**Code review – code with comments**

package com.example.myapplication;

import android.Manifest;

import android.annotation.SuppressLint;

import android.content.Context;

import android.content.Intent;

import android.content.pm.PackageManager;

import android.graphics.Bitmap;

import android.net.Uri;

import android.os.Bundle;

import android.provider.MediaStore;

import android.text.TextUtils;

import android.util.Log;

import android.view.View;

import android.widget.Button;

import android.widget.ProgressBar;

import android.widget.TextView;

import android.widget.Toast;

import androidx.activity.result.ActivityResultLauncher;

import androidx.activity.result.contract.ActivityResultContracts;

import androidx.appcompat.app.AppCompatActivity;

import androidx.core.app.ActivityCompat;

import androidx.core.content.ContextCompat;

import androidx.core.graphics.Insets;

import androidx.core.view.ViewCompat;

import androidx.core.view.WindowInsetsCompat;

import com.google.android.gms.auth.api.signin.GoogleSignIn;

import com.google.android.gms.auth.api.signin.GoogleSignInAccount;

import com.google.android.gms.auth.api.signin.GoogleSignInClient;

import com.google.android.gms.auth.api.signin.GoogleSignInOptions;

import com.google.android.gms.common.api.ApiException;

import com.google.android.material.textfield.TextInputEditText;

import com.google.firebase.auth.AuthCredential;

import com.google.firebase.auth.FirebaseAuth;

import com.google.firebase.auth.FirebaseUser;

import com.google.firebase.auth.GoogleAuthProvider;

import com.google.firebase.auth.UserProfileChangeRequest;

import com.google.firebase.firestore.FirebaseFirestore;

import com.google.firebase.storage.FirebaseStorage;

import com.google.firebase.storage.StorageReference;

import java.io.ByteArrayOutputStream;

import java.util.HashMap;

import java.util.Map;

public class SignUp extends AppCompatActivity {

private static final String TAG = "GoogleSignIn";

private GoogleSignInClient mGoogleSignInClient;

TextInputEditText editTextEmail, editTextPassword, editTextFullName;

TextInputEditText editTextID, editPhoneNum;

Button buttonSignUp, googleBtn;

FirebaseAuth mAuth;

ProgressBar progressBar;

TextView textView;

private Button btnOpenCamera, btnUploadImage;

private Uri imageUri;

private FirebaseStorage storage;

private StorageReference storageReference;

@Override

protected void onStart() {

super.onStart();

mAuth = FirebaseAuth.getInstance();

FirebaseUser currentUser = mAuth.getCurrentUser();

if (currentUser != null) {

startActivity(new Intent(getApplicationContext(), MainActivity.class));

finish();

}

}

@SuppressLint("MissingInflatedId")

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_sign\_up);

ViewCompat.setOnApplyWindowInsetsListener(findViewById(R.id.main), (v, insets) -> {

Insets systemBars = insets.getInsets(WindowInsetsCompat.Type.systemBars());

v.setPadding(systemBars.left, systemBars.top, systemBars.right, systemBars.bottom);

return insets;

});

mAuth = FirebaseAuth.getInstance(); **// נכתב פעמיים גם בoncreate וגם בonstart**

editTextEmail = findViewById(R.id.email); **// ניתן להפריד לפונקציה ייעודית לאתחול ממשק המשתמש- רלוונטי גם כן לשורות מטה**

editTextPassword = findViewById(R.id.password);

buttonSignUp = findViewById(R.id.btn\_signUp);

progressBar = findViewById(R.id.progressBar);

textView = findViewById(R.id.loginNow);

editTextFullName = findViewById(R.id.fullName);

editTextID = findViewById(R.id.id\_num);

editPhoneNum = findViewById(R.id.phone\_number);

googleBtn = findViewById(R.id.btn\_google\_sign\_in);

storage = FirebaseStorage.getInstance();

storageReference = storage.getReference();

progressBar = findViewById(R.id.progressBar**); // נכתב פעמיים**

btnOpenCamera = findViewById(R.id.btn\_open\_camera);

btnUploadImage = findViewById(R.id.btn\_upload\_image);

if (ContextCompat.checkSelfPermission(this, Manifest.permission.CAMERA) != PackageManager.PERMISSION\_GRANTED) {

ActivityCompat.requestPermissions(this, new String[]{Manifest.permission.CAMERA}, 100);

}

btnOpenCamera.setOnClickListener(v -> {

Intent takePictureIntent = new Intent(MediaStore.ACTION\_IMAGE\_CAPTURE);

if (takePictureIntent.resolveActivity(getPackageManager()) != null) {

cameraResultLauncher.launch(takePictureIntent);

}

});

btnUploadImage.setOnClickListener(v -> {

Intent pickPhoto = new Intent(Intent.ACTION\_PICK, MediaStore.Images.Media.EXTERNAL\_CONTENT\_URI);

galleryResultLauncher.launch(pickPhoto);

});

googleBtn.setOnClickListener(v -> signInGoogle());

textView.setOnClickListener(v -> {

startActivity(new Intent(getApplicationContext(), Login.class));

finish();

});

GoogleSignInOptions gso = new GoogleSignInOptions.Builder(GoogleSignInOptions.DEFAULT\_SIGN\_IN)

.requestIdToken(getString(R.string.default\_web\_client\_id))

.requestEmail()

.build();

mGoogleSignInClient = GoogleSignIn.getClient(this, gso);

buttonSignUp.setOnClickListener(v -> registerUser());

}

private void registerUser() {

progressBar.setVisibility(View.VISIBLE);

String email = editTextEmail.getText().toString().trim();

String password = editTextPassword.getText().toString().trim();

String fullName = editTextFullName.getText().toString().trim();

String id = editTextID.getText().toString().trim();

String phoneNum = editPhoneNum.getText().toString().trim();

**// את הבדיקות כדאי לבצע בפונקציה נפרדת על מנת לשמור על קריאות ומודולריות**

if (TextUtils.isEmpty(email) || TextUtils.isEmpty(password) || TextUtils.isEmpty(fullName) ||

TextUtils.isEmpty(id) || TextUtils.isEmpty(phoneNum)) {

Toast.makeText(this, "All fields are required", Toast.LENGTH\_SHORT).show();

progressBar.setVisibility(View.GONE);

return;

}

if (id.length() < 9) {

editTextID.setError("ID must be at least 9 digits");

progressBar.setVisibility(View.GONE);

return;

}

mAuth.createUserWithEmailAndPassword(email, password)

.addOnCompleteListener(task -> {

progressBar.setVisibility(View.GONE);

if (task.isSuccessful()) {

FirebaseUser user = mAuth.getCurrentUser();

if (user != null) {

UserProfileChangeRequest profileUpdates = new UserProfileChangeRequest.Builder()

.setDisplayName(fullName)

.build();

user.updateProfile(profileUpdates);

FirebaseFirestore db = FirebaseFirestore.getInstance();

Map<String, Object> userProfile = new HashMap<>();

userProfile.put("fullName", fullName);

userProfile.put("email", email);

userProfile.put("phoneNumber", phoneNum);

userProfile.put("id", id);

db.collection("users").document(user.getUid()).set(userProfile);

Toast.makeText(SignUp.this, "Account created.", Toast.LENGTH\_SHORT).show();

startActivity(new Intent(getApplicationContext(), Login.class)); **// בעת ההתחברות אפשר להוסיף מסך טעינה כדי למנוע מהמשתמש ללחוץ מספר רב של פעמים על התחברות וכך ליצור עומס בקשות**

finish();

}

} else {

Toast.makeText(SignUp.this, "Authentication failed.", Toast.LENGTH\_SHORT).show(); **//השגיאות מוצגות באמצעות טוסטים , מומלץ להציגם בעזרת לוג ובכל להקל באיתור שגיאות ובאגים שיווצרו ( רלוונטי לכל הטוסטים בהמשך)**

}

});

}

private void signInGoogle() {

Intent signInIntent = mGoogleSignInClient.getSignInIntent();

signInLauncher.launch(signInIntent);

}

ActivityResultLauncher<Intent> signInLauncher = registerForActivityResult(

new ActivityResultContracts.StartActivityForResult(),

result -> {

if (result.getResultCode() == RESULT\_OK && result.getData() != null) {

try {

GoogleSignInAccount account = GoogleSignIn.getSignedInAccountFromIntent(result.getData())

.getResult(ApiException.class);

firebaseAuthWithGoogle(account);

} catch (ApiException e) {

Log.w(TAG, "Google sign-in failed", e);

Toast.makeText(SignUp.this, "Google sign-in failed", Toast.LENGTH\_SHORT).show();

}

}

}

);

ActivityResultLauncher<Intent> cameraResultLauncher = registerForActivityResult(

new ActivityResultContracts.StartActivityForResult(),

result -> {

if (result.getResultCode() == RESULT\_OK && result.getData() != null) {

Bitmap photo = (Bitmap) result.getData().getExtras().get("data");

imageUri = getImageUri(this, photo);

}

}

);

ActivityResultLauncher<Intent> galleryResultLauncher = registerForActivityResult(

new ActivityResultContracts.StartActivityForResult(),

result -> {

if (result.getResultCode() == RESULT\_OK && result.getData() != null) {

imageUri = result.getData().getData();

}

}

);

private void uploadImageToFirebase(Uri imageUri) {

if (imageUri != null) {

progressBar.setVisibility(View.VISIBLE);

String userId = mAuth.getCurrentUser().getUid();

StorageReference fileReference = storageReference.child("student\_cards/" + userId + ".jpg");

fileReference.putFile(imageUri)

.addOnSuccessListener(taskSnapshot -> {

progressBar.setVisibility(View.GONE);

Toast.makeText(SignUp.this, "Image Uploaded Successfully", Toast.LENGTH\_SHORT).show();

fileReference.getDownloadUrl().addOnSuccessListener(uri -> {

String imageUrl = uri.toString();

saveStudentData(imageUrl);

});

})

.addOnFailureListener(e -> {

progressBar.setVisibility(View.GONE);

**// הצגה/הסתרה של הפרוגרס בר מופיעה פעמים רבות במהלך הקוד- ניתן להפריד לפונקציה ייעודית**

Toast.makeText(SignUp.this, "Upload Failed: " + e.getMessage(), Toast.LENGTH\_SHORT).show();

});

}

}

private void saveStudentData(String imageUrl) {

String email = ((TextInputEditText) findViewById(R.id.email)).getText().toString();

**// אפשר להשתמש באדיט טקסט שהוגדר במקום לחפש שוב לפי האיידי – רלוונטי גם לשורות מטה**

String fullName = ((TextInputEditText) findViewById(R.id.fullName)).getText().toString();

String idNum = ((TextInputEditText) findViewById(R.id.id\_num)).getText().toString();

String phoneNumber = ((TextInputEditText) findViewById(R.id.phone\_number)).getText().toString();

FirebaseFirestore db = FirebaseFirestore.getInstance();

Map<String, Object> studentData = new HashMap<>();

studentData.put("email", email);

studentData.put("fullName", fullName);

studentData.put("idNum", idNum);

studentData.put("phoneNumber", phoneNumber);

studentData.put("imageUrl", imageUrl);

db.collection("students").document(mAuth.getCurrentUser().getUid()).set(studentData)

.addOnSuccessListener(aVoid -> {

Toast.makeText(SignUp.this, "Student Info Saved", Toast.LENGTH\_SHORT).show();

})

.addOnFailureListener(e -> {

Toast.makeText(SignUp.this, "Error: " + e.getMessage(), Toast.LENGTH\_SHORT).show();

});

}

private void firebaseAuthWithGoogle(GoogleSignInAccount acct) {

AuthCredential credential = GoogleAuthProvider.getCredential(acct.getIdToken(), null);

mAuth.signInWithCredential(credential)

.addOnCompleteListener(this, task -> {

if (task.isSuccessful()) {

FirebaseUser user = mAuth.getCurrentUser();

startActivity(new Intent(SignUp.this, MainActivity.class));

finish();

} else {

Toast.makeText(SignUp.this, "Authentication Failed.", Toast.LENGTH\_SHORT).show();

}

});

}

private Uri getImageUri(Context context, Bitmap bitmap) {

ByteArrayOutputStream bytes = new ByteArrayOutputStream();

bitmap.compress(Bitmap.CompressFormat.JPEG, 100, bytes);

String path = MediaStore.Images.Media.insertImage(context.getContentResolver(), bitmap, "Image", null);

return Uri.parse(path);

}

}