Unit Converter App - Complete Documentation

1. Project Overview

App Name

Unit Converter Pro (or choose your preferred name)

Description

A simple, fast, and offline unit converter app that helps users convert between different units of measurement across multiple categories.

Target Platform

- Android (Google Play Store)

- Minimum SDK: API 21 (Android 5.0)

- Target SDK: API 34 (Android 14)

App Type

Utility/Tools

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2. Features & Functionality

Core Features

1. **Multiple Conversion Categories**
   - Length (meters, km, miles, feet, inches, cm, mm)

   - Weight (kg, grams, pounds, ounces, tons)

   - Temperature (Celsius, Fahrenheit, Kelvin)

   - Volume (liters, ml, gallons, cups, fluid ounces)

   - Area (sq meters, sq feet, acres, hectares)

   - Speed (km/h, mph, m/s, knots)

2. **Real-time Conversion**
   - Instant results as user types

   - High precision calculations

   - Support for decimal values

3. **User-Friendly Interface**

- Clean, modern Material Design

- Easy unit selection with dropdowns

- Swap button to reverse conversion

- Clear button to reset values

4. **Additional Features**
    - Recent conversions history

    - Favorite conversions quick access

    - Dark mode support

    - Completely offline (no internet required)

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3. Technical Architecture

Technology Stack

- **Framework**: Flutter 3.x

- **Language**: Dart

- **State Management**: Provider

- **Local Storage**: shared_preferences

- **Design**: Material Design 3

Project Structure

```
lib/
├── main.dart
├── models/
│   ├── conversion_category.dart
│   ├── unit.dart
│   └── conversion_history.dart
├── providers/
│   ├── conversion_provider.dart
│   └── theme_provider.dart
├── screens/
│   ├── home_screen.dart
│   ├── conversion_screen.dart
│   ├── history_screen.dart
│   └── about_screen.dart
├── widgets/
│   ├── category_card.dart
│   ├── unit_dropdown.dart
```

```
|   ├───── conversion_input.dart
|   └───── history_item.dart
├───── utils/
|   ├───── conversion_logic.dart
|   └───── constants.dart
└───── theme/
    └───── app_theme.dart
```

Key Dependencies (pubspec.yaml)

```yaml
dependencies:
  flutter:
    sdk: flutter
  provider: ^6.1.1
  shared_preferences: ^2.2.2
  google_fonts: ^6.1.0
  flutter_launcher_icons: ^0.13.1
```

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4. Conversion Logic

Length Conversions

Base unit: Meter

- 1 km = 1000 m

- 1 mile = 1609.34 m

- 1 foot = 0.3048 m

- 1 inch = 0.0254 m

- 1 cm = 0.01 m

- 1 mm = 0.001 m

Weight Conversions

Base unit: Kilogram

- 1 gram = 0.001 kg

- 1 pound = 0.453592 kg

- 1 ounce = 0.0283495 kg

- 1 ton = 1000 kg

Temperature Conversions

- Celsius to Fahrenheit: $(C \times 9/5) + 32$

- Fahrenheit to Celsius: $(F - 32) \times 5/9$

- Celsius to Kelvin: $C + 273.15$

- Kelvin to Celsius: $K - 273.15$

Volume Conversions

Base unit: Liter

- 1 ml = 0.001 L

- 1 gallon (US) = 3.78541 L

- 1 cup = 0.236588 L

- 1 fluid ounce = 0.0295735 L

Area Conversions

Base unit: Square Meter

- 1 sq km = 1,000,000 sq m

- 1 sq foot = 0.092903 sq m

- 1 acre = 4046.86 sq m

- 1 hectare = 10,000 sq m

Speed Conversions

Base unit: Meters per second

- 1 km/h = 0.277778 m/s

- 1 mph = 0.44704 m/s

- 1 knot = 0.514444 m/s

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5. UI/UX Design Guidelines

Color Scheme

Light Mode:

- Primary: ⬤ #2196F3 (Blue)

- Secondary: ⬤ #03A9F4 (Light Blue)

- Background: (⬜ #FFFFFF)
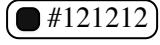
- Surface: (⬜ #F5F5F5)

- Text: (⬛ #212121)

Dark Mode:

- Primary: (🟦 #42A5F5)

- Secondary: (🟦 #29B6F6)

- Background: (⬛ #121212)

- Surface: (⬛ #1E1E1E)

- Text: (⬜ #FFFFFF)

Typography

- Headers: Google Fonts - Poppins (Bold)

- Body: Google Fonts - Roboto (Regular)

- Numbers: System Monospace

Screen Layouts

Home Screen

- App bar with title and settings icon

- Grid view of conversion categories (2 columns)

- Each card shows category icon and name

- Bottom navigation (optional): Home, History, About

Conversion Screen

- App bar with category title and back button

- Input field for value (large, centered)

- "From" unit dropdown

- Swap button (icon)

- "To" unit dropdown

- Result display (large, prominent)

- Clear button

- Optional: Save to favorites button

History Screen

- List of recent conversions

- Each item shows: value, from unit, to unit, result

- Swipe to delete

- Clear all button

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6. Development Phases

Phase 1: Setup (Day 1)

☐ Create Flutter project
☐ Add dependencies to pubspec.yaml
☐ Set up project structure (folders)
☐ Configure app icon and splash screen
☐ Set up Android permissions and configurations

Phase 2: Core Functionality (Days 2-3)

☐ Create data models (Category, Unit)
☐ Implement conversion logic for all categories
☐ Create Provider for state management
☐ Build home screen with category grid
☐ Build conversion screen with input/output

Phase 3: UI Polish (Day 4)

☐ Apply Material Design theme
☐ Add animations and transitions
☐ Implement dark mode
☐ Add input validation
☐ Create custom widgets for reusability

Phase 4: Additional Features (Day 5)

☐ Implement history feature with local storage
☐ Add favorites functionality
☐ Create about/settings screen
☐ Add help/instructions
☐ Implement error handling

Phase 5: Testing & Optimization (Day 6)

☐ Test all conversions for accuracy

☐ Test on different screen sizes

☐ Test dark/light mode switching

☐ Fix bugs and edge cases

☐ Optimize performance

☐ Test offline functionality

Phase 6: Play Store Preparation (Day 7)

☐ Create app icon (512x512)

☐ Take screenshots (4-6 different screens)

☐ Create feature graphic (1024x500)

☐ Write app description

☐ Create privacy policy

☐ Generate signed APK/AAB

☐ Fill Play Store listing

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7. Play Store Requirements

App Assets Needed

App Icon

- Size: 512x512 pixels

- Format: 32-bit PNG

- No transparency

- Design: Simple, recognizable icon with conversion symbol

Feature Graphic

- Size: 1024x500 pixels

- Format: JPG or PNG

- Showcase: App name + key feature visual

Screenshots

- Minimum: 2 screenshots

- Recommended: 4-6 screenshots

- Size: 16:9 or 9:16 aspect ratio

- Show: Main features, different conversion categories, clean UI

Short Description (80 characters max) "Fast & accurate unit converter. Convert length, weight, temperature & more!"

Full Description (4000 characters max)

Unit Converter Pro - Your All-in-One Conversion Tool

Convert units quickly and accurately with our simple, easy-to-use app. Perfect for students, professionals, travelers, and anyone who needs quick conversions.

✨ FEATURES:
- 6 conversion categories with 30+ units
- Real-time conversion as you type
- Offline functionality - no internet required
- Clean, modern interface
- Dark mode support
- Conversion history
- Completely free with no ads

📏 SUPPORTED CONVERSIONS:
- Length: meters, kilometers, miles, feet, inches, and more
- Weight: kilograms, pounds, ounces, grams
- Temperature: Celsius, Fahrenheit, Kelvin
- Volume: liters, gallons, cups, milliliters
- Area: square meters, acres, hectares
- Speed: km/h, mph, m/s, knots

🎯 WHY CHOOSE UNIT CONVERTER PRO?
- Lightning fast conversions
- High precision calculations
- Simple and intuitive design
- Works completely offline
- No annoying ads
- Regular updates

Perfect for:
✓ Students doing homework
✓ Travelers abroad
✓ Cooking and recipes
✓ Construction and DIY projects
✓ Fitness tracking
✓ And much more!

Download now and make conversions easy!

Privacy Policy

You need a privacy policy URL. Create a simple page stating:

- What data you collect (if using shared_preferences, state you store data locally only)

- No data is transmitted to servers

- No personal information collected

- No third-party tracking

Host on: Google Sites, GitHub Pages, or your own website

Content Rating

In Play Console, complete the questionnaire:

- Select "No" for violence, inappropriate content, etc.

- App should be rated "Everyone"

App Category

- Category: Tools

- Tags: converter, unit, calculator, measurement

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8. Code Snippets & Examples

Main App Structure

```dart
void main() {
  runApp(
    MultiProvider(
      providers: [
        ChangeNotifierProvider(create: (_) => ConversionProvider()),
        ChangeNotifierProvider(create: (_) => ThemeProvider()),
      ],
      child: const MyApp(),
    ),
  );
}
```

Conversion Logic Example

```dart
```

```
double convertLength(double value, String fromUnit, String toUnit) {
  // Convert to base unit (meters)
  double meters;
  switch (fromUnit) {
    case 'Meters':
      meters = value;
      break;
    case 'Kilometers':
      meters = value * 1000;
      break;
    case 'Miles':
      meters = value * 1609.34;
      break;
    // Add other cases
  }

  // Convert from base unit to target
  switch (toUnit) {
    case 'Meters':
      return meters;
    case 'Kilometers':
      return meters / 1000;
    case 'Miles':
      return meters / 1609.34;
    // Add other cases
  }
}
```

9. Testing Checklist

Functional Testing

☐ All conversion categories work correctly

☐ Calculations are accurate (test with known values)

☐ Swap button reverses units correctly

☐ Clear button resets all fields

☐ Input accepts decimal values

☐ Large numbers display correctly

☐ Invalid input is handled gracefully

UI Testing

☐ App looks good on small screens (5")

☐ App looks good on large screens (6.5"+)

- [ ] All text is readable
- [ ] Buttons are easily tappable
- [ ] Dark mode works properly
- [ ] Animations are smooth
- [ ] Navigation works correctly

Edge Cases

- [ ] Very large numbers (1,000,000+)
- [ ] Very small numbers (0.000001)
- [ ] Zero values
- [ ] Negative temperatures
- [ ] Same unit conversion (km to km)

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10. Launch Checklist

Pre-Launch

- [ ] All features tested and working
- [ ] App icon looks professional
- [ ] Screenshots showcase key features
- [ ] Privacy policy published online
- [ ] App description is clear and compelling
- [ ] Version number set (1.0.0)
- [ ] Build number incremented

Play Store Submission

- [ ] Create Play Console account ($25 one-time fee)
- [ ] Upload signed AAB (Android App Bundle)
- [ ] Fill all required fields
- [ ] Upload all graphics
- [ ] Set pricing (Free)
- [ ] Select countries/regions
- [ ] Complete content rating
- [ ] Submit for review

Post-Launch

- [ ] Monitor crash reports
- [ ] Respond to user reviews
- [ ] Plan future updates
- [ ] Track downloads and ratings

11. Future Enhancements (v2.0)

Potential features to add later:

- Currency converter with API

- Custom unit creation

- Widget for home screen

- Share conversion results

- Scientific units

- Multiple languages

- Unit conversion formulas display

- Voice input

- Tablet UI optimization

12. Resources & References

Flutter Documentation

- https://docs.flutter.dev/

- https://pub.dev/packages/provider

- https://pub.dev/packages/shared_preferences

Design Resources

- Material Design: https://m3.material.io/

- Google Fonts: https://fonts.google.com/

- Icon packs: https://fonts.google.com/icons

Play Store

- Play Console: https://play.google.com/console

- Policy Center: https://support.google.com/googleplay/android-developer/

Conversion References

- NIST Unit Conversions: https://www.nist.gov/pml/owm

- Unit conversion formulas verification

Contact & Support

Developer: [Your Name] **Email**: [Your Email] **Version**: 1.0.0 **Last Updated**: [Date]

Good luck with your first Play Store app! 🚀