

Software for Mobile Devices

Name: Muhammad Abu Huraira

Section: BCS 6B

Roll Number: 22F-3853

Submission on: April 20, 2025

Submitted to: Mam Kanwal Naz

Task 1:

Main Activity

```
// MainActivity.java
package com.example.android_firebase_task;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.graphics.Insets;
import androidx.core.view.ViewCompat;
import androidx.core.view.WindowInsetsCompat;
import androidx.recyclerview.widget.LinearLayoutManager;
import androidx.recyclerview.widget.RecyclerView;

import android.app.AlertDialog;
import android.os.Bundle;
import android.view.LayoutInflater;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;

import com.google.firebaseio.database.DataSnapshot;
import com.google.firebaseio.database.DatabaseError;
import com.google.firebaseio.database.DatabaseReference;
import com.google.firebaseio.database.FirebaseDatabase;
import com.google.firebaseio.database.ValueEventListener;

import java.util.ArrayList;
import java.util.List;

public class MainActivity extends AppCompatActivity {
    private RecyclerView recyclerView;
    private DataAdapter adapter;
    private DatabaseReference databaseReference;

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

```
// Initialize Firebase
FirebaseDatabase database = FirebaseDatabase.getInstance();
databaseReference = database.getReference("data");

// Setup RecyclerView
recyclerView = findViewById(R.id.recyclerView);
recyclerView.setLayoutManager(new LinearLayoutManager(this));
adapter = new DataAdapter(new ArrayList<>());
recyclerView.setAdapter(adapter);

// Add Data Button
Button btnAdd = findViewById(R.id.btn_add);
btnAdd.setOnClickListener(v -> showAddDataDialog());

// Read Data from Firebase
readData();
}

private void showAddDataDialog() {
    AlertDialog.Builder builder = new AlertDialog.Builder(this);
    builder.setTitle("Add New Data");

    // Inflate the layout for the dialog
    View view = LayoutInflater.from(this).inflate(R.layout.activity_add_data, null);
    EditText etName = view.findViewById(R.id.et_name);
    EditText etDescription = view.findViewById(R.id.et_description);

    builder.setView(view);

    // Set up the buttons
    builder.setPositiveButton("Add", (dialog, which) -> {
        String name = etName.getText().toString().trim();
        String description = etDescription.getText().toString().trim();

        if (!name.isEmpty() && !description.isEmpty()) {
            addDataToFirebase(name, description);
        } else {
            Toast.makeText(MainActivity.this, "Please fill in all fields", Toast.LENGTH_SHORT).show();
        }
    });

    builder.setNegativeButton("Cancel", (dialog, which) -> dialog.cancel());

    builder.show();
}
```

```
}

private void addDataToFirebase(String name, String description) {
    String id = databaseReference.push().getKey();
    DataModel data = new DataModel(id, name, description);

    if (id != null) {
        databaseReference.child(id).setValue(data)
            .addOnSuccessListener(aVoid -> Toast.makeText(MainActivity.this, "Data added
successfully", Toast.LENGTH_SHORT).show())
            .addOnFailureListener(e -> Toast.makeText(MainActivity.this, "Failed to add data: " +
e.getMessage(), Toast.LENGTH_SHORT).show());
    }
}

private void readData() {
    databaseReference.addValueEventListener(new ValueEventListener() {
        @Override
        public void onDataChange(@NonNull DataSnapshot snapshot) {
            List<DataModel> dataList = new ArrayList<>();
            for (DataSnapshot dataSnapshot : snapshot.getChildren()) {
                DataModel data = dataSnapshot.getValue(DataModel.class);
                if (data != null) {
                    dataList.add(data);
                }
            }
            adapter.setData(dataList);
        }

        @Override
        public void onCancelled(@NonNull DatabaseError error) {
            Toast.makeText(MainActivity.this, "Error: " + error.getMessage(),
Toast.LENGTH_SHORT).show();
        }
    });
}
```

View Data Activity

```
package com.example.android_firebase_task;

import android.os.Bundle;
import android.util.Log;
import android.widget.Toast;
import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.recyclerview.widget.LinearLayoutManager;
import androidx.recyclerview.widget.RecyclerView;

import com.google.android.gms.tasks.OnFailureListener;
import com.google.android.gms.tasks.OnSuccessListener;
import com.google.firebase.storage.FirebaseStorage;
import com.google.firebase.storage.ListResult;
import com.google.firebase.storage.StorageReference;

import java.util.ArrayList;
import java.util.List;

public class ViewDataActivity extends AppCompatActivity {

    private RecyclerView recyclerView;
    private DataAdapter adapter;
    private StorageReference storageReference;

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

        recyclerView = findViewById(R.id.recyclerView);
        recyclerView.setLayoutManager(new LinearLayoutManager(this));
        adapter = new DataAdapter(new ArrayList<>());
        recyclerView.setAdapter(adapter);

        // Initialize Firebase Storage reference to the 'data' directory
        storageReference = FirebaseStorage.getInstance().getReference().child("data");

        fetchData();
    }

    private void fetchData() {
```

```

// List all files in the 'data' directory
storageReference.listAll()
    .addOnSuccessListener(new OnSuccessListener<ListResult>() {
        @Override
        public void onSuccess(ListResult listResult) {
            List<DataModel> list = new ArrayList<>();
            for (StorageReference item : listResult.getItems()) {
                // Get file name and download URL
                String fileName = item.getName();
                item.getDownloadUrl().addOnSuccessListener(uri -> {
                    // Create DataModel with file name as title and URL as description
                    DataModel model = new DataModel(fileName, fileName, uri.toString());
                    list.add(model);
                });
                // Update adapter after all URLs are fetched
                if (list.size() == listResult.getItems().size()) {
                    adapter.setData(list);
                    Toast.makeText(ViewDataActivity.this, "📥 Data loaded (" + list.size() + " items)",
                    Toast.LENGTH_SHORT).show();
                }
            }).addOnFailureListener(e -> {
                Log.e("FirebaseStorage", "Failed to get URL for " + fileName + ": " + e.getMessage());
            });
        }
        // Handle case where no files are found
        if (listResult.getItems().isEmpty()) {
            adapter.setData(list);
            Toast.makeText(ViewDataActivity.this, "🚫 No files found",
            Toast.LENGTH_SHORT).show();
        }
    })
    .addOnFailureListener(new OnFailureListener() {
        @Override
        public void onFailure(@NonNull Exception e) {
            Toast.makeText(ViewDataActivity.this, "✖ Error: " + e.getMessage(),
            Toast.LENGTH_SHORT).show();
            Log.e("FirebaseStorage", "Failed to list files: " + e.getMessage());
        }
    });
}
}

```

Item data

```
package com.example.android_firebase_task;

import android.os.Bundle;

import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.graphics.Insets;
import androidx.core.view.ViewCompat;
import androidx.core.view.WindowInsetsCompat;

public class ItemData extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        EdgeToEdge.enable(this);
        setContentView(R.layout.activity_item_data);

    }
}
```

Data model

```
// DataModel.java
package com.example.android_firebase_task;

public class DataModel {
    private String id;
    private String name;
    private String description;

    // Required empty constructor for Firebase
    public DataModel() {
    }

    public DataModel(String id, String name, String description) {
        this.id = id;
        this.name = name;
        this.description = description;
    }
}
```

```
public String getId() {
    return id;
}

public void setId(String id) {
    this.id = id;
}

public String getName() {
    return name;
}

public void setName(String name) {
    this.name = name;
}

public String getDescription() {
    return description;
}

public void setDescription(String description) {
    this.description = description;
}
```

Data adapter

```
// DataAdapter.java
package com.example.android_firebase_task;

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

import androidx.annotation.NonNull;
import androidx.recyclerview.widget.RecyclerView;

import java.util.List;

public class DataAdapter extends RecyclerView.Adapter<DataAdapter.ViewHolder> {
    private List<DataModel> dataList;
```

```
public DataAdapter(List<DataModel> dataList) {
    this.dataList = dataList;
}

@NonNull
@Override
public ViewHolder onCreateViewHolder(@NonNull ViewGroup parent, int viewType) {
    View view = LayoutInflater.from(parent.getContext())
        .inflate(R.layout.activity_item_data, parent, false);
    return new ViewHolder(view);
}

@Override
public void onBindViewHolder(@NonNull ViewHolder holder, int position) {
    DataModel data = dataList.get(position);
    holder.tvName.setText(data.getName());
    holder.tvDescription.setText(data.getDescription());
}

@Override
public int getItemCount() {
    return dataList.size();
}

public void setData(List<DataModel> dataList) {
    this.dataList = dataList;
    notifyDataSetChanged();
}

public static class ViewHolder extends RecyclerView.ViewHolder {
    TextView tvName, tvDescription;

    public ViewHolder(@NonNull View itemView) {
        super(itemView);
        tvName = itemView.findViewById(R.id.tv_name);
        tvDescription = itemView.findViewById(R.id.tv_description);
    }
}
}
```

Add data

```
package com.example.android_firebase_task;

import android.os.Bundle;

import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.graphics.Insets;
import androidx.core.view.ViewCompat;
import androidx.core.view.WindowInsetsCompat;

public class AddData extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        EdgeToEdge.enable(this);
        setContentView(R.layout.activity_add_data);

    }
}
```

XML Layouts

Add data

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="vertical"
    android:padding="16dp">

    <EditText
        android:id="@+id/et_name"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter name"
        android:inputType="text"
        android:minHeight="48dp" />

    <EditText
        android:id="@+id/et_description"
        android:layout_width="match_parent"
```

```
    android:layout_height="wrap_content"
    android:layout_marginTop="8dp"
    android:hint="Enter description"
    android:inputType="textMultiLine"
    android:minHeight="48dp" />

</LinearLayout>
```

Item data

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.cardview.widget.CardView xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="4dp"
    android:layout_marginTop="8dp"
    app:cardCornerRadius="8dp"
    app:cardElevation="4dp">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical"
        android:padding="12dp"
        android:paddingTop="16dp"> <!-- Added extra top padding here -->

        <TextView
            android:id="@+id/tv_name"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:textSize="18sp"
            android:textStyle="bold" />

        <TextView
            android:id="@+id/tv_description"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="4dp"
            android:textSize="14sp" />

    </LinearLayout>
</androidx.cardview.widget.CardView>
```

Main activity

```
<androidx.constraintlayout.widget.ConstraintLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <androidx.recyclerview.widget.RecyclerView
        android:id="@+id/recyclerView"
        android:layout_width="0dp"
        android:layout_height="0dp"
        android:padding="8dp"
        android:layout_marginTop="45dp"
        app:layout_constraintBottom_toTopOf="@+id	btn_add"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.0"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.0" />

    <Button
        android:id="@+id	btn_add"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginBottom="16dp"
        android:text="Add Data"
        android:backgroundTint="#FF9800"
        android:textColor="#FFFFFF"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent" />

</androidx.constraintlayout.widget.ConstraintLayout>
```

View data

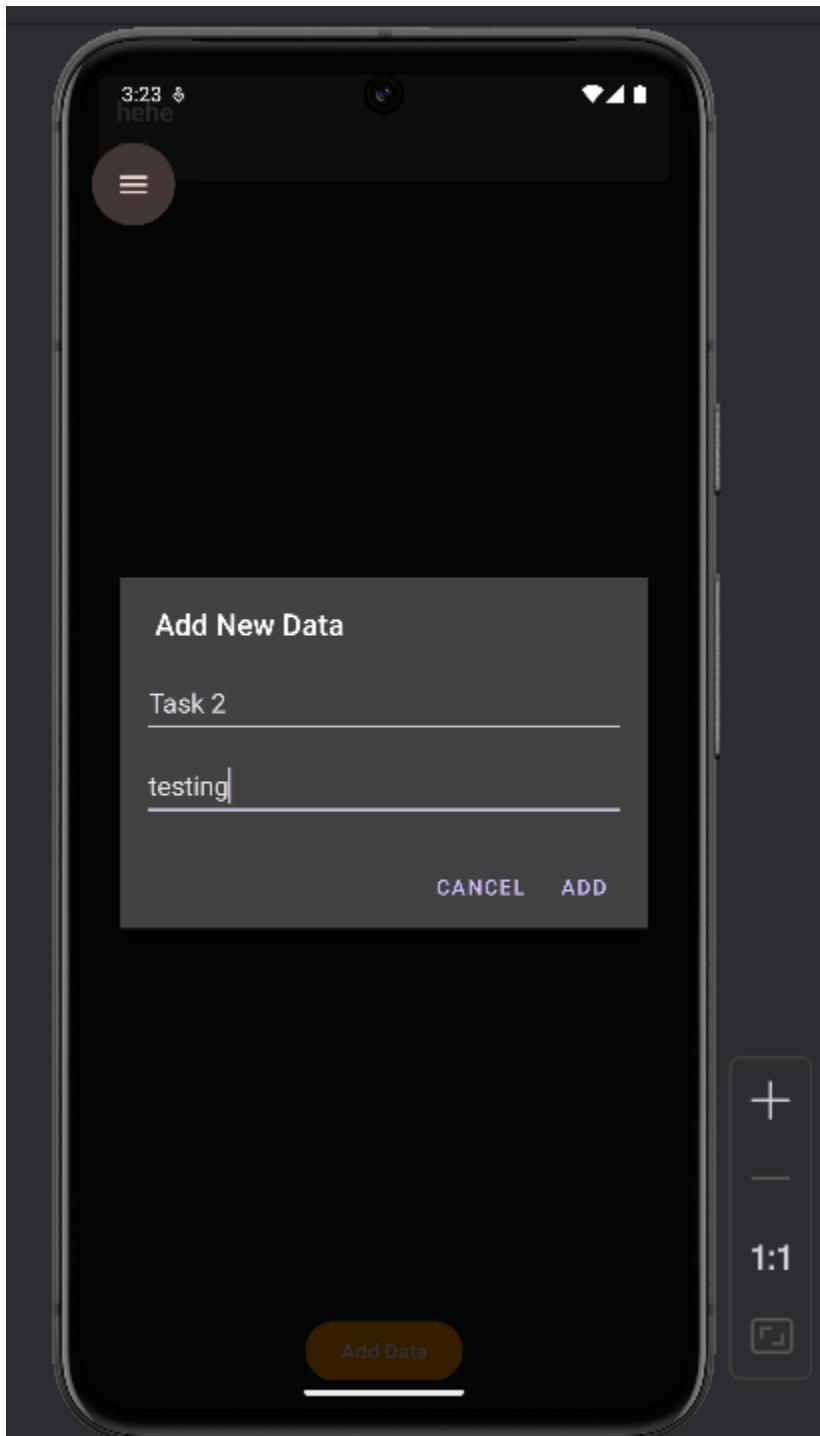
```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:orientation="vertical"
    android:layout_marginTop="150dp"
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <androidx.recyclerview.widget.RecyclerView
        android:id="@+id/recyclerView"
        android:layout_width="0dp"
        android:layout_height="0dp"
        android:padding="8dp"

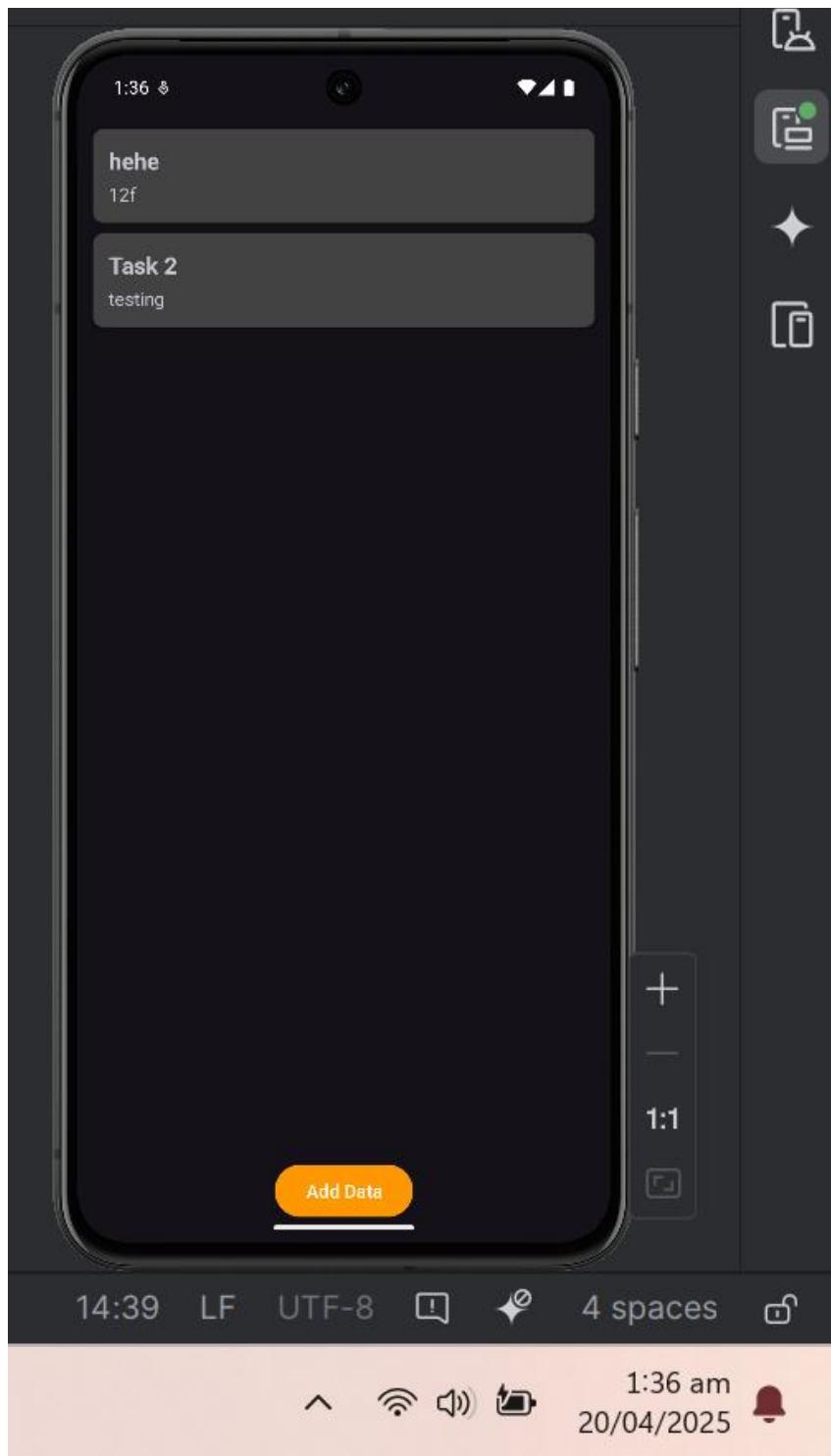
        android:paddingTop="116dp"
        android:clipToPadding="false"
        app:layout_constraintBottom_toTopOf="@+id	btn_add"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

</LinearLayout>
```

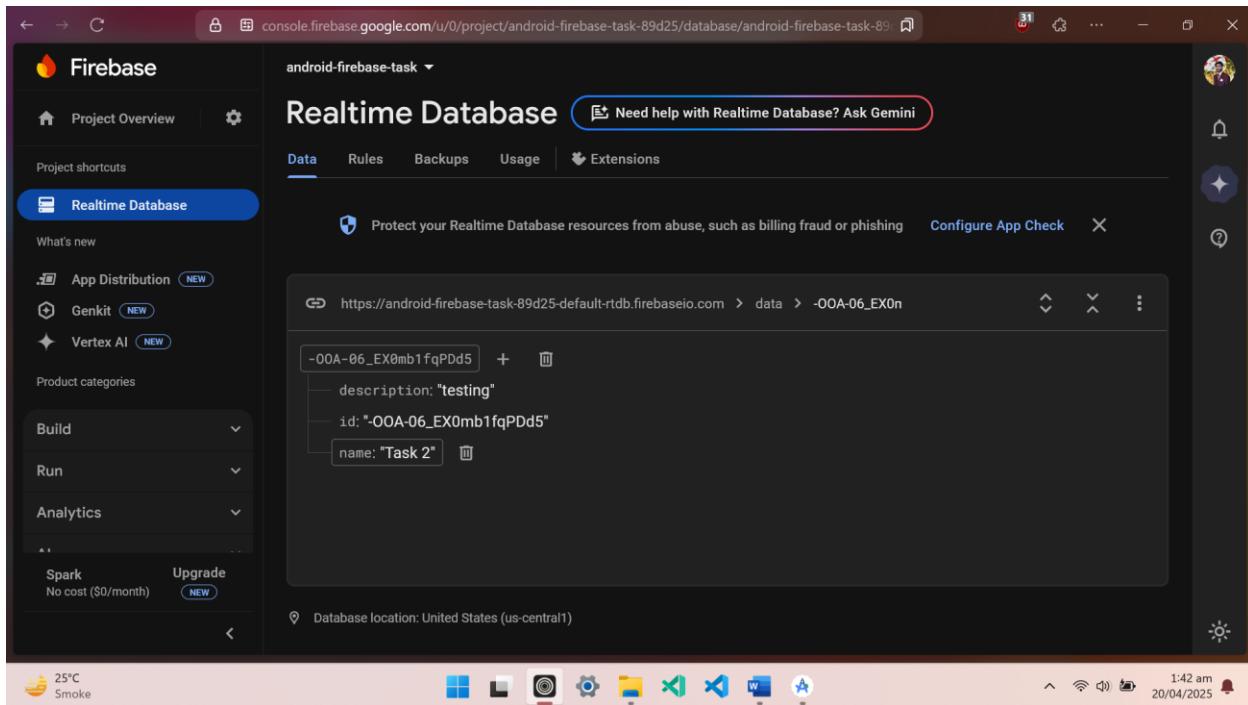
Add data from application to database



Reading data from firebase



Data in firebase database



The screenshot shows the Firebase Realtime Database interface. On the left, the navigation sidebar includes 'Project Overview', 'Realtime Database' (which is selected and highlighted in blue), 'Data', 'Rules', 'Backups', 'Usage', and 'Extensions'. Below these are sections for 'App Distribution', 'Genkit', 'Vertex AI', 'Product categories', 'Build', 'Run', 'Analytics', and a 'Spark' plan option. The main content area is titled 'Realtime Database' and shows a tree view of database structure under 'https://android-firebase-task-89d25-default.firebaseio.com'. A specific node path '-O0A-06_EX0mb1fqPDd5' is expanded, revealing three child properties: 'description' with value 'testing', 'id' with value 'O0A-06_EX0mb1fqPDd5', and 'name' with value 'Task 2'. At the bottom of the page, it says 'Database location: United States (us-central1)'. The browser address bar shows the URL 'console.firebaseio.google.com/u/0/project/android-firebase-task-89d25/database/android-firebase-task-89d25'. The system tray at the bottom right indicates the date as '20/04/2025' and time as '1:42 am'.