```java
package com.example.quiz_ly;

import android.app.Application;

public class myApp extends Application {
    private QuestionBank bank = new QuestionBank();

    public QuestionBank getBank() {
        return bank;
    }

    private StorageManager manager = new StorageManager();

    public StorageManager getManager() {
        return manager;
    }
}

```

```java
package com.example.quiz_ly;

public class Question {
    int question;
    int answer;



    public Question(int question, int answer) {
        this.question = question;
        this.answer = answer;


    }
}

```

```java
package com.example.quiz_ly;

import static android.widget.Toast.makeText;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AlertDialog;
import androidx.appcompat.app.AppCompatActivity;
import androidx.fragment.app.FragmentManager;

import android.app.Activity;
import android.content.DialogInterface;
import android.content.Intent;
import android.os.Bundle;
import android.util.Log;
import android.view.Menu;
import android.view.MenuInflater;
import android.view.MenuItem;
import android.view.View;
import android.widget.Button;
import android.widget.ProgressBar;
import android.widget.Toast;

import java.util.ArrayList;
import java.util.Collections;

public class MainActivity extends AppCompatActivity {
    Button true_btn;
    Button false_btn;
    ProgressBar progress;
    int index = 0;
    QuestionBank bank;
    int correctNum=0;
    AlertDialog.Builder alert1;
    AlertDialog.Builder alert2;
    StorageManager storageM;
//    UserFragment userFragment;
    FragmentManager fragManager;

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

```
        true_btn = findViewById(R.id.true_btn);
        false_btn = findViewById(R.id.false_btn);
        progress = findViewById(R.id.progressBar);
        alert1 = new AlertDialog.Builder(this);
        alert2 = new AlertDialog.Builder(this);
        bank = ((myApp)getApplication()).getBank();
        storageM = ((myApp)getApplication()).getManager();
        updateFragment(bank.questionList.get(index).question, bank.colorList.get(index));
        true_btn.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (index == bank.questionList.size()-1) {
                    progress.setProgress(index+1);
                    showScoreDialog();
                } else {
                    if (bank.questionList.get(index).answer == R.string.true_answer) {
                        correctNum++;
                        Toast.makeText(getApplicationContext(), getString(R.string.correct_msg), Toast.LENGTH_LONG).show();
                        progress.setProgress(index+1);
                    } else {
                        progress.setProgress(index+1);
                        Toast.makeText(getApplicationContext(), getString(R.string.wrong_msg), Toast.LENGTH_LONG).show();
                    }
                    updateFragment(bank.questionList.get(index+1).question, bank.colorList.get(index+1));
                }
                index++;}
        });

        false_btn.setOnClickListener(new View.OnClickListener() {
            @Override
```

```
            public void onClick(View v) {
                if (index == bank.questionList.size()-1) {
                    showScoreDialog();
                } else {
                    if (bank.questionList.get(index).answer == R.string.false_answer) {
                        correctNum++;
                        Toast.makeText(getApplicationContext(), getString(R.string.correct_msg), Toast.LENGTH_LONG).show();
                        progress.setProgress(index+1);
                    } else {
                        progress.setProgress(index+1);
                        Toast.makeText(getApplicationContext(), getString(R.string.wrong_msg), Toast.LENGTH_LONG).show();
                    }
                    updateFragment(bank.questionList.get(index+1).question, bank.colorList.get(index+1));
                }
                index++;}
        });
    }

    public void showScoreDialog() {
        alert1.create();
        alert1.setMessage("Your total score is " + correctNum + " out of " + bank.questionList.size());
        alert1.setPositiveButton("SAVE", new DialogInterface.OnClickListener() {
            @Override
            public void onClick(DialogInterface dialog, int which) {
                storageM.saveData(MainActivity.this,bank.questionList.size(),correctNum);
                Collections.shuffle(((myApp) getApplication()).getBank().questionList);
                Collections.shuffle(((myApp) getApplication()).getBank().colorList);
```

```
                index = 0;
                correctNum = 0;
            }
        });

        alert1.setNegativeButton("TRY AGAIN", new DialogInterface.OnClickListener() {
            @Override
            public void onClick(DialogInterface dialog, int which) {
                Collections.shuffle(((myApp)getApplication()).getBank().questionList);
                Collections.shuffle(((myApp)getApplication()).getBank().colorList);
                index = 0;
                correctNum = 0;
            }
        });
        alert1.show();
    }

    public void showAverageDialog() {
        alert2.create();


        String average = ((myApp)getApplication()).getManager().getData(this);
        int attempts = ((myApp)getApplication()).getManager().attempts.size();
        Log.d("attemps_main",String.valueOf(attempts));
        alert2.setMessage("Your average score is " + average + " in " +
                attempts + " attempts");
        alert2.setNeutralButton("OK", new DialogInterface.OnClickListener() {
            @Override
            public void onClick(DialogInterface dialog, int which) {
            }
        });
        alert2.show();
    }

```

```
    void updateFragment(int questionID,int colorID) {
        fragManager = getSupportFragmentManager();
        fragManager.findFragmentById(R.id.question);
        QuizFragment frag = QuizFragment.newInstance(questionID,colorID);
        if(frag == null) {
            fragManager.beginTransaction().add(R.id.question,frag).commit();
        } else {
            fragManager.beginTransaction().replace(R.id.question,frag).commit();
        }
    }

    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        MenuInflater inflater = getMenuInflater();
        inflater.inflate(R.menu.menu, menu);
        return true;
    }

//    void userFragment() {
//        fragManager = getSupportFragmentManager();
//        fragManager.findFragmentById(R.id.userInterface);
//        fragManager.beginTransaction().add(R.id.userInterface,new UserFragment()).commit();
//    }

    @Override
    public boolean onOptionsItemSelected(@NonNull MenuItem item){
        super.onOptionsItemSelected(item);
        switch (item.getItemId()) {
            case R.id.average:{
                showAverageDialog();
                break;
            }
//            case R.id.q_num:{
//                Intent intent = new Intent(
```

```
getApplicationContext(),userActivity.class);
//                startActivity(intent);
//                break;
//            }
            case R.id.reset:{
                ((myApp)getApplication()).getManager().resetHistory(this);
            }
        } return true;
    }

    public void onSavedInstanceState (Bundle outState) {

        }

//    public void setQuestionNum(View view) {
//        int input = Integer.parseInt(userFragment.userInput.getText().toString());
//        Log.d("input",String.valueOf(input));
//        bank.questionList.subList(input,bank.questionList.size()).clear();;
//    }
}
```

```java
package com.example.quiz_ly;

import java.util.ArrayList;

public class QuestionBank {
    public ArrayList<Question> questionList;
    public ArrayList<Integer> colorList = new ArrayList<>();
    public QuestionBank() {


        this.questionList = new ArrayList<Question>();
        this.questionList.add(new Question((R.string.bear),R.string.true_answer));
        this.questionList.add(new Question((R.string.horse),R.string.false_answer));
        this.questionList.add(new Question((R.string.puffin),R.string.true_answer));
        this.questionList.add(new Question((R.string.cat),R.string.false_answer));
        this.questionList.add(new Question((R.string.dog),R.string.false_answer));
        this.questionList.add(new Question((R.string.cow),R.string.true_answer));
        this.questionList.add(new Question((R.string.koala),R.string.true_answer));
        this.questionList.add(new Question((R.string.reindeer),R.string.false_answer));
        this.questionList.add(new Question((R.string.chimp),R.string.true_answer));
        this.questionList.add(new Question((R.string.narwhal),R.string.false_answer));
        this.questionList.add(new Question((R.string.lion),R.string.false_answer));
//
//
        this.colorList.add(R.color.Green);
        this.colorList.add(R.color.MediumSeaGreen);
        this.colorList.add(R.color.SteelBlue);
        this.colorList.add(R.color.DarkOliveGreen);
        this.colorList.add(R.color.CadetBlue);
        this.colorList.add(R.color.MidnightBlue);
        this.colorList.add(R.color.DarkSlateGray);
```

```
        this.colorList.add(R.color.DarkGoldenrod);
        this.colorList.add(R.color.black);
        this.colorList.add(R.color.SaddleBrown);
        this.colorList.add(R.color.DarkBlue);
//
    }


    public ArrayList<Question> getQuestionList() {
        return questionList;
    }

    public ArrayList<Integer> getColorList() {
        return colorList;
    }
}

```

```java
package com.example.quiz_ly;

import android.os.Bundle;

import androidx.fragment.app.Fragment;

import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.TextView;

/**
 * A simple {@link Fragment} subclass.
 * Use the {@link QuizFragment#newInstance} factory method to
 * create an instance of this fragment.
 */
public class QuizFragment extends Fragment {

//    private QuestionBank questionBank;
//
//    public QuizFragment(QuestionBank questionBank) {
//        super();
//        this.questionBank = questionBank;
//    }
//
//    public QuestionBank getQuestionBank() {
//        return questionBank;
//    }

    // TODO: Rename parameter arguments, choose names that match
    // the fragment initialization parameters, e.g. ARG_ITEM_NUMBER
//    private static final int ARG_PARAM1 = questionID;
//    private static final int ARG_PARAM2 = "colorID";

    // TODO: Rename and change types of parameters
    private int questionID;
    private int colorID;

```

```
    public QuizFragment() {
        // Required empty public constructor
    }


    public static QuizFragment newInstance(int questionID, int colorID) {
        QuizFragment fragment = new QuizFragment();
        Bundle args = new Bundle();
        args.putInt("question",questionID);
        args.putInt("color",colorID);
        fragment.setArguments(args);
        return fragment;
    }

//    @Override
//    public void onCreate(Bundle savedInstanceState) {
//        super.onCreate(savedInstanceState);
//        if (getArguments() != null) {
//            mParam1 = getArguments().getString(ARG_PARAM1);
//            mParam2 = getArguments().getString(ARG_PARAM2);
//        }
//    }

    @Override
    public View onCreateView(LayoutInflater inflater, ViewGroup container,
                             Bundle savedInstanceState) {
        View v = inflater.inflate(R.layout.fragment_quiz, container, false);
        TextView q = v.findViewById(R.id.question_frag);
        q.setText(getArguments().getInt("question"));
        q.setBackgroundResource(getArguments().getInt("color"));

        return v;


```

```

    }
}
```

```
//package com.example.quiz_ly;
//
//import androidx.appcompat.app.AppCompatActivity;
//
//import android.content.Intent;
//import android.os.Bundle;
//import android.view.View;
//import android.widget.Button;
//import android.widget.EditText;
//import android.widget.TextView;
//
//import java.util.ArrayList;
//
//public class userActivity extends AppCompatActivity {
//    TextView question;
//    EditText input;
//    Button submit;
//    QuestionBank bank;
//
//    @Override
//    protected void onCreate(Bundle savedInstanceState) {
//        super.onCreate(savedInstanceState);
//        setContentView(R.layout.activity_user);
//        question = findViewById(R.id.how_many);
//        input = findViewById(R.id.user_input);
//        submit = findViewById(R.id.submit);
//        bank = ((myApp)getApplication()).getBank();
//
//        int size = bank.questionList.size();
//        if (size > Integer.parseInt(input.getText().toString())) {
//            bank.questionList.subList(Integer.parseInt(input.getText().toString()), size).clear();
//        }
//
//        submit.setOnClickListener(new View.OnClickListener() {
//            @Override
//            public void onClick(View v) {
//                Intent intent = new Intent(
```

```
getApplicationContext(),MainActivity.class);
//                 startActivity(intent);
//
//             }
//         });
//
//
//     }
//}
```

```
//package com.example.quiz_ly;
//
//import android.os.Bundle;
//
//import androidx.fragment.app.Fragment;
//
//import android.view.LayoutInflater;
//import android.view.View;
//import android.view.ViewGroup;
//import android.widget.ArrayAdapter;
//import android.widget.Button;
//import android.widget.EditText;
//import android.widget.Spinner;
//import android.widget.TextView;
//
///**
// * A simple {@link Fragment} subclass.
// * Use the {@link UserFragment#newInstance} factory method to
// * create an instance of this fragment.
// */
//public class UserFragment extends Fragment implements StorageManager.getValue {
//
////    // TODO: Rename parameter arguments, choose names that match
////    // the fragment initialization parameters, e.g. ARG_ITEM_NUMBER
////    private static final String ARG_PARAM1 = "param1";
////    private static final String ARG_PARAM2 = "param2";
////
////    // TODO: Rename and change types of parameters
//
//    EditText userInput;
//    Button submit;
//
//
//
//    public UserFragment() {
//        // Required empty public constructor
//    }
```

```
//
//
//
//
//    @Override
//    public View onCreateView(LayoutInflater inflater, ViewGroup container,
//                             Bundle savedInstanceState) {
//        // Inflate the layout for this fragment
//        View v = inflater.inflate(R.layout.fragment_user, container, false);
//        userInput = v.findViewById(R.id.user_input);
//        submit = v.findViewById(R.id.submit);
//        return v;
//    }
//
//
//    @Override
//    public String getInput() {
//        return userInput.getText().toString();
//    }
//}
```

```java
package com.example.quiz_ly;

import android.app.Activity;
import android.content.Context;
import android.util.Log;
import android.widget.Toast;

import java.io.FileInputStream;
import java.io.FileNotFoundException;
import java.io.FileOutputStream;
import java.io.IOException;
import java.lang.reflect.Array;
import java.util.ArrayList;

public class StorageManager {

    String filename = "record.txt";
    ArrayList<String> attempts = new ArrayList(0);

    public void saveData(Activity context, int q_num, int score ) {
        FileOutputStream fileOutputStream = null;
        try {
            fileOutputStream = context.openFileOutput(filename, Context.MODE_APPEND);
            Toast.makeText(context.getApplicationContext(), "Attempts saved to " + context.getFilesDir(),Toast.LENGTH_LONG).show();
            fileOutputStream.write((score + "/" + q_num + "&").getBytes());
        } catch (FileNotFoundException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        }
        finally{
            try {
                fileOutputStream.close();
            } catch (IOException e) {
                e.printStackTrace();
            }
        }
    }

```

```java
    public void resetHistory(Activity context) {
        FileOutputStream fileOutputStream = null;
        try {
            fileOutputStream = context.openFileOutput(filename, Context.MODE_PRIVATE);
            Toast.makeText(context.getApplicationContext(), "Record reset",Toast.LENGTH_LONG).show();
            fileOutputStream.write("".getBytes());
        } catch (FileNotFoundException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        }
        finally{
            try {
                fileOutputStream.close();
            } catch (IOException e) {
                e.printStackTrace();
            }
        }
    }

    public String getData(Activity context) {
        FileInputStream fileInputStream = null;
        String averageStr ="";
        double total = 0.0;
        double average;
        StringBuffer stringBuffer = new StringBuffer();
        int read=0;
        try {
            fileInputStream = context.openFileInput(filename);
            while ((read = fileInputStream.read() )!= -1) {
                stringBuffer.append((char) read);
            }
            attempts = getHistory(stringBuffer.toString());
//            Log.d("history",attempts.toString());
            for (int i=0; i < attempts.size();i++) {
                total += Integer.parseInt(attempts.
```

```
get(i));
            }
            Log.d("total",String.valueOf(total));
            Log.d("attempts",String.valueOf(attempts.size()));
            average = total / attempts.size();
            averageStr = String.format("%.2f", average);
        }
        catch (FileNotFoundException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        }

        return averageStr;
    }

    private ArrayList<String> getHistory(String stringFromFile) {
        int index=0;
        for (int i=0;i<stringFromFile.toCharArray().length;i++) {
            if(stringFromFile.toCharArray()[i] == '&') {
                index = i+1;
            } else {
                if(stringFromFile.toCharArray()[i] == '/') {
                    String score = stringFromFile.substring(index,i);
                    Log.d("score",score);
                    attempts.add(score);
                    Log.d("attempt",String.valueOf(attempts.size()));
                }
            }
        }
        return attempts;
    }
}

```