

Lab 4: Flutter Fundamentals - UI Design

Lab Overview

In this lab, you'll create your first Flutter application and learn about Flutter's core widgets, rendering model, and hot reload.

Lab Objectives

By the end of this lab, you should be able to:

- Create and run your first Flutter application
- Understand Flutter's widget tree and rendering model
- Use core Flutter widgets: Text, Icon, Image, Container, Card
- Implement layout widgets: Column, Row, Stack, Expanded, Padding
- Style widgets with colors, typography, and Material Design
- Load and display images from assets and network
- Utilize hot reload for rapid UI development
- Build responsive layouts that adapt to different screen sizes

Tip Calculator (Guided Tutorial)

- 1) Create a New Flutter Project
- 2) Open your terminal or command prompt.
- 3) Run the command to create a new Flutter project named `tip_app`
 - `flutter create tip_app` .
- 4) Alternatively, you can use the IDE to create the project by using the following steps I. Open VS Code.
 - Press **Ctrl + Shift + P** (or **Cmd + Shift + P** on Mac) to open the command palette.
 - In the command palette, type **Flutter: New Project** and select it.
 - Choose Flutter Application and the location where you want to save your project.
 - Enter a name for your project (e.g., `tip_app`), and press Enter.
- 5) **Open the Project**
- 6) Navigate to the project directory and open it in your preferred IDE (e.g., VS Code, Android Studio).
- 7) **Run the app**
 - Ensure you have an emulator or a physical device connected.
 - Run the app to verify that everything is set up correctly.
- 8) **Explore the Project Structure**
 - Familiarize yourself with key files and directories:

- lib/main.dart: Entry point of the application.
- pubspec.yaml: Manages project dependencies and assets.
- android, ios: Platform-specific code.

9) Create lib/tip_calculator.dart file and implement **TipCalculator** as a stateful widget having a Scaffold with an AppBar and a body section. The screen design is shown in figure 1.

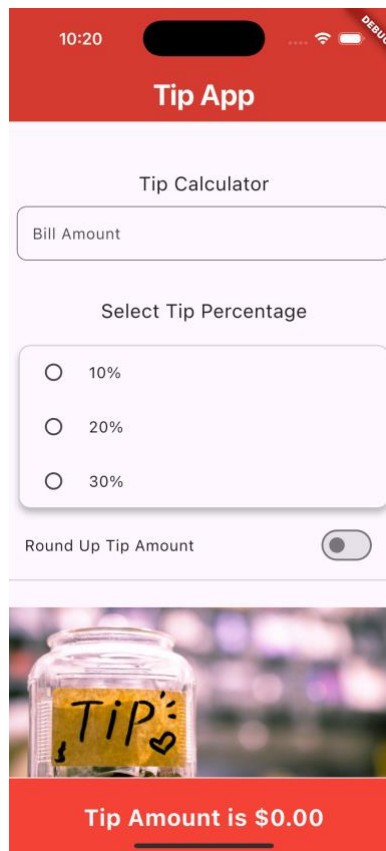


Figure 1 : Tip Calculator

App Features

1. **AppBar**
 - Title: *Tip App*.
 - Red background with white text.
2. **Main Content**
 - A header text: *Tip Calculator*.
 - A text field to enter the bill amount (numeric input only).
3. **Tip Percentage Selection**
 - A labeled section: *Select Tip Percentage*.
 - Three options: **10%**, **20%**, **30%**.
 - The user can select only one option (radio buttons).

4. **Round Tip Toggle**

- A switch labeled *Round Up Tip Amount*.
- When turned ON, the app will round the tip amount **up to the next whole number**.

5. **Calculate Button**

- A large, rounded, red button labeled *Calculate*.
- When pressed, it computes the tip and updates the display.

6. **Bottom Result Bar**

- A red bar fixed at the bottom of the screen.
 - Displays the result in white bold text:
 - Example: *Tip Amount is \$12.00*
 - The value updates when the user enters a new bill, changes the percentage, or toggles rounding and presses *Calculate*.
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Example Behavior

- Bill amount: **101**
- Tip percentage: **10%**
- Round Up: **ON**
- Calculation: $101 \times 10\% = 10.1 \rightarrow \text{rounded up} = 11$
- Total = $101 + 11 = 112$
- Result bar shows: **Tip Amount is \$112.00**