**Flutter Technical Interview Q&A for Beginners**

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## 🔵Flutter Basics

**1. What is Flutter, and how does it work?** Flutter is an open-source UI toolkit by Google used to build natively compiled applications for mobile, web, and desktop from a single codebase. It uses Dart language and works by compiling Dart code to native ARM code. The rendering is done by the Flutter engine using Skia.

**2. What is the difference between StatefulWidget and StatelessWidget?**

- StatelessWidget: UI that doesn't change over time. Used for static content.
- StatefulWidget: UI that can change dynamically. Holds mutable state.

**3. What is a widget in Flutter? Are widgets classes or functions?** A widget is a basic building block of the UI in Flutter. Everything (text, layout, etc.) is a widget. Widgets are Dart classes that extend `Widget`.

**4. What is the widget lifecycle in Flutter?** For StatefulWidgets:

- `createState()`
- `initState()`
- `build()`
- `didUpdateWidget()`
- `dispose()`

**5. What is BuildContext?** BuildContext is a handle to the location of a widget in the widget tree. It allows access to theme, navigator, etc.

**6. Explain hot reload vs hot restart.**

- Hot reload: Injects updated code into the app without losing the state.
- Hot restart: Restarts the app and resets the state.

**7. What is the use of setState()?** `setState()` notifies Flutter that the internal state has changed and the widget needs to be rebuilt.

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## 🔹 Layout & UI

**1. What are common layout widgets in Flutter?** `Container`, `Row`, `Column`, `Stack`, `ListView`, `Expanded`, `Padding`, `SizedBox`, etc.

**2. Difference between Column, Row, Stack, and ListView?**

- `Column`: Vertical arrangement

- `Row`: Horizontal arrangement
- `Stack`: Overlapping widgets
- `ListView`: Scrollable list of widgets

**3. When to use Expanded, Flexible, and Spacer?**

- `Expanded`: Takes available space equally
- `Flexible`: Similar to Expanded but with flexibility to shrink
- `Spacer`: Creates adjustable empty space between widgets

**4. How do you handle responsiveness in Flutter?** Using `MediaQuery`, `LayoutBuilder`, and `Flexible` widgets. Also by using libraries like `flutter_screenutil` or defining relative widths/heights.

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## 🔹 Navigation & Routing

**1. How do you navigate between screens in Flutter?** Using `Navigator.push()` or `Navigator.pushNamed()`

**2. Difference between push, pushReplacement, and pushNamed?**

- `push`: Pushes a new screen on top
- `pushReplacement`: Replaces the current screen
- `pushNamed`: Uses route names defined in `MaterialApp`

**3. What is Navigator.pop() used for?** Used to go back to the previous screen.

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## 🔹 State Management (Basic level)

**1. What is state management? Why is it important?** It refers to managing the data/state of the app and how it changes over time. It helps keep the UI in sync with the data.

**2. Explain Provider or any other state management you've used.** `Provider` is a wrapper around InheritedWidget and is used to expose and listen to changes in state efficiently.

**3. How do you pass data between widgets?**

- Via constructor parameters (top-down)
- Using state management solutions like Provider, Riverpod

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## 🔹 Asynchronous Programming

**1. What is async and await in Dart?** `async` marks a function as asynchronous. `await` pauses the execution until the future is complete.

**2. How does a Future work?** A `Future` represents a potential value or error that will be available at some time in the future.

**3. What is a Stream and when would you use it?** A `Stream` provides a sequence of asynchronous events. Useful for real-time data, like listening to user input or socket data.

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## 🔹 Others

**1. What is pubspec.yaml used for?** It manages dependencies, assets, fonts, and other metadata for the Flutter project.

**2. How do you add assets like images and fonts in a Flutter app?**

- Add assets to the folder (e.g., `assets/images`)
- Declare them in `pubspec.yaml`

```
flutter:
  assets:
    - assets/images/
  fonts:
    - family: MyFont
      fonts:
        - asset: fonts/MyFont.ttf
```

**3. What are some commonly used Flutter packages?**

- `http`
- `provider`
- `flutter_bloc`
- `shared_preferences`
- `firebase_core`, `firebase_auth`, `cloud_firestore`

**4. What is the difference between hot reload and full restart?**

- Hot reload: Retains state, only updates code
- Full restart: Rebuilds app from scratch, clears state

**5. Explain the role of main() function in a Dart program.** `main()` is the entry point of a Dart/Flutter app. It's the first function that gets called when the app starts.

```
void main() {
  runApp(MyApp());
}
```