



Low Level Design Document

Introduction

This Low Level Design (LLD) document outlines the core components and implementation details for **MediaQueryLab - Responsive Design Tester**. The project is a React-based playground for testing and visualizing CSS media queries and responsive layouts, utilizing Tailwind CSS.

1. System Components

Component Name	Description	Key Responsibilities
App	Root component	Layout, routing, state management
QueryEditor	Code editor for CSS media queries	Input, validation, state updates
PreviewPane	Displays responsive layout preview	Renders user content, applies CSS
DeviceToolbar	Device/frame size selection	Updates preview size, presets
LayoutSelector	Selects example layouts	Loads predefined layouts
ErrorBanner	Displays error messages	Shows validation/runtime errors

2. Class/Interface Overview

Component/Class	Props/State (Key)	Relationships
App	layout, query, device	Parent of all components
QueryEditor	value, onChange, error	Child of App
PreviewPane	layout, query, device	Child of App
DeviceToolbar	selectedDevice, onSelect	Child of App
LayoutSelector	selectedLayout, onSelect	Child of App
ErrorBanner	message	Child of App

Key Methods/Attributes Example:

```
// QueryEditor
props: { value, onChange, error }
handleInputChange(newValue): void

// DeviceToolbar
props: { selectedDevice, onSelect }
handleDeviceSelect(device): void
```



3. Data Structure Overview

Model/Schema	Fields/Attributes	Description
DevicePreset	id, name, width, height	Device/frame size options
LayoutExample	id, name, html, tailwindClasses	Predefined layout templates
MediaQuery	queryString	User-defined CSS media query
AppState	layout, query, device, error	Main application state

4. Algorithms/Logic

Preview Rendering Flow:

```
On QueryEditor change:
  Validate CSS media query
  If valid:
    Update AppState.query
    Rerender PreviewPane with new query
  Else:
    Set AppState.error

On DeviceToolbar select:
  Update AppState.device
  Rerender PreviewPane with new device size

On LayoutSelector select:
  Update AppState.layout
  Rerender PreviewPane with new layout
```

5. Error Handling

Scenario	Handling Approach
Invalid CSS media query	Show error in ErrorBanner
Unsupported device size	Fallback to default device
Layout loading failure	Show error, revert to previous layout
Editor input errors	Highlight input, display error message

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