

Responsive Widgets in Flutter

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1. **LayoutBuilder**

Adapts the layout based on the available space.

```
dart
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LayoutBuilder(
  builder: (context, constraints) {
    if (constraints.maxWidth < 600) {
      return Text('Mobile View');
    } else {
      return Text('Tablet/Desktop View');
    }
  },
)
```

2. **MediaQuery**

Gives you information about the screen size and orientation.

```
dart
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double screenWidth = MediaQuery.of(context).size.width;
double screenHeight = MediaQuery.of(context).size.height;

Container(
  width: screenWidth * 0.8,
  height: screenHeight * 0.2,
  color: Colors.blue,
)
```

3. **Flexible and Expanded**

Adjusts the size of child widgets within a **Row** or **Column**.

```
dart
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Row(
  children: [
    Expanded(
      child: Container(color: Colors.red),
    ),
    Flexible(
      child: Container(color: Colors.green),
    ),
  ],
)
```

```
),  
],  
)
```

4. FittedBox

Scales and positions the child widget to fit within its parent.

```
dart  
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FittedBox(  
  fit: BoxFit.contain,  
  child: Text('Responsive Text'),  
)
```

5. AspectRatio

Maintains a fixed aspect ratio for the child widget.

```
dart  
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AspectRatio(  
  aspectRatio: 16 / 9,  
  child: Container(color: Colors.blue),  
)
```

6. FractionallySizedBox

Sets the size as a fraction of its parent's size.

```
dart  
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FractionallySizedBox(  
  widthFactor: 0.5,  
  heightFactor: 0.3,  
  child: Container(color: Colors.orange),  
)
```

7. Responsive GridView (Using `flutter_staggered_grid_view`)

For responsive grid layouts.

```
dart  
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import 'package:flutter_staggered_grid_view/flutter_staggered_grid_view.dart';  
  
StaggeredGridView.countBuilder(  
  crossAxisCount: 4,  
  itemCount: 8,  
  itemBuilder: (context, index) => Container(  
    color: Colors.teal,
```

```

        child: Center(child: Text('$index')),
      ),
      staggeredTileBuilder: (int index) => StaggeredTile.fit(2),
    )
  )

```

8. Wrap

Automatically wraps child widgets to the next line.

```

dart
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Wrap(
  spacing: 8.0,
  runSpacing: 4.0,
  children: List.generate(10, (index) {
    return Chip(label: Text('Item $index'));
  }),
)

```

🌟 Third-Party Responsive Libraries

1. Responsive Framework

```

yaml
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dependencies: responsive_framework: ^0.1.0

```

1. Usage:

```

dart
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ResponsiveWrapper.builder(
  ClampingScrollWrapper.builder(context, MyHomePage()),
  breakpoints: [
    ResponsiveBreakpoint.resize(350, name: MOBILE),
    ResponsiveBreakpoint.autoScale(600, name: TABLET),
    ResponsiveBreakpoint.resize(800, name: DESKTOP),
  ],
)

```

1. Sizer

```

yaml
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dependencies: sizer: ^2.0.15

```

1. Usage:

```

dart
CopyEdit
Text(

```

```
'Responsive Text',  
style: TextStyle(fontSize: 20.sp),  
)
```

1. ScreenUtil

```
yaml  
CopyEdit  
dependencies:flutter_screenutil: ^5.5.4
```

1. Usage:

```
dart  
CopyEdit  
ScreenUtilInit(  
  designSize: const Size(360, 690),  
  builder: (context, child) => MaterialApp(  
    home: Scaffold(  
      body: Container(  
        width: 100.w,  
        height: 50.h,  
      ),  
    ),  
  ),  
);
```

Best Practices for Responsiveness

1. **Use Adaptive Widgets:** Like `AdaptiveContainer` and `AdaptiveText`.
2. **Avoid Hardcoded Sizes:** Use relative sizing with `MediaQuery` or packages like `Sizer`.
3. **Dynamic Font Sizes:** Scale fonts using screen dimensions.
4. **Test on Multiple Devices:** Use emulators and real devices of various sizes.