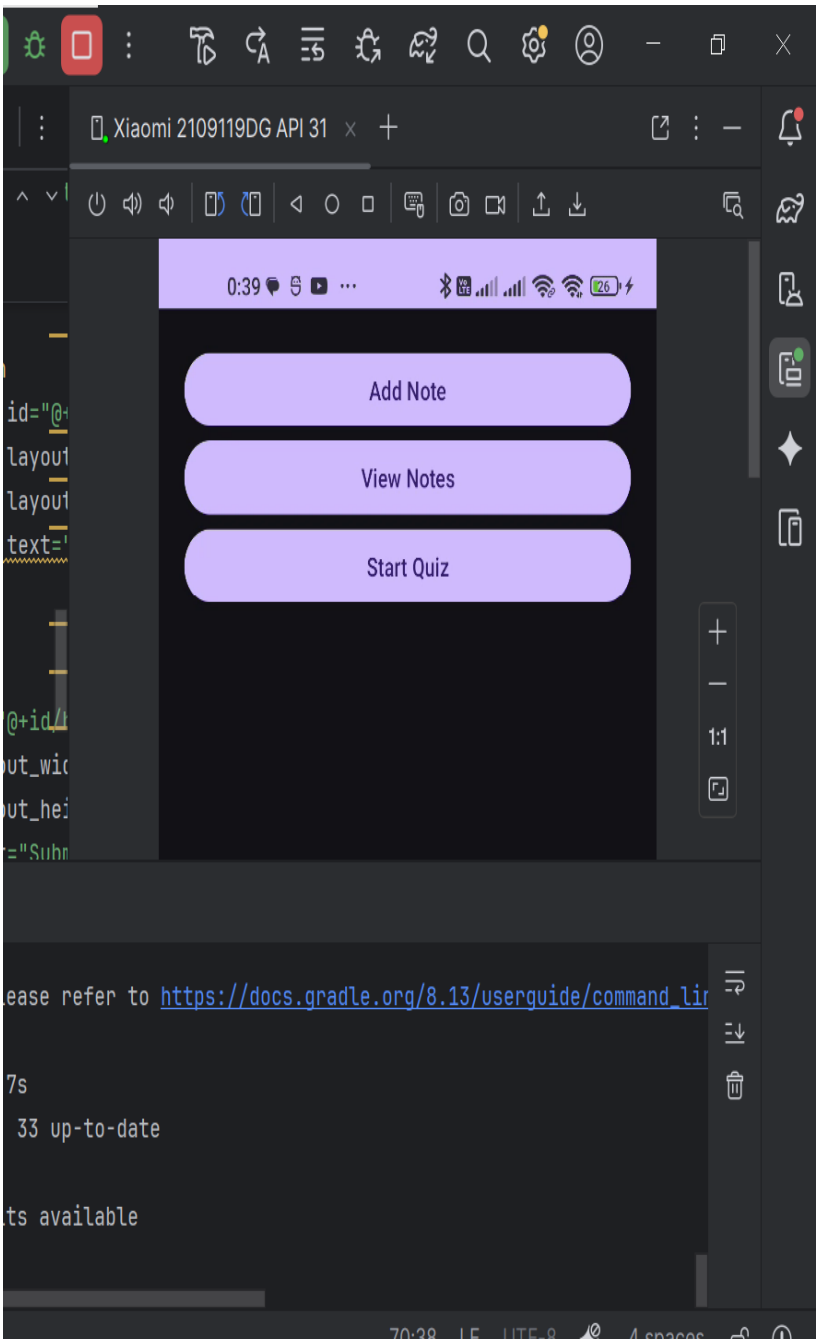
```java
package com.example.assignment3;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.database.Cursor;
import android.widget.TextView;

public class NotesListActivity extends AppCompatActivity {

    DBHelper db;
    TextView tvNotes;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_notes_list);

        db = new DBHelper(this);
        tvNotes = findViewById(R.id.tvNotes);

        Cursor c = db.getNotes();
        StringBuilder data = new StringBuilder();

        while (c.moveToNext()) {
            data.append("Title: ")
                    .append(c.getString(1))
                    .append("\n")
                    .append("Note: ")
                    .append(c.getString(2))
                    .append("\n\n");
        }

        tvNotes.setText(data.toString());
    }
}
```

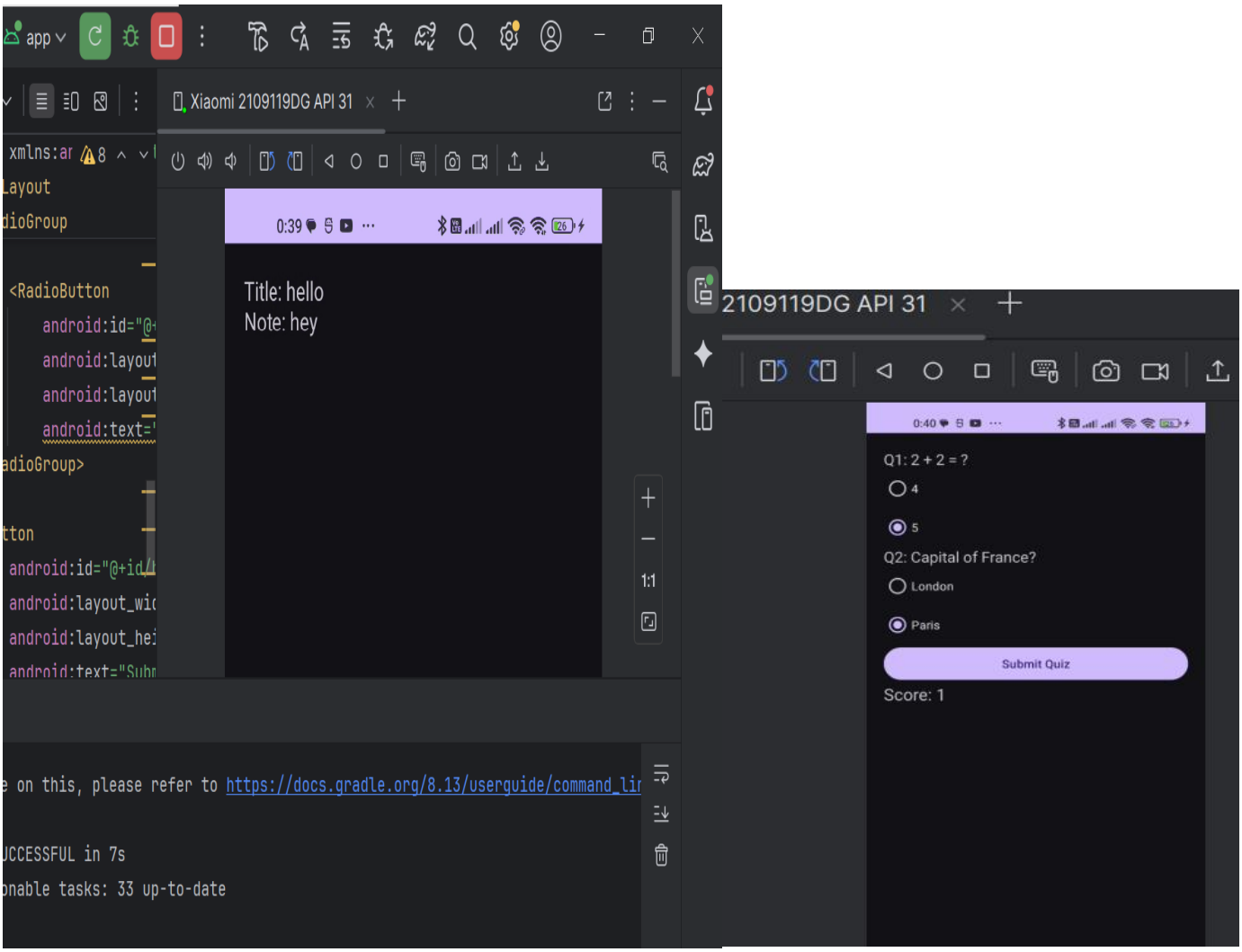
```java
package com.example.assignment3;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.Button;
import android.widget.RadioGroup;
import android.widget.TextView;
import android.content.SharedPreferences;
import android.widget.Toast;

public class QuizActivity extends AppCompatActivity {

    RadioGroup rgQ1, rgQ2;
    Button btnSubmit;
    TextView tvScore;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_quiz);

        rgQ1 = findViewById(R.id.rgQ1);
        rgQ2 = findViewById(R.id.rgQ2);
        btnSubmit = findViewById(R.id.btnSubmit);
        tvScore = findViewById(R.id.tvScore);

        SharedPreferences sp = getSharedPreferences("quiz", MODE_PRIVATE);
        tvScore.setText("Last Score: " + sp.getInt("score", 0));
```

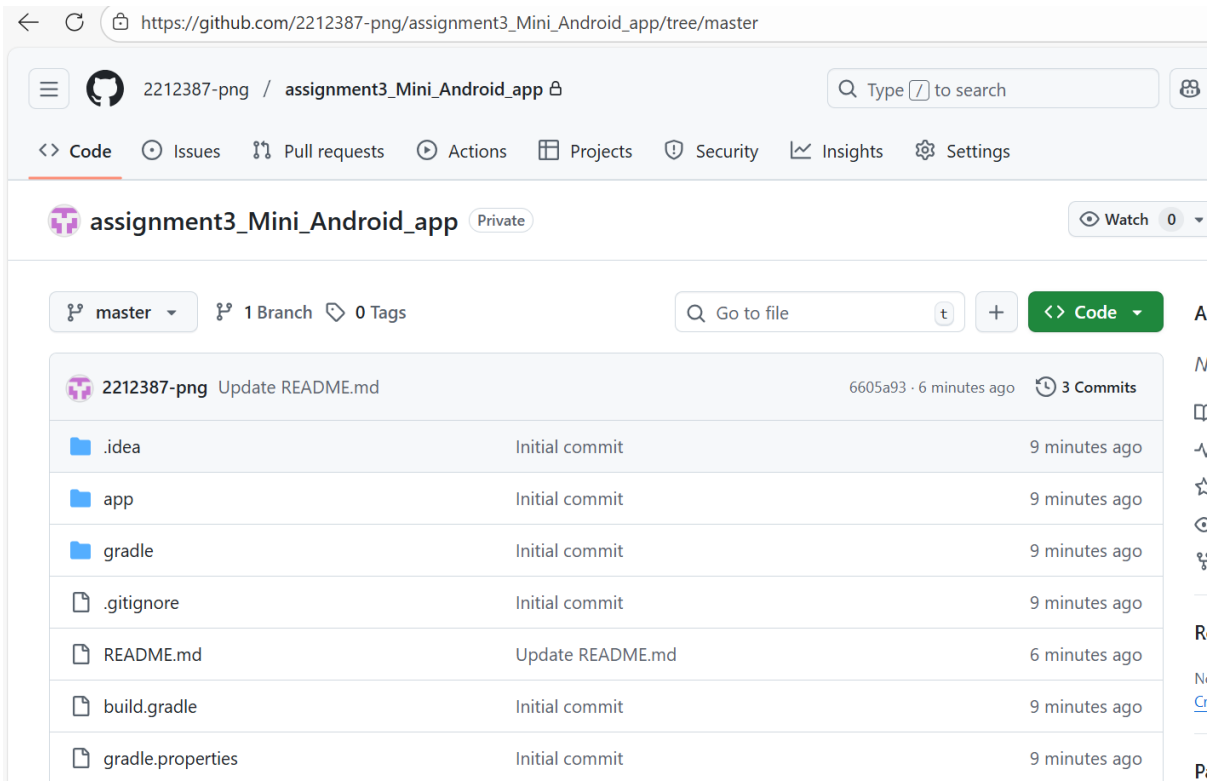
```
        btnSubmit.setOnClickListener(v -> {

            int score = 0;

            if (rgQ1.getCheckedRadioButtonId() == R.id.rbQ1_4) {
                score++;
            }

            if (rgQ2.getCheckedRadioButtonId() == R.id.rbQ2_Paris) {
                score++;
            }

            tvScore.setText("Score: " + score);
            sp.edit().putInt("score", score).apply();

            Toast.makeText(this, "Quiz Submitted", Toast.LENGTH_SHORT).show();
        });
    }
}
```



OUTPUTS:


Xiaomi 2109119DG API 31
0:39
Add Note
View Notes
Start Quiz
1:1
ease refer to https://docs.gradle.org/8.13/userguide/command_lir
7s
33 up-to-date
ts available


app
Xiaomi 2109119DG API 31
xmlns:ar
Layout
dioGroup
<RadioButton
android:id="@+
android:layout
android:layout
android:text="
adioGroup>
tton
android:id="@+id/
android:layout_wi
android:layout_hei
android:text="Subm
0:39
Title: hello
Note: hey
1:1
e on this, please refer to https://docs.gradle.org/8.13/userguide/command_lin
UCCESSFUL in 7s
onable tasks: 33 up-to-date
2109119DG API 31
0:40
Q1: 2 + 2 = ?
4
5
Q2: Capital of France?
London
Paris
Submit Quiz
Score: 1


https://github.com/2212387-png/assignment3_Mini_Android_app/tree/master
2212387-png / assignment3_Mini_Android_app
Type / to search
Code
Issues
Pull requests
Actions
Projects
Security
Insights
Settings
assignment3_Mini_Android_app
Private
Watch 0
master
1 Branch
0 Tags
Go to file
t
Code
2212387-png Update README.md
6605a93 · 6 minutes ago
3 Commits
.idea Initial commit 9 minutes ago
app Initial commit 9 minutes ago
gradle Initial commit 9 minutes ago
.gitignore Initial commit 9 minutes ago
README.md Update README.md 6 minutes ago
build.gradle Initial commit 9 minutes ago
gradle.properties Initial commit 9 minutes ago

GITHUB LINK:

https://github.com/2212387-png/assignment3_Mini_Android_app.git