

EXERCISE 4

ANDROID APPLICATION DEVELOPMENT USING DATABASE

AIM:

Develop a Product information application in Android that enables to perform CRUD operations on data stored in SQLite Database.

COMPONENTS USED:

ANDROID WIDGETS:

- TextView
- EditText
- RadioGroup
- RadioButton
- Spinner
- Button

LAYOUTS USED:

- LinearLayout (Vertical)
- LinearLayout (Horizontal)
- TableLayout
- ConstraintLayout

ACTIVITY AND INTENTS USED:

Activities:

- MainActivity JAVA Class
- InsertActivity JAVA Class
- UpdateActivity JAVA Class
- DeleteActivity JAVA Class
- RetrieveActivity JAVA Class
- DisplayActivity JAVA Class

Intents:

- Intent between MainActivity JAVA Class (sender) and InsertActivity JAVA Class (receiver)
- Intent between MainActivity JAVA Class (sender) and UpdateActivity JAVA Class (receiver)
- Intent between MainActivity JAVA Class (sender) and DeleteActivity JAVA Class (receiver)
- Intent between MainActivity JAVA Class (sender) and RetrieveActivity JAVA Class (receiver)
- Intent between RetrieveActivity JAVA Class (sender) and DisplayActivity JAVA Class (receiver)
- Intent between MainActivity JAVA Class (sender) and DisplayActivity JAVA Class (receiver)

CODE:
activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical"
    tools:context=".MainActivity" >

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="150dp"
        android:orientation="horizontal">

        <TextView
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:gravity="center|center_vertical|center_horizontal"
            android:text="Product Information"
            android:textColor="#000000"
            android:textSize="40sp"
            android:textStyle="bold"
            android:typeface="monospace" />

    </LinearLayout>

    <Button
        android:id="@+id/button_insert"
        android:layout_width="200dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="80dp"
        android:layout_gravity="center|center_horizontal"
        android:backgroundTint="#578004"
        android:text="Insert"
        android:textColor="#000000"
        android:textSize="20sp"
        android:textStyle="bold"
        android:typeface="monospace" />

    <Button
        android:id="@+id/button_update"
        android:layout_width="200dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="25dp"
        android:layout_gravity="center|center_horizontal"
        android:backgroundTint="#578004"
```

```
        android:text="Update"
        android:textColor="#000000"
        android:textSize="20sp"
        android:textStyle="bold"
        android:typeface="monospace" />

<Button
    android:id="@+id/button_delete"
    android:layout_width="200dp"
    android:layout_height="wrap_content"
    android:layout_marginTop="25dp"
    android:layout_gravity="center|center_horizontal"
    android:backgroundTint="#578004"
    android:text="Delete"
    android:textColor="#000000"
    android:textSize="20sp"
    android:textStyle="bold"
    android:typeface="monospace" />

<Button
    android:id="@+id/button_retrieve"
    android:layout_width="200dp"
    android:layout_height="wrap_content"
    android:layout_marginTop="25dp"
    android:layout_gravity="center|center_horizontal"
    android:backgroundTint="#578004"
    android:text="Retrieve"
    android:textColor="#000000"
    android:textSize="20sp"
    android:textStyle="bold"
    android:typeface="monospace" />

<Button
    android:id="@+id/button_retrieve_all"
    android:layout_width="200dp"
    android:layout_height="wrap_content"
    android:layout_gravity="center|center_horizontal"
    android:layout_marginTop="25dp"
    android:backgroundTint="#578004"
    android:text="Retrieve All"
    android:textColor="#000000"
    android:textSize="20sp"
    android:textStyle="bold"
    android:typeface="monospace" />
</LinearLayout>
```

activity_insert.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical"
    tools:context=".InsertActivity">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="80dp"
        android:orientation="horizontal">

        <TextView
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:gravity="center|center_vertical|center_horizontal"
            android:text="Insert"
            android:textColor="#578004"
            android:textSize="36sp"
            android:textStyle="bold"
            android:typeface="monospace" />

    </LinearLayout>

    <TableLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="50dp">

        <TableRow
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:minHeight="80dp">

            <TextView
                android:id="@+id/product_id"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_marginStart="24dp"
                android:gravity="center|left"
                android:text="Product\nID"
                android:textColor="#000000"
                android:textSize="16sp"
                android:textStyle="bold"
                android:typeface="monospace" />

        </TableRow>

    </TableLayout>

</LinearLayout>
```

```
<EditText
    android:id="@+id/entered_product_id"
    android:layout_width="200dp"
    android:layout_height="match_parent"
    android:layout_marginStart="24dp"
    android:inputType="number"
    android:minHeight="80dp"
    android:text=""
    android:textColor="#578004"
    android:textSize="16sp"
    android:textStyle="bold" />

</TableRow>

<TableRow
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:minHeight="80dp">

    <TextView
        android:id="@+id/product_name"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="24dp"
        android:gravity="center|left"
        android:text="Product\nName"
        android:textColor="#000000"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace" />

    <Spinner
        android:id="@+id/entered_product_name"
        android:layout_width="50dp"
        android:layout_height="match_parent"
        android:layout_marginStart="24dp"
        android:gravity="center|center_horizontal|center_vertical"
        android:textAlignment="center"
        android:textColor="#578004"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace" />

</TableRow>

<TableRow
    android:layout_width="match_parent"
    android:layout_height="match_parent"
```

```
android:minHeight="150dp">

<TextView
    android:id="@+id/product_brand"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="24dp"
    android:layout_marginTop="10dp"
    android:gravity="center|left"
    android:text="Product\nBrand"
    android:textColor="#000000"
    android:textSize="16sp"
    android:textStyle="bold"
    android:typeface="monospace" />

<RadioGroup
    android:id="@+id/brand"
    android:layout_width="50dp"
    android:layout_height="match_parent"
    android:layout_marginStart="24dp">

    <RadioButton
        android:id="@+id/brand1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Brand 1"
        android:textColor="#578004"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace" />

    <RadioButton
        android:id="@+id/brand2"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Brand 2"
        android:textColor="#578004"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace" />

    <RadioButton
        android:id="@+id/brand3"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Brand 3"
        android:textColor="#578004"
        android:textSize="16sp"
        android:textStyle="bold"
```

```
        android:typeface="monospace" />

    </RadioGroup>

</TableRow>

<TableRow
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:minHeight="80dp">

    <TextView
        android:id="@+id/product_description"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="24dp"
        android:gravity="center|left"
        android:text="Product\nDescription"
        android:textColor="#000000"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace" />

    <EditText
        android:id="@+id/entered_product_description"
        android:layout_width="200dp"
        android:layout_height="match_parent"
        android:layout_marginStart="24dp"
        android:inputType="text"
        android:minHeight="80dp"
        android:text=""
        android:textColor="#578004"
        android:textSize="16sp"
        android:textStyle="bold" />

</TableRow>

<TableRow
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:minHeight="80dp">

    <TextView
        android:id="@+id/product_price"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="24dp"
        android:gravity="center|left"
        android:text="Product\nPrice"
```

```
        android:textColor="#000000"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace" />

<EditText
    android:id="@+id/entered_product_price"
    android:layout_width="200dp"
    android:layout_height="match_parent"
    android:layout_marginStart="24dp"
    android:inputType="number"
    android:minHeight="80dp"
    android:text=""
    android:textColor="#578004"
    android:textSize="16sp"
    android:textStyle="bold" />

</TableRow>

</TableLayout>

<androidx.constraintlayout.widget.ConstraintLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <Button
        android:id="@+id/cancel"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="77dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="228dp"
        android:layout_marginBottom="38dp"
        android:backgroundTint="#578004"
        android:text="Cancel"
        android:textColor="#000000"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.2" />

    <Button
        android:id="@+id/insert"
        android:layout_width="wrap_content"
```



```
        android:layout_height="wrap_content"
        android:layout_marginStart="222dp"
        android:layout_marginTop="15dp"
        android:layout_marginEnd="83dp"
        android:layout_marginBottom="39dp"
        android:backgroundTint="#578004"
        android:text="Insert"
        android:textColor="#000000"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.22" />

<TextView
    android:id="@+id/error"
    android:layout_width="wrap_content"
    android:layout_height="32dp"
    android:layout_marginStart="205dp"
    android:layout_marginTop="64dp"
    android:layout_marginEnd="206dp"
    android:layout_marginBottom="19dp"
    android:gravity="center|center_vertical|center_horizontal"
    android:textColor="#990000"
    android:textSize="16sp"
    android:textStyle="bold|italic"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />

</androidx.constraintlayout.widget.ConstraintLayout>

</LinearLayout>
```

activity_update.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical"
```

```
tools:context=".UpdateActivity">

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="80dp"
    android:orientation="horizontal">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:gravity="center|center_vertical|center_horizontal"
        android:text="Update"
        android:textColor="#578004"
        android:textSize="36sp"
        android:textStyle="bold"
        android:typeface="monospace" />

</LinearLayout>

<TableLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="50dp">

    <TableRow
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_marginTop="50dp"
        android:minHeight="80dp">

        <TextView
            android:id="@+id/product_id"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginStart="24dp"
            android:gravity="center|left"
            android:text="Product\nID"
            android:textColor="#000000"
            android:textSize="16sp"
            android:textStyle="bold"
            android:typeface="monospace" />

        <EditText
            android:id="@+id/entered_product_id"
            android:layout_width="200dp"
            android:layout_height="match_parent"
            android:layout_marginStart="24dp"
            android:inputType="number"
            android:minHeight="80dp">
```

```
        android:text=""
        android:textColor="#578004"
        android:textSize="16sp"
        android:textStyle="bold" />

</TableRow>

<TableRow
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_marginTop="10dp"
    android:minHeight="80dp">

    <TextView
        android:id="@+id/product_price"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="24dp"
        android:gravity="center|left"
        android:text="Product\nPrice"
        android:textColor="#000000"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace" />

    <EditText
        android:id="@+id/entered_product_price"
        android:layout_width="200dp"
        android:layout_height="match_parent"
        android:layout_marginStart="24dp"
        android:inputType="number"
        android:minHeight="80dp"
        android:text=""
        android:textColor="#578004"
        android:textSize="16sp"
        android:textStyle="bold" />

</TableRow>

</TableLayout>

<androidx.constraintlayout.widget.ConstraintLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <Button
        android:id="@+id/cancel"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
```

```
android:layout_marginStart="77dp"
android:layout_marginTop="16dp"
android:layout_marginEnd="228dp"
android:layout_marginBottom="38dp"
android:backgroundTint="#578004"
android:text="Cancel"
android:textColor="#000000"
android:textSize="16sp"
android:textStyle="bold"
android:typeface="monospace"
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintHorizontal_bias="1.0"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent"
app:layout_constraintVertical_bias="0.2" />
```

<Button

```
android:id="@+id/update"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="222dp"
android:layout_marginTop="15dp"
android:layout_marginEnd="83dp"
android:layout_marginBottom="39dp"
android:backgroundTint="#578004"
android:text="Update"
android:textColor="#000000"
android:textSize="16sp"
android:textStyle="bold"
android:typeface="monospace"
app:layout_constraintBottom_toBottomOf="parent"
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="0.2" />
```

<TextView

```
android:id="@+id/error"
android:layout_width="wrap_content"
android:layout_height="32dp"
android:layout_marginStart="140dp"
android:layout_marginTop="64dp"
android:layout_marginEnd="271dp"
android:layout_marginBottom="19dp"
android:gravity="center|center_vertical|center_horizontal"
android:textColor="#990000"
android:textSize="16sp"
```

```
        android:textStyle="bold|italic"
        app:layout_constraintBottom_toBottomOf="parent"
        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="0.341" />

</androidx.constraintlayout.widget.ConstraintLayout>

</LinearLayout>

activity_delete.xml

<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical"
    tools:context=".DeleteActivity">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="80dp"
        android:orientation="horizontal">

        <TextView
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:gravity="center|center_vertical|center_horizontal"
            android:text="Delete"
            android:textColor="#578004"
            android:textSize="36sp"
            android:textStyle="bold"
            android:typeface="monospace" />

    </LinearLayout>

    <TableLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="50dp">

        <TableRow
            android:layout_width="match_parent"
            android:layout_height="match_parent"
```

```
android:layout_marginTop="50dp"
android:minHeight="80dp">

<TextView
    android:id="@+id/product_id"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="24dp"
    android:gravity="center|left"
    android:text="Product\nID"
    android:textColor="#000000"
    android:textSize="16sp"
    android:textStyle="bold"
    android:typeface="monospace" />

<EditText
    android:id="@+id/entered_product_id"
    android:layout_width="200dp"
    android:layout_height="match_parent"
    android:layout_marginStart="24dp"
    android:inputType="number"
    android:minHeight="80dp"
    android:text=""
    android:textColor="#578004"
    android:textSize="16sp"
    android:textStyle="bold" />

</TableRow>

</TableLayout>

<androidx.constraintlayout.widget.ConstraintLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <Button
        android:id="@+id/cancel"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="77dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="228dp"
        android:layout_marginBottom="38dp"
        android:backgroundTint="#578004"
        android:text="Cancel"
        android:textColor="#000000"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace"
```

```
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintHorizontal_bias="1.0"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent"
app:layout_constraintVertical_bias="0.2" />
```

<Button

```
    android:id="@+id/delete"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="222dp"
    android:layout_marginTop="15dp"
    android:layout_marginEnd="83dp"
    android:layout_marginBottom="39dp"
    android:backgroundTint="#578004"
    android:text="Delete"
    android:textColor="#000000"
    android:textSize="16sp"
    android:textStyle="bold"
    android:typeface="monospace"
    app:layout_constraintBottom_toBottomOf="parent"
    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="0.2" />
```

<TextView

```
    android:id="@+id/error"
    android:layout_width="wrap_content"
    android:layout_height="32dp"
    android:layout_marginStart="140dp"
    android:layout_marginTop="64dp"
    android:layout_marginEnd="271dp"
    android:layout_marginBottom="19dp"
    android:gravity="center|center_vertical|center_horizontal"
    android:textColor="#990000"
    android:textSize="16sp"
    android:textStyle="bold|italic"
    app:layout_constraintBottom_toBottomOf="parent"
    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="0.341" />
```

</androidx.constraintlayout.widget.ConstraintLayout>

</LinearLayout>

activity_retrieve.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical"
    tools:context=".RetrieveActivity">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="80dp"
        android:orientation="horizontal">

        <TextView
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:gravity="center|center_vertical|center_horizontal"
            android:text="Retrieve"
            android:textColor="#578004"
            android:textSize="36sp"
            android:textStyle="bold"
            android:typeface="monospace" />

    </LinearLayout>

    <TableLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="15dp">

        <TableRow
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:layout_margin="50dp"
            android:minHeight="80dp">

            <TextView
                android:id="@+id/product_id"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_marginStart="24dp"
                android:gravity="center|left"
                android:text="Product\nID"
```



```
        android:textColor="#000000"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace" />

<EditText
    android:id="@+id/entered_product_id"
    android:layout_width="200dp"
    android:layout_height="match_parent"
    android:layout_marginStart="24dp"
    android:inputType="number"
    android:minHeight="80dp"
    android:text=""
    android:textColor="#578004"
    android:textSize="16sp"
    android:textStyle="bold" />

</TableRow>

</TableLayout>

<androidx.constraintlayout.widget.ConstraintLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <Button
        android:id="@+id/cancel"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="77dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="228dp"
        android:layout_marginBottom="38dp"
        android:backgroundTint="#578004"
        android:text="Cancel"
        android:textColor="#000000"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.2" />

    <Button
        android:id="@+id/retrieve"
        android:layout_width="wrap_content"
```

```
        android:layout_height="wrap_content"
        android:layout_marginStart="222dp"
        android:layout_marginTop="15dp"
        android:layout_marginEnd="83dp"
        android:layout_marginBottom="39dp"
        android:backgroundTint="#578004"
        android:text="Retrieve"
        android:textColor="#000000"
        android:textSize="16sp"
        android:textStyle="bold"
        android:typeface="monospace"
        app:layout_constraintBottom_toBottomOf="parent"
        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="0.2" />

<TextView
    android:id="@+id/error"
    android:layout_width="wrap_content"
    android:layout_height="32dp"
    android:layout_marginStart="140dp"
    android:layout_marginTop="64dp"
    android:layout_marginEnd="271dp"
    android:layout_marginBottom="19dp"
    android:gravity="center|center_vertical|center_horizontal"
    android:textColor="#990000"
    android:textSize="16sp"
    android:textStyle="bold|italic"
    app:layout_constraintBottom_toBottomOf="parent"
    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="0.341" />

</androidx.constraintlayout.widget.ConstraintLayout>

</LinearLayout>
```

activity_display.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
android:orientation="vertical"
tools:context=".DisplayActivity">

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="80dp"
    android:orientation="horizontal">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:gravity="center|center_vertical|center_horizontal"
        android:text="Record"
        android:textColor="#578004"
        android:textSize="36sp"
        android:textStyle="bold"
        android:typeface="monospace" />

</LinearLayout>

<ScrollView
    android:layout_width="match_parent"
    android:layout_height="wrap_content">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical">

        <TextView
            android:id="@+id/record"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="50dp"
            android:text=""
            android:textSize="16sp"
            android:textColor="#000000"
            android:textStyle="bold"
            android:typeface="monospace" />

        <Button
            android:id="@+id/back"
            android:layout_width="200dp"
            android:layout_height="50dp"
            android:layout_margin="50dp"
            android:layout_gravity="center"
            android:text="Back"
            android:textColor="#000000"
```

```
                android:textSize="16sp"
                android:textStyle="bold"
                android:backgroundTint="#578004" />

            </LinearLayout>

        </ScrollView>

    </LinearLayout>
```

MainActivity.java

```
package com.example.exercise4;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.database.Cursor;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;

public class MainActivity extends AppCompatActivity {

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

        //        Button create = (Button) findViewById(R.id.button_create);
        //        create.setOnClickListener(new View.OnClickListener() {
        //            @Override
        //            public void onClick(View view) {
        //
        //                DBHelper db = new DBHelper(getApplicationContext());
        //            }
        //        });

        Button insert = (Button) findViewById(R.id.button_insert);
        insert.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent i = new Intent(MainActivity.this,
InsertActivity.class);
                startActivity(i);
            }
        });
    }
}
```

```
Button update = (Button) findViewById(R.id.button_update);
update.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        Intent i = new Intent(MainActivity.this,
UpdateActivity.class);
        startActivity(i);
    }
});

Button delete = (Button) findViewById(R.id.button_delete);
delete.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        Intent i = new Intent(MainActivity.this,
DeleteActivity.class);
        startActivity(i);
    }
});

Button retrieve = (Button) findViewById(R.id.button_retrieve);
retrieve.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        Intent i = new Intent(MainActivity.this,
RetrieveActivity.class);
        startActivity(i);
    }
});

Button retrieve_all = (Button)
findViewById(R.id.button_retrieve_all);
retrieve_all.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        DBHelper db = new DBHelper(getApplicationContext());

        Cursor record = db.retrieve_all_records();
        String record_details = "";
        while(record.moveToNext())
        {
            record_details += "ID: " + record.getString(0) + "\n";
            record_details += "Name: " + record.getString(1) + "\n";
            record_details += "Brand: " + record.getString(2) + "\n";
            record_details += "Description: " + record.getString(3) +
"\n";
            record_details += "Price: " + record.getString(4) +
"\n\n";
        }
    }
});
```

```
                Intent i = new Intent(MainActivity.this,
DisplayActivity.class);
                i.putExtra("record_details", record_details);
                startActivity(i);
            }
        });
    }
}
```

InsertActivity.java

```
package com.example.exercise4;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.Button;
import android.widget.EditText;
import android.widget.RadioGroup;
import android.widget.Spinner;
import android.widget.TextView;
import android.widget.Toast;

public class InsertActivity extends AppCompatActivity {

    String brand = "";
    String name = "";
    String description = "";
    String[] product_items = {"--Select--", "Product 1", "Product 2",
"Product 3", "Product 4", "Product 5", "Product 6"};
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_insert);

        EditText product_id = (EditText)
findViewById(R.id.entered_product_id);

        Spinner product_name = (Spinner)
findViewById(R.id.entered_product_name);
        ArrayAdapter sp_item = new ArrayAdapter(this,
androidx.appcompat.R.layout.support_simple_spinner_dropdown_item,
product_items);
```

```
sp_item.setDropDownViewResource(androidx.appcompat.R.layout.support_simple_spinner_dropdown_item);
    product_name.setAdapter(sp_item);

    RadioGroup product_brand = findViewById(R.id.brand);

    EditText product_description = (EditText)
findViewById(R.id.entered_product_description);

    EditText product_price = (EditText)
findViewById(R.id.entered_product_price);
    TextView error = (TextView) findViewById(R.id.error);
    error.setText("");

    Button cancel = (Button) findViewById(R.id.cancel);
    cancel.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
            Intent i = new Intent(InsertActivity.this,
MainActivity.class);
            startActivity(i);
        }
    });

    Button insert = (Button) findViewById(R.id.insert);
    insert.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
            Boolean id_flag = true, id_len_flag = true;
            String id = product_id.getText().toString();
            try {
                int id_validation = Integer.parseInt(id);
                if(id_validation / 1000 == 0 || id_validation / 1000 > 9)
                {
                    id_len_flag = false;
                }
            }
            catch (NumberFormatException nfe)
            {
                id_flag = false;
            }

            if(id_flag == false || id_len_flag == false)
            {
                error.setText("Product ID must be 4 digits");
                product_id.setText("");
            }
            else
```

```
{
    name = product_name.getSelectedItem().toString();
    description = product_description.getText().toString();
    int rid = product_brand.getCheckedRadioButtonId();
    if(rid == R.id.brand1)
    {
        brand = "Brand 1";
    }
    else if(rid == R.id.brand2)
    {
        brand = "Brand 2";
    }
    else if(rid == R.id.brand3)
    {
        brand = "Brand 3";
    }
    String price = product_price.getText().toString();
    Boolean price_flag = true;
    try {
        int price_validation = Integer.parseInt(price);
    }
    catch(NumberFormatException nfe) {
        price_flag = false;
    }

    if(price_flag == false) error.setText("Price should be a
number");
    else
    {
        DBHelper db = new DBHelper(getApplicationContext());
        Boolean check_insert = db.insert_record(id, name,
brand, description, price);
        String x = id + " " + name + " " + brand + " " +
description + " " + price;
        if(check_insert == true)
        {
            Intent j = new Intent(InsertActivity.this,
MainActivity.class);
            startActivity(j);
        }
        else
        {
            error.setText("Record could not be inserted!");
            product_id.setText("");
            product_name.setAdapter(sp_item);
            product_brand.clearCheck();
            product_description.setText("");
            product_price.setText("");
        }
    }
}
```



```
        }  
    }  
});  
}  
}
```

UpdateActivity.java

```
package com.example.exercise4;  
  
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;  
  
public class UpdateActivity extends AppCompatActivity {  
  
    @Override  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.activity_update);  
  
        EditText product_id = (EditText)  
findViewById(R.id.entered_product_id);  
        EditText product_price = (EditText)  
findViewById(R.id.entered_product_price);  
        TextView error = (TextView) findViewById(R.id.error);  
  
        Button update = (Button) findViewById(R.id.update);  
        update.setOnClickListener(new View.OnClickListener() {  
            @Override  
            public void onClick(View view) {  
                String id = product_id.getText().toString();  
                String price = product_price.getText().toString();  
  
                DBHelper db = new DBHelper(getApplicationContext());  
  
                Boolean check = db.update_record(id, price);  
                if(check == true)  
                {  
                    Intent i = new Intent(UpdateActivity.this,  
MainActivity.class);
```

```
        startActivity(i);
    }
    else
    {
        error.setText("Could not update!");
        product_id.setText("");
        product_price.setText("");
    }
}
});

Button cancel = (Button) findViewById(R.id.cancel);
cancel.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        Intent i = new Intent(UpdateActivity.this,
MainActivity.class);
        startActivity(i);
    }
});
}
}
```

DeleteActivity.java

```
package com.example.exercise4;

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;

public class DeleteActivity extends AppCompatActivity {

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

        EditText product_id = (EditText)
findViewById(R.id.entered_product_id);
        TextView error = (TextView) findViewById(R.id.error);

        Button delete = (Button) findViewById(R.id.delete);
```

```
delete.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        String id = product_id.getText().toString();

        DBHelper db = new DBHelper(getApplicationContext());

        Boolean check = db.delete_record(id);
        if(check == true)
        {
            Intent i = new Intent>DeleteActivity.this,
MainActivity.class);
            startActivity(i);
        }
        else
        {
            error.setText("Could not delete!");
            product_id.setText("");
        }
    }
});

Button cancel = (Button) findViewById(R.id.cancel);
cancel.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        Intent i = new Intent>DeleteActivity.this,
MainActivity.class);
        startActivity(i);
    }
});
}
}
```

RetrieveActivity.java

```
package com.example.exercise4;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.database.Cursor;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
```

```
public class RetrieveActivity extends AppCompatActivity {

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

        EditText product_id = (EditText)
findViewById(R.id.entered_product_id);
        TextView error = (TextView) findViewById(R.id.error);

        Button retrieve = (Button) findViewById(R.id.retrieve);
        retrieve.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {

                String id = product_id.getText().toString();

                DBHelper db = new DBHelper(getApplicationContext());

                Cursor record = db.retrieve_record(id);
                if(record.getCount() != 1)
                {
                    error.setText("Could not retrieve!");
                    product_id.setText("");
                }
                else
                {
                    error.setText("Could retrieve!");
                    String record_details = "";
                    while(record.moveToNext())
                    {
                        record_details += "ID: " + record.getString(0) +
"\n";
                        record_details += "Name: " + record.getString(1) +
"\n";
                        record_details += "Brand: " + record.getString(2) +
"\n";
                        record_details += "Description: " +
record.getString(3) + "\n";
                        record_details += "Price: " + record.getString(4) +
"\n\n";
                    }

                    Intent i = new Intent(RetrieveActivity.this,
DisplayActivity.class);
                    i.putExtra("record_details", record_details);
                    startActivity(i);
                }
            }
        })
    }
}
```

```
    });  
  
    Button cancel = (Button) findViewById(R.id.cancel);  
    cancel.setOnClickListener(new View.OnClickListener() {  
        @Override  
        public void onClick(View view) {  
            Intent i = new Intent(RetrieveActivity.this,  
MainActivity.class);  
            startActivity(i);  
        }  
    });  
}  
}
```

DisplayActivity.java

```
package com.example.exercise4;  
  
import androidx.appcompat.app.AppCompatActivity;  
  
import android.content.Intent;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.TextView;  
  
public class DisplayActivity extends AppCompatActivity {  
  
    @Override  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.activity_display);  
  
        TextView record = (TextView) findViewById(R.id.record);  
        Intent i = getIntent();  
        String record_display = i.getStringExtra("record_details");  
        record.setText(record_display);  
  
        Button back = (Button) findViewById(R.id.back);  
        back.setOnClickListener(new View.OnClickListener() {  
            @Override  
            public void onClick(View view) {  
                Intent i = new Intent(DisplayActivity.this,  
MainActivity.class);  
                startActivity(i);  
            }  
        });  
    }  
}
```

```
}
```

DBHelper.java

```
package com.example.exercise4;

import androidx.annotation.Nullable;
import androidx.appcompat.app.AppCompatActivity;

import android.content.ContentValues;
import android.content.Context;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
import android.os.Bundle;
import android.database.Cursor;
public class DBHelper extends SQLiteOpenHelper {
    public DBHelper(@Nullable Context context) {
        super(context, "ProductDB.db", null, 1);
    }

    @Override
    public void onCreate(SQLiteDatabase db) {
        db.execSQL("CREATE TABLE product (" +
            "id INT PRIMARY KEY, " +
            "name Text, " +
            "brand Text, " +
            "description Text, " +
            "price INT)");
    }

    @Override
    public void onUpgrade(SQLiteDatabase db, int i, int i1) {
        db.execSQL("DROP TABLE IF EXISTS product");
    }

    //Insertion
    public Boolean insert_record(String id, String name, String brand, String
description, String price) {
        //To get db connection
        SQLiteDatabase db = this.getWritableDatabase();
        //To write into db
        ContentValues content_value = new ContentValues();
        content_value.put("id", id);
        content_value.put("name", name);
        content_value.put("brand", brand);
        content_value.put("description", description);
        content_value.put("price", price);
    }
}
```

```
//Execute insertion
Long result = db.insert("product", null, content_value);
if(result == -1) return false;
return true;
}

//Updation
public Boolean update_record(String id, String price) {
    //To get db connection
    SQLiteDatabase db = this.getWritableDatabase();
    //To write into db
    ContentValues content_value = new ContentValues();
    content_value.put("price", price);

    Cursor record = db.rawQuery("SELECT * FROM product WHERE id = ?", new
String []{id});

    //Execute updation if there is a record to be updated
    if(record.getCount() > 0)
    {
        int result = db.update("product", content_value, "id = ?", new
String []{id});
        if(result == -1) return false;
        else return true;
    }
    return false;
}

//Deletion
public Boolean delete_record(String id) {
    //To get db connection
    SQLiteDatabase db = this.getWritableDatabase();

    Cursor record = db.rawQuery("SELECT * FROM product WHERE id = ?", new
String []{id});

    //Execute deletion if there is a record to be deleted
    if(record.getCount() > 0)
    {
        int result = db.delete("product", "id = ?", new String []{id});
        if(result == -1) return false;
        else return true;
    }
    return false;
}

//Retrieval
public Cursor retrieve_record(String id) {
    //To get db connection
```

```
        SQLiteDatabase db = this.getWritableDatabase();

        Cursor record = db.rawQuery("SELECT * FROM product WHERE id = ?", new
String []{id});
        return record;
    }

    //Retrieve all
    public Cursor retrieve_all_records() {
        //To get db connection
        SQLiteDatabase db = this.getWritableDatabase();

        Cursor records = db.rawQuery("SELECT * FROM product", null);
        return records;
    }
}
```


OUTPUT :

11:15

Product Information

Insert

Update

Delete

Retrieve

Retrieve All

11:15

Insert

Product ID

Product Name

Product Brand

Product Description

Product Price

--Select--

Brand 1

Brand 2

Brand 3

Cancel

Insert

11:18

Insert

Product ID

Product Name

Product Brand

Product Description

Product Price

1000

Product 1

Brand 1

Brand 2

Brand 3

Desc 1

1000

Cancel

Insert

11:16

Retrieve

Product ID

Cancel

Retrieve

11:29

Retrieve

Product ID

1000

Cancel

Retrieve

11:18

Record

ID: 1000

Name: Product 1





Brand: Brand 1





Description: Desc 1

Price: 1000

Back

11:19





Insert

Product ID

2000

Product Name

Product 2

Product Brand

☐ Brand 1

☒ Brand 2

☐ Brand 3

Product Description

Desc 2




Product Price

2000

Cancel

Insert

11:19

Record

ID: 1000

Name: Product 1

Brand: Brand 1

Description: Desc 1

Price: 1000

ID: 2000

Name: Product 2

Brand: Brand 2

Description: Desc 2

Price: 2000

Back

11:16

•

Delete

Product
ID

Cancel

Delete

11:20 11:20 11:20

Delete

Product ID 2000

Cancel Delete

11:18 11:18 11:18

Record

ID: 1000
Name: Product 1
Brand: Brand 1
Description: Desc 1
Price: 1000

Back

11:16 11:16 11:16

Update

Product ID

Product Price

Cancel Update

11:20 11:20 11:20

Update

Product ID 1000

Product Price 2500

Cancel Update

11:20 11:20 11:20

Record

ID: 1000
Name: Product 1
Brand: Brand 1
Description: Desc 1
Price: 2500

Back

BEST PRACTICES:

- Standard naming conventions
- Suitable comments
- Proper indentation
- Proper user interface which is understandable and easy to navigate
- Use of modularity and functions

LEARNING OUTCOMES:

- I learnt the working of Android Studio.
- I learnt about the various widgets.
- I learnt to choose and use the layouts.
- I learnt to use event handlers.
- I learnt to link the main activity and view activity.
- I learnt to perform CRUD operations using SQLite database.
- I learnt to run the emulator and debugger.