

## Q1.

```
// MainActivity.kt
package com.example.myapp3

import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Button
import android.widget.TextView

class MainActivity : AppCompatActivity() {

    private lateinit var tvResult: TextView
    private var firstNumber: String = ""
    private var secondNumber: String = ""
    private var operation: String = ""

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        tvResult = findViewById(R.id.tvResult)

        val buttons = listOf<Button>(
            findViewById(R.id.btn0), findViewById(R.id.btn1),
        findViewById(R.id.btn2),
            findViewById(R.id.btn3), findViewById(R.id.btn4),
        findViewById(R.id.btn5),
            findViewById(R.id.btn6), findViewById(R.id.btn7),
        findViewById(R.id.btn8),
            findViewById(R.id.btn9), findViewById(R.id.btnAdd),
        findViewById(R.id.btnSubtract),
            findViewById(R.id.btnMultiply), findViewById(R.id.btnDivide),
        findViewById(R.id.btnClear),
            findViewById(R.id.btnEquals)
        )

        for (button in buttons) {
            button.setOnClickListener { onButtonClick(it as Button) }
        }
    }

    private fun onButtonClick(button: Button) {
        val buttonText = button.text.toString()

        when (buttonText) {
            "C" -> {
                firstNumber = ""
                secondNumber = ""
                operation = ""
                tvResult.text = "0"
            }
            "+", "-", "*", "/" -> {
                operation = buttonText
                tvResult.text = "$firstNumber $operation"
            }
        }
    }
}
```

```

        "=" -> {
            val result = performCalculation()
            tvResult.text = result.toString()
            firstNumber = result.toString()
            secondNumber = ""
            operation = ""
        }
    else -> {
        if (operation.isEmpty()) {
            firstNumber += buttonText
            tvResult.text = firstNumber
        } else {
            secondNumber += buttonText
            tvResult.text = "$firstNumber $operation $secondNumber"
        }
    }
}
}

private fun performCalculation(): Double {
    val num1 = firstNumber.toDoubleOrNull() ?: 0.0
    val num2 = secondNumber.toDoubleOrNull() ?: 0.0

    return when (operation) {
        "+" -> num1 + num2
        "-" -> num1 - num2
        "*" -> num1 * num2
        "/" -> if (num2 != 0.0) num1 / num2 else Double.NaN
        else -> 0.0
    }
}
}
}

```

```

<!-- res/layout/activity_main.xml -->
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"
    tools:context=".MainActivity">

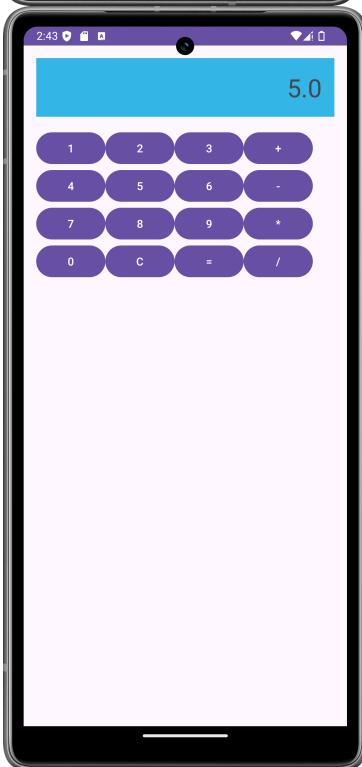
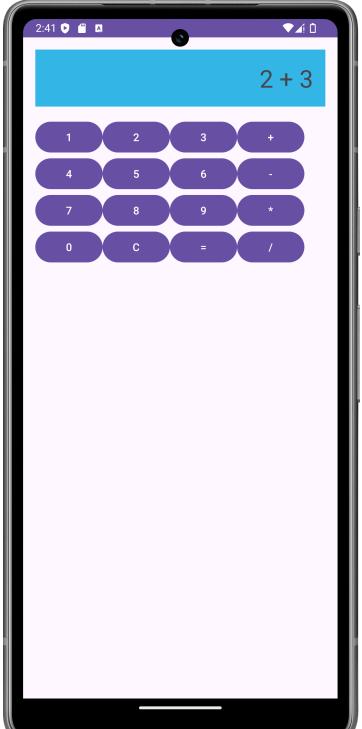
    <TextView
        android:id="@+id/tvResult"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:gravity="end"
        android:textSize="32sp"
        android:padding="16dp"
        android:background="@android:color/holo_blue_light"
        android:text="0" />

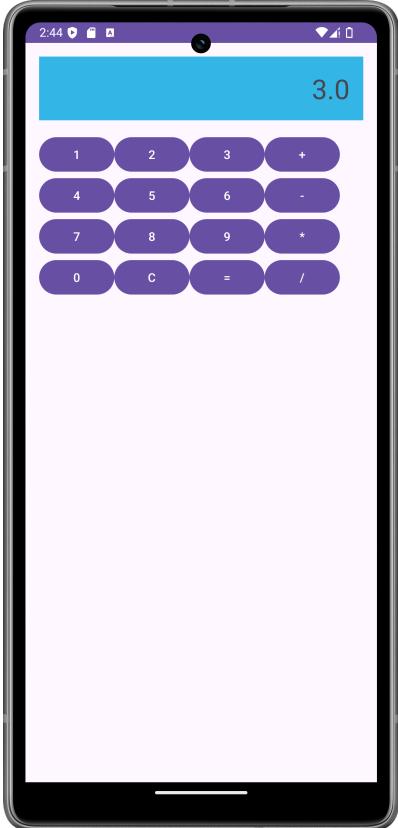
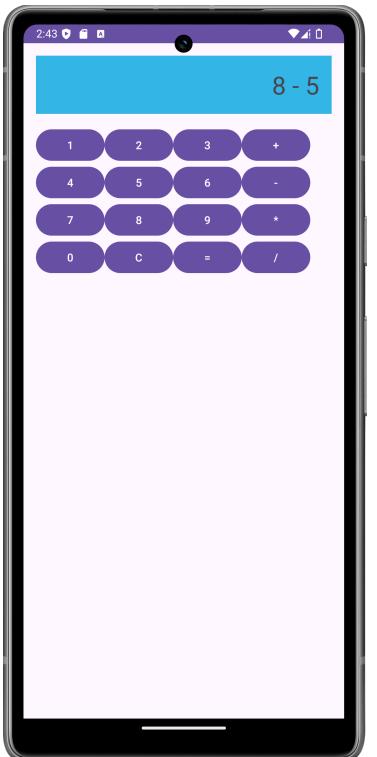
    <GridLayout

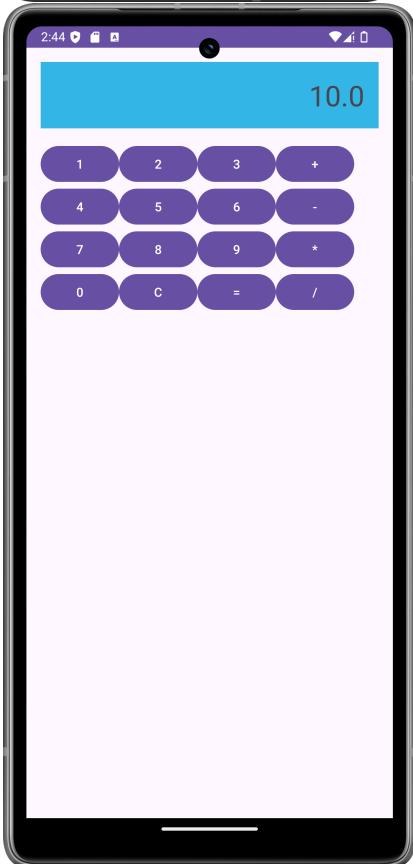
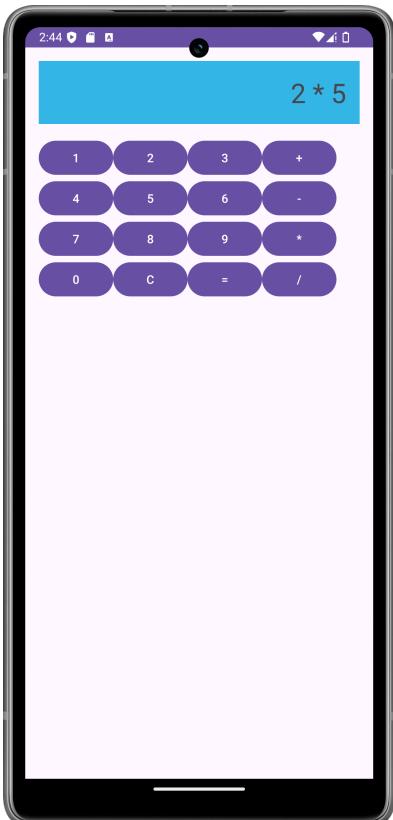
```

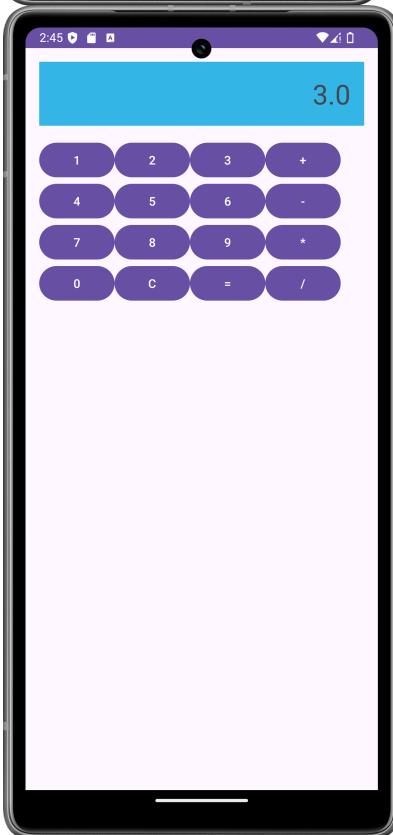
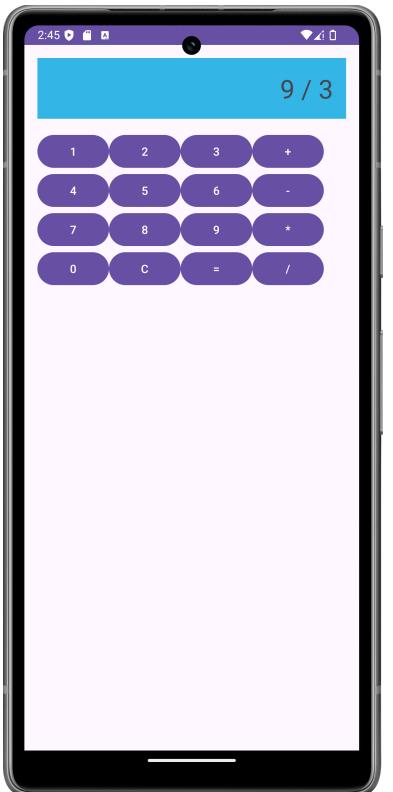
```
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:columnCount="4"
        android:rowCount="5"
        android:layout_marginTop="16dp">

        <!-- Buttons for digits 0-9 and operations +, -, *, / -->
        <Button android:text="1" android:id="@+id	btn1"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="2" android:id="@+id	btn2"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="3" android:id="@+id	btn3"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="+" android:id="@+id	btnAdd"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="4" android:id="@+id	btn4"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="5" android:id="@+id	btn5"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="6" android:id="@+id	btn6"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="-" android:id="@+id	btnSubtract"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="7" android:id="@+id	btn7"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="8" android:id="@+id	btn8"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="9" android:id="@+id	btn9"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="*" android:id="@+id	btnMultiply"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="0" android:id="@+id	btn0"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="C" android:id="@+id	btnClear"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="=" android:id="@+id	btnEquals"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="/" android:id="@+id	btnDivide"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
    </GridLayout>
</LinearLayout>
```









## Q2.

```
package com.example.myapp2

import android.os.Bundle
import android.view.View
import android.widget.*
import androidx.appcompat.app.AppCompatActivity

class MainActivity : AppCompatActivity() {

    private lateinit var taskInput: EditText
    private lateinit var prioritySpinner: Spinner
    private lateinit var addTaskButton: Button
    private lateinit var taskListView: ListView
    private lateinit var taskAdapter: ArrayAdapter<String>
    private val taskList = mutableListOf<String>()

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        taskInput = findViewById(R.id.taskInput)
        prioritySpinner = findViewById(R.id.prioritySpinner)
        addTaskButton = findViewById(R.id.addTaskButton)
        taskListView = findViewById(R.id.taskListView)

        val priorities = arrayOf("Small", "Medium", "Large")
        val spinnerAdapter = ArrayAdapter(this,
            android.R.layout.simple_spinner_item, priorities)

        spinnerAdapter.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item)
        prioritySpinner.adapter = spinnerAdapter

        taskAdapter = ArrayAdapter(this, android.R.layout.simple_list_item_1,
            taskList)
        taskListView.adapter = taskAdapter

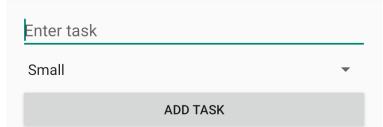
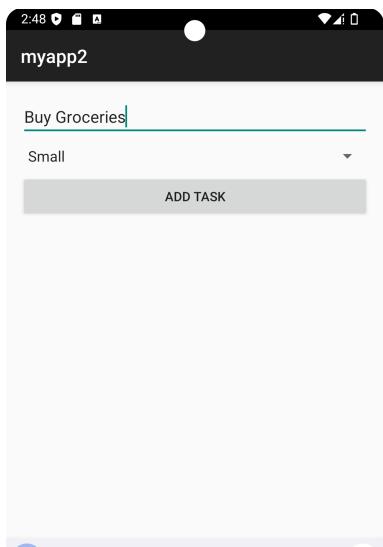
        addTaskButton.setOnClickListener {
            val task = taskInput.text.toString()
            val priority = prioritySpinner.selectedItem.toString()
            if (task.isNotEmpty()) {
                taskList.add("$task - Priority: $priority")
                taskAdapter.notifyDataSetChanged()
                taskInput.text.clear()
            } else {
                Toast.makeText(this, "Add a task", Toast.LENGTH_SHORT).show()
            }
        }

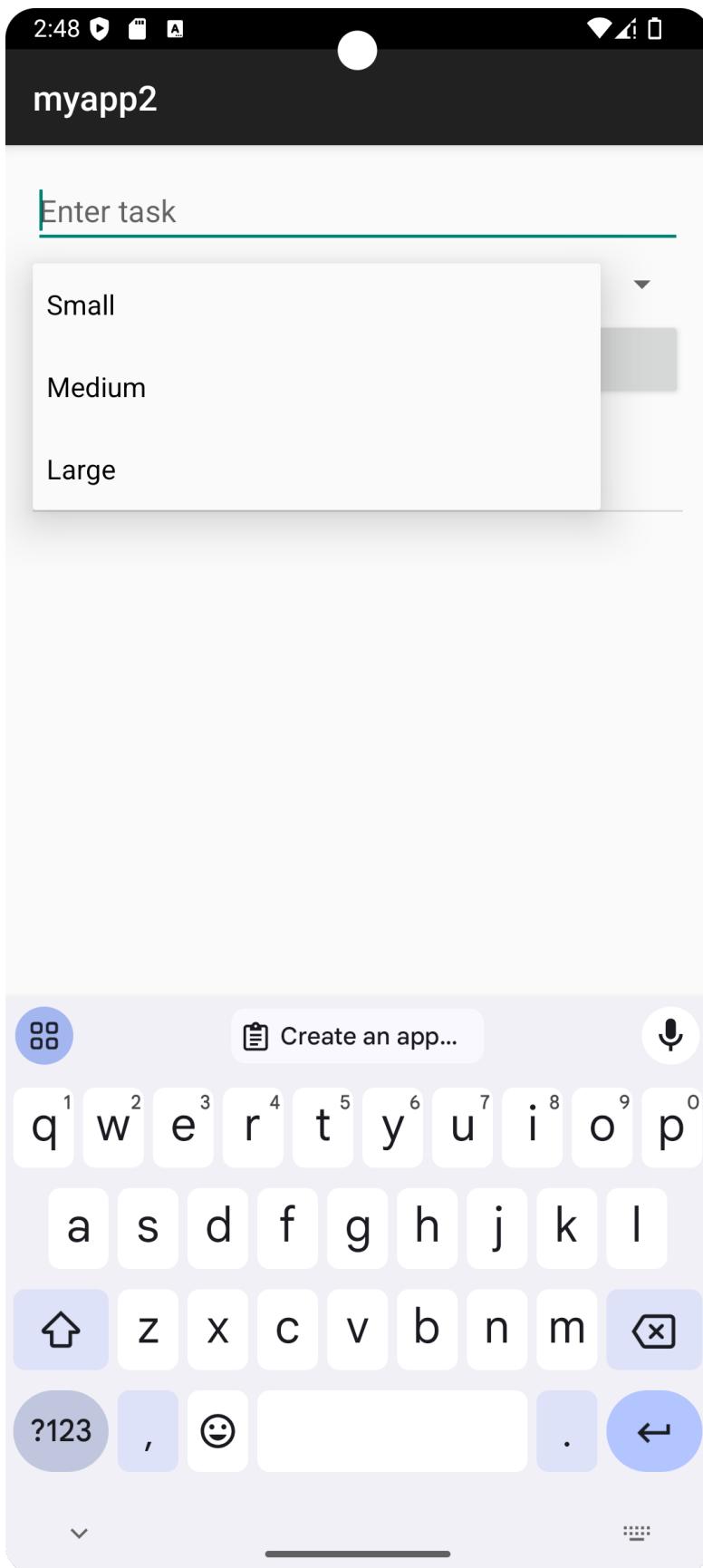
        prioritySpinner.onItemSelectedListener = object :
            AdapterView.OnItemSelectedListener {
            override fun onItemSelected(parent: AdapterView<*>, view: View?,

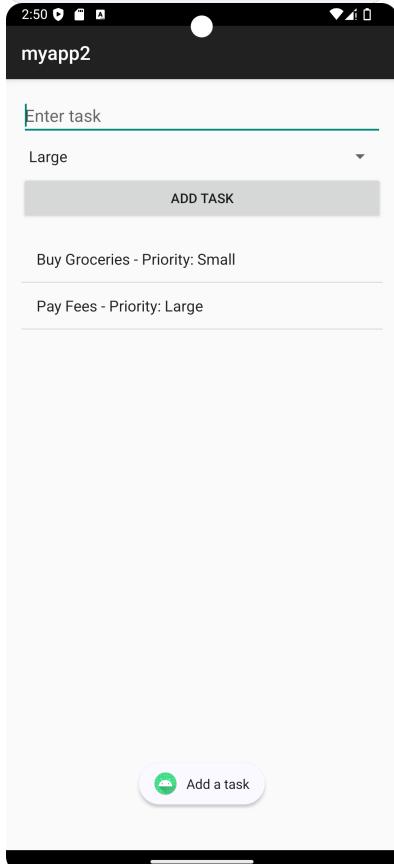
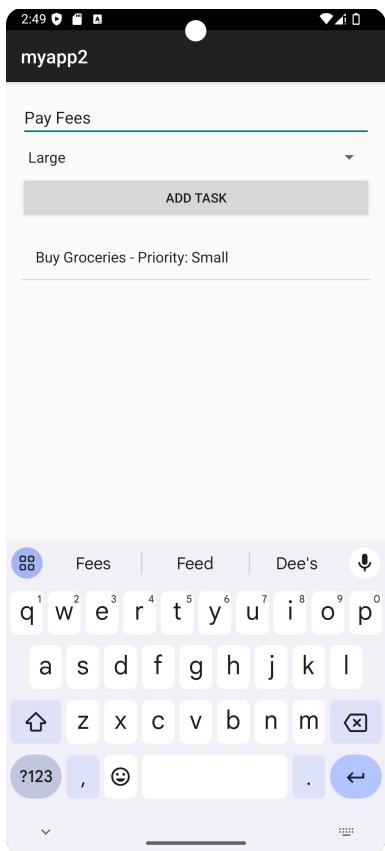
```

```
position: Int, id: Long) {  
    }  
  
    override fun onNothingSelected(parent: AdapterView<*>) {  
        }  
    }  
}  
}
```

```
<?xml version="1.0" encoding="utf-8"?>  
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
    android:layout_width="match_parent"  
    android:layout_height="match_parent"  
    android:orientation="vertical"  
    android:padding="16dp">  
  
    <EditText  
        android:id="@+id/taskInput"  
        android:layout_width="match_parent"  
        android:layout_height="wrap_content"  
        android:hint="Enter task" />  
  
    <Spinner  
        android:id="@+id/prioritySpinner"  
        android:layout_width="match_parent"  
        android:layout_height="wrap_content"  
        android:layout_marginTop="8dp" />  
  
    <Button  
        android:id="@+id/addTaskButton"  
        android:layout_width="match_parent"  
        android:layout_height="wrap_content"  
        android:text="Add Task"  
        android:layout_marginTop="8dp" />  
  
    <ListView  
        android:id="@+id/taskListView"  
        android:layout_width="match_parent"  
        android:layout_height="0dp"  
        android:layout_weight="1"  
        android:layout_marginTop="16dp" />  
</LinearLayout>
```







Q3.

```
// MainActivity.kt
package com.example.myapp5

import android.content.Intent
import android.os.Bundle
import android.widget.Button
import androidx.appcompat.app.AppCompatActivity
import com.example.mainapp.TodoListActivity
import com.example.myapp6.CalculatorActivity

class MainActivity : AppCompatActivity() {

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        val buttonCalculator: Button = findViewById(R.id.buttonCalculator)
        val buttonTodoList: Button = findViewById(R.id.buttonTodoList)

        buttonCalculator.setOnClickListener {
            val intent = Intent(this, CalculatorActivity::class.java)
            intent.putExtra("initValue", "0")
            startActivity(intent)
        }

        buttonTodoList.setOnClickListener {
            val intent = Intent(this, TodoListActivity::class.java)
            intent.putExtra("welcomeMessage", "Welcome to Todo List")
            startActivity(intent)
        }
    }
}
```

```
<!-- res/layout/activity_main.xml -->
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"
    tools:context=".MainActivity">

    <Button
        android:id="@+id/buttonCalculator"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Open Calculator" />

    <Button
        android:id="@+id/buttonTodoList"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Open Todo List" />

```

```
        android:layout_marginTop="16dp" />
    </LinearLayout>
```

```
<!-- res/layout/activity_main.xml -->
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"
    tools:context=".MainActivity">

    <Button
        android:id="@+id/buttonCalculator"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Open Calculator" />

    <Button
        android:id="@+id/buttonTodoList"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Open Todo List"
        android:layout_marginTop="16dp" />
</LinearLayout>
```

```
// CalculatorActivity.kt
package com.example.myapp6

import android.os.Bundle
import android.widget.Button
import android.widget.TextView
import androidx.appcompat.app.AppCompatActivity
import com.example.myapp5.R

class CalculatorActivity : AppCompatActivity() {

    private lateinit var tvResult: TextView
    private var firstNumber: String = ""
    private var secondNumber: String = ""
    private var operation: String = ""

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_calculator)

        tvResult = findViewById(R.id.tvResult)
        val initialValue = intent.getStringExtra("initValue") ?: "0"
        tvResult.text = initialValue

        val buttons = listOf<Button>(
            findViewById(R.id.btn0), findViewById(R.id.btn1),
            findViewById(R.id.btn2),
            findViewById(R.id.btn3), findViewById(R.id.btn4),
            findViewById(R.id.btn5),
```

```

        findViewById(R.id.btn6), findViewById(R.id.btn7),
findViewById(R.id.btn8),
        findViewById(R.id.btn9), findViewById(R.id.btnAdd),
findViewById(R.id.btnSubtract),
        findViewById(R.id.btnMultiply), findViewById(R.id.btnDivide),
findViewById(R.id.btnClear),
        findViewById(R.id.btnExit)
    )

    for (button in buttons) {
        button.setOnClickListener { onButtonClick(it as Button) }
    }
}

private fun onButtonClick(button: Button) {
    val buttonText = button.text.toString()

    when (buttonText) {
        "C" -> {
            firstNumber = ""
            secondNumber = ""
            operation = ""
            tvResult.text = "0"
        }
        "+", "-", "*", "/" -> {
            operation = buttonText
            tvResult.text = "$firstNumber $operation"
        }
        "=" -> {
            val result = performCalculation()
            tvResult.text = result.toString()
            firstNumber = result.toString()
            secondNumber = ""
            operation = ""
        }
        else -> {
            if (operation.isEmpty()) {
                firstNumber += buttonText
                tvResult.text = firstNumber
            } else {
                secondNumber += buttonText
                tvResult.text = "$firstNumber $operation $secondNumber"
            }
        }
    }
}

private fun performCalculation(): Double {
    val num1 = firstNumber.toDoubleOrNull() ?: 0.0
    val num2 = secondNumber.toDoubleOrNull() ?: 0.0

    return when (operation) {
        "+" -> num1 + num2
        "-" -> num1 - num2
        "*" -> num1 * num2
        "/" -> if (num2 != 0.0) num1 / num2 else Double.NaN
        else -> 0.0
    }
}

```

```
        }
    }
}

<!-- res/layout/activity_calculator.xml -->
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"
    tools:context=".CalculatorActivity">

    <TextView
        android:id="@+id/tvResult"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:gravity="end"
        android:textSize="32sp"
        android:padding="16dp"
        android:background="@android:color/holo_blue_light"
        android:text="0" />

    <GridLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:columnCount="4"
        android:rowCount="5"
        android:layout_marginTop="16dp">

        <!-- Buttons for digits 0-9 and operations +, -, *, / -->
        <Button android:text="1" android:id="@+id/btn1"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="2" android:id="@+id/btn2"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="3" android:id="@+id/btn3"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="+" android:id="@+id/btnAdd"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="4" android:id="@+id/btn4"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="5" android:id="@+id/btn5"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="6" android:id="@+id/btn6"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="-" android:id="@+id/btnSubtract"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="7" android:id="@+id/btn7"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="8" android:id="@+id/btn8"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="9" android:id="@+id/btn9"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="*" android:id="@+id/btnMultiply"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        <Button android:text="0" android:id="@+id/btn0"
            android:layout_width="wrap_content" android:layout_height="wrap_content"/>
```

```
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
            <Button android:text="C" android:id="@+id/btnClear"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
            <Button android:text="=" android:id="@+id/btnEquals"
        android:layout_width="wrap_content" android:layout_height="wrap_content"/>
            <Button android:text="/" android:id="@+id/btnDivide"
    android:layout_width="wrap_content" android:layout_height="wrap_content"/>
        </GridLayout>
</LinearLayout>
```

```
// TodoListActivity.kt
package com.example.mainapp

import android.os.Bundle
import android.view.View
import android.widget.AdapterView
import android.widget.ArrayAdapter
import android.widget.Button
import android.widget.EditText
import android.widget.Spinner
import android.widget.TextView
import androidx.appcompat.app.AppCompatActivity
import androidx.recyclerview.widget.LinearLayoutManager
import androidx.recyclerview.widget.RecyclerView
import com.example.myapp5.R
import com.google.android.gms.gcm.Task
import com.google.android.gms.tasks.Task

class TodoListActivity : AppCompatActivity() {

    private lateinit var textViewWelcome: TextView
    private lateinit var spinnerFilter: Spinner
    private lateinit var editTextTask: EditText
    private lateinit var buttonAddTask: Button
    private lateinit var recyclerViewTasks: RecyclerView

    private val tasks = mutableListOf<Task>()
    private lateinit var adapter: TaskAdapter

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_todo_list)

        textViewWelcome = findViewById(R.id.textViewWelcome)
        spinnerFilter = findViewById(R.id.spinnerFilter)
        editTextTask = findViewById(R.id.editTextTask)
        buttonAddTask = findViewById(R.id.buttonAddTask)
        recyclerViewTasks = findViewById(R.id.recyclerViewTasks)

        val welcomeMessage = intent.getStringExtra("welcomeMessage") ?:
"Welcome"
        textViewWelcome.text = welcomeMessage

        // Setup Spinner
        ArrayAdapter.createFromResource (
```

```

        this,
        R.array.filter_options,
        android.R.layout.simple_spinner_item
    ).also { adapter ->

    adapter.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item)
    spinnerFilter.adapter = adapter
}

// Setup RecyclerView
recyclerViewTasks.layoutManager = LinearLayoutManager(this)
adapter = TaskAdapter(tasks)
recyclerViewTasks.adapter = adapter

// Setup Button Click Listener
buttonAddTask.setOnClickListener {
    val taskDescription = editTextTask.text.toString()
    if (taskDescription.isNotEmpty()) {
        val task = Task(taskDescription)
        tasks.add(task)
        adapter.notifyDataSetChanged()
        editTextTask.text.clear()
    }
}

// Setup Spinner Item Selected Listener
spinnerFilter.onItemSelectedListener = object : AdapterView.OnItemSelectedListener {
    override fun onItemSelected(parent: AdapterView<*>, view: View?, position: Int, id: Long) {
        filterTasks(parent.getItemAtPosition(position) as String)
    }

    override fun onNothingSelected(parent: AdapterView<*>) {}
}
}

private fun filterTasks(filter: String) {
    val filteredTasks = when (filter) {
        "Completed" -> tasks.filter { it.isCompleted }
        "Incomplete" -> tasks.filter { !it.isCompleted }
        else -> tasks
    }
    adapter = TaskAdapter(filteredTasks)
    recyclerViewTasks.adapter = adapter
}
}

```

```

<!-- res/layout/activity_todo_list.xml -->
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"

```

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

<TextView
    android:id="@+id/textViewWelcome"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:textSize="24sp"
    android:layout_marginBottom="16dp" />

<Spinner
    android:id="@+id/spinnerFilter"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:entries="@array/filter_options" />

<EditText
    android:id="@+id/editTextTask"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Enter new task" />

<Button
    android:id="@+id/buttonAddTask"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Add Task" />

<androidx.recyclerview.widget.RecyclerView
    android:id="@+id/recyclerViewTasks"
    android:layout_width="match_parent"
    android:layout_height="0dp"
    android:layout_weight="1"
    android:layout_marginTop="16dp" />
</LinearLayout>
```