UNIVERSITY OF BUEA

FACULTY OF ENGINEERING AND TECHNOLOGY

Department of Computer Engineering

SafePath

CEF 440:

INTERNET PROGRAMMING AND MOBILE PROGRAMMING

Task 5 Report — UI Design and Implementation

Project Title: Design and Implementation of a Road Sign and Road State Mobile Notification Application (SafePath)

GROUP 1 MEMBERS	MATRICULE
ARREY-TABOT PASCALINE	FE22A151
TANUI NORBERT TANGIE	FE22A306
OROCKTAKANG MANYI	FE22A293
NGATTA GEORGE TABOT	FE22A259
FOMECHE ABONGACHU SIDNEY	FE22A218

CONTENTS

1. App Identity

1.1 App Name & Mission

- **App Name:** SafePath
- **Mission Statement:** "Real-time insights for smarter driving and safer roads"

1.2 Purpose & Target Audience

- **Purpose:**
  SafePath is a mobile application designed to deliver notifications about road signs, traffic conditions, and emergency updates. By combining a comprehensive road-sign library with location-based alerts, SafePath helps drivers make informed decisions, avoid hazards, and contribute insights back to the community.
- **Target Audience:**
  - Individual drivers (personal vehicles, ride-share drivers)
  - Commuters (bus/taxi users, bikers)
  - Road safety personnel (traffic officers, transportation agencies)
  - General road users in urban and semi-urban regions

1.3 Core Functional Requirements

These core features guide both the UI design and the eventual frontend implementation:

1. **Interactive Road Sign Library**
   - Displays an organized collection of common and region-specific road signs
   - Each sign entry includes an icon, name, and textual explanation
2. **Personalized Notifications Based on Location**
   - Users can opt in to receive alerts tailored to their current GPS location or frequently traveled routes
3. **Traffic Updates**
   - Displays live traffic data (e.g., slowdowns, accidents) on a map or as a feed
4. **Location-Based Integration**
   - Utilizes device GPS (minimum) or full-location services (optimal)
   - Ensures alerts are relevant to the user's current or planned route
5. **Data Collection & Analytics**
   - Gathers anonymized feedback from users on sign visibility or hazard accuracy
6. **Nearby Petrol Stations Notifications**

- Uses geofencing to notify drivers when they approach a petrol station.

7. **User Feedback Mechanism**
    - "Report Issue" or "Suggest Edit" button on each sign/alert

1.4 App Structure & Sections

SafePath's UI is organized into **four primary sections** to streamline user navigation and functionality:

1. **Home**
    - Overview dashboard with quick access to the road sign library, trending alerts, and search
    - Map preview showing nearby alerts
    -
2. **Alerts / Notifications**
    - Chronological feed of all active alerts (traffic, weather, closures)
    - Filter by type (Traffic, Weather, Emergency)
    - Color-coded cards:
        - Red (High-Risk Alerts)
        - Orange (Moderate Hazards)
        - Green (Clear/Informational)
        -
3. **Report Incident / Emergency Contact**
    - A contribution interface where users can submit new hazards or incorrect/missing signs
    - Option to attach a photo, select sign category, and add descriptive text
    - Emergency contact buttons (e.g., local traffic helpline, towing services)
    -
4. **Settings / User Profile**
    - Profile information (name, email, vehicle preferences)
    - Notification preferences (toggle switches for each alert type)
    - Dark mode / Light mode toggle
    - Feedback & app-support links
    - Logout / Account deletion

2. Visual Design

2.1 Brand Identity & Logo

- **Logo Space:** Placeholder reserved in all mockups (to be inserted once finalized).
- **Logo Font:** Quicksand (used exclusively for logo lettering to convey modernity).
- **Primary Typeface:** Poppins (selected for its rounded letterforms, high legibility at small sizes, and friendly, modern feel)

2.2 Color Scheme & Psychology

SafePath's palette is grounded in **safety**, **calm**, and **trust**, while maintaining high contrast for readability—especially important for drivers using the app outdoors.

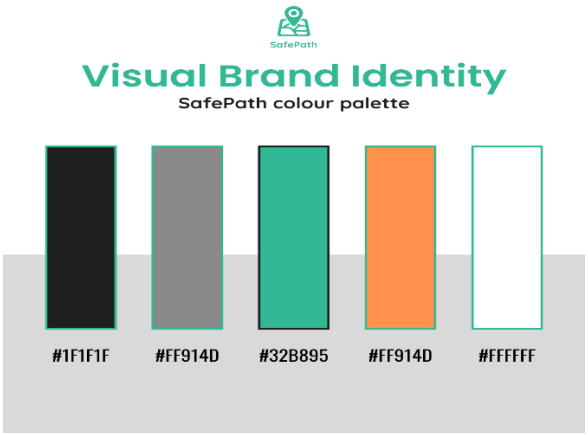
Role	Color Name	Hex Code	Usage & Psychological Rationale
SafePath Identity Green	SafePath Green	#32B895	• Represents growth, balance, Promotes calmness and trust, reducing driver stress.safety. •Green is associated with "go" signals (positive, reassuring).
White / Light background	Pure White	#FFFFFF	Gives the App a Modern Clean Look
BLACK	Charcoal Black	#000000	• Background for most screens (clean, minimal distractions). Enhances contrast with text/icons.

Role	Color Name	Hex Code	Usage & Psychological Rationale
Dark Mode Background and Texts	Dark Grey	#1F1F1F	Maintains readability and reduces eye strain in low-light. Conveys sophistication and focus.
Accent Orange	Warm Orange	#FF914D	Used sparingly for secondary CTAs (e.g., "Submit Report"). Orange evokes energy, visibility, and caution, without the alarm of red.
Alert Red	Critical Red	#E53935	Reserved for high-severity alerts (accidents, closures). Instantly grabs attention due to its association with danger.

Color Psychology Note:

- **Green (#32B895):** Studies show green reduces visual fatigue and is perceived as trustworthy—ideal for building driver confidence.
- **White (#FFFFFF):** Suggests openness and clarity; maximum contrast with green or dark elements.
- **Dark (#1F1F1F):** Feels authoritative and helps UI elements "pop" in dark mode, reducing glare at night.
- **Orange (#FF914D):** A friendlier "attention" color—less aggressive than red, signaling users to proceed with caution but not panic.
- **Red (#E53935):** Universally recognized as a symbol of danger or stop—used only when absolute immediacy is required.

(Refer to attached Brand Identity screenshot for full palette visualization.)

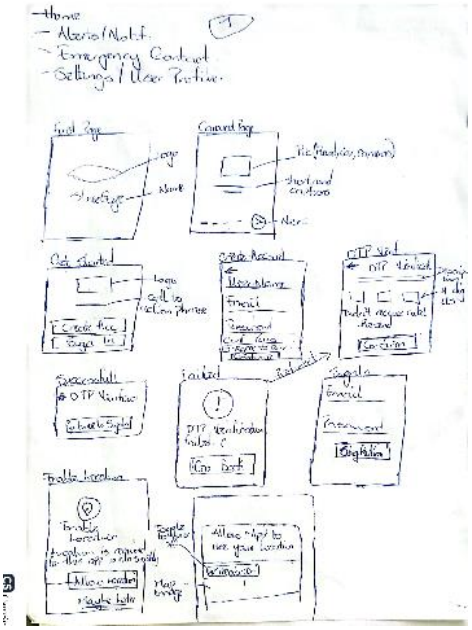


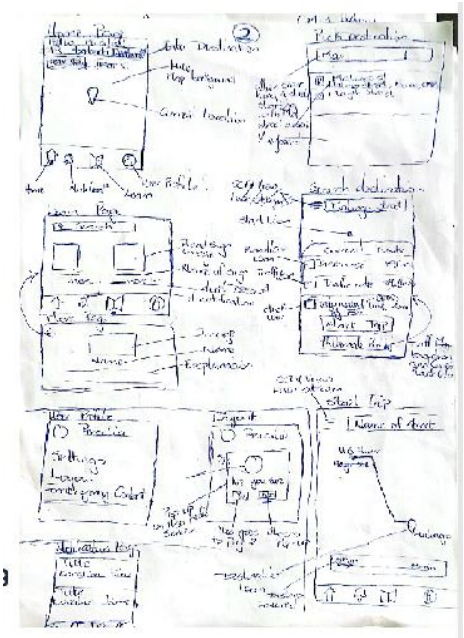
2.3 Typography & Iconography

- **Poppins (Primary Font):**
  - Headings: Poppins Bold, 18–24pt
  - Subheadings: Poppins SemiBold, 16–18pt
  - Body Text: Poppins Regular, 14–16pt
  - Captions: Poppins Light, 12–14pt
- **Quicksand (Logo Only):**
  - Used at 32–48pt on splash and onboarding screens for brand name.
- **Iconography:**
  - All icons are custom-designed or sourced from a consistent vector set (e.g.,Canva) and optimized as SVG files for crispness on Retina/HD screens.
  - Road sign icons: high-contrast white silhouette on green circular backgrounds (default), switching to black-on-white in light mode.
  - Action icons (home, alerts, report, settings) use minimalist line-art style in black or white, depending on background.

2.4 Low-Fidelity Wireframes

Before moving into high-fidelity mockups, **low-fidelity wireframes** were sketched to validate layout, user flow, and screen hierarchy. These sketches were done on paper and then scanned or photographed into Canva as reference layers.





Each wireframe prioritized:

- **Touch Targets & Spacing:** Ensuring all buttons meet the 44×44pt minimum for tappable areas.
- **Logical Flow:** Minimizing taps from Home → Alert details or Home → Report screen.
- **Information Hierarchy:** Placing the most critical information (e.g., active alerts) "above the fold."
- **Clarity:** Using simple rectangles and labels (e.g., "Icon," "Title," "CTA") to map out each screen's skeletal structure.

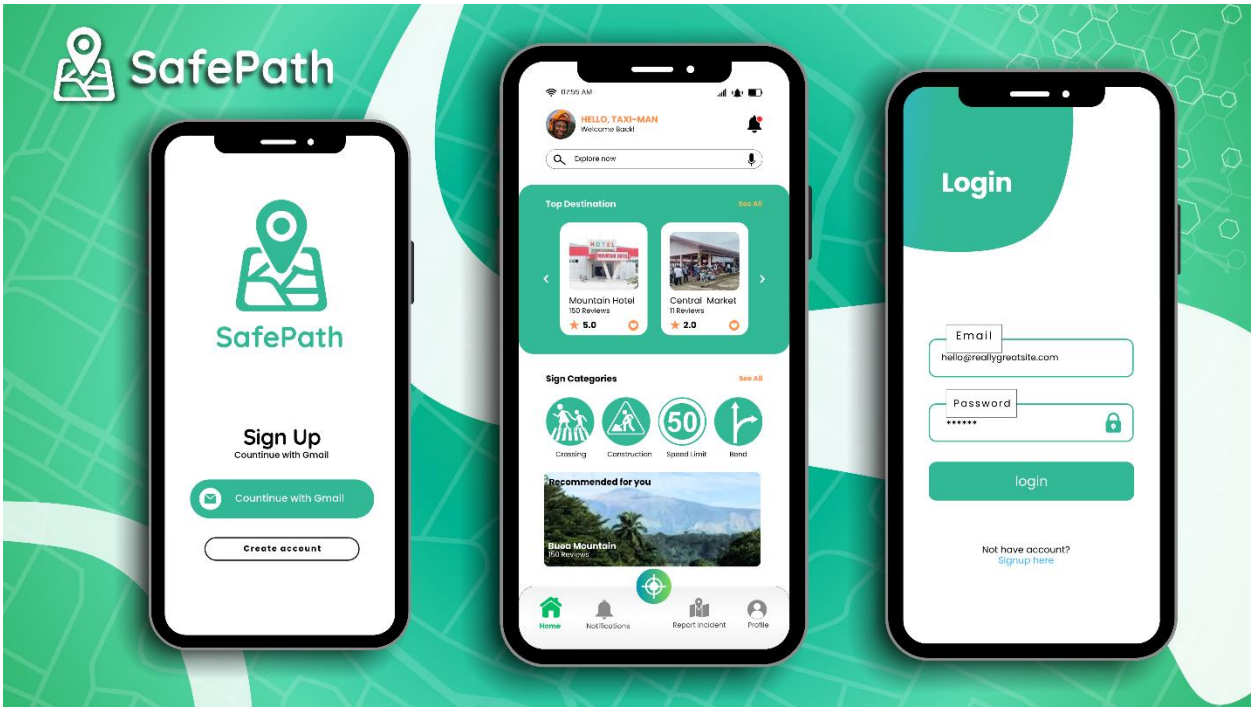
2.5 High-Fidelity Interface Screens

Using the color palette, typography, and iconography guidelines above, the following key screens were designed in Figma (with some initial mockups created in Canva for rapid iteration):

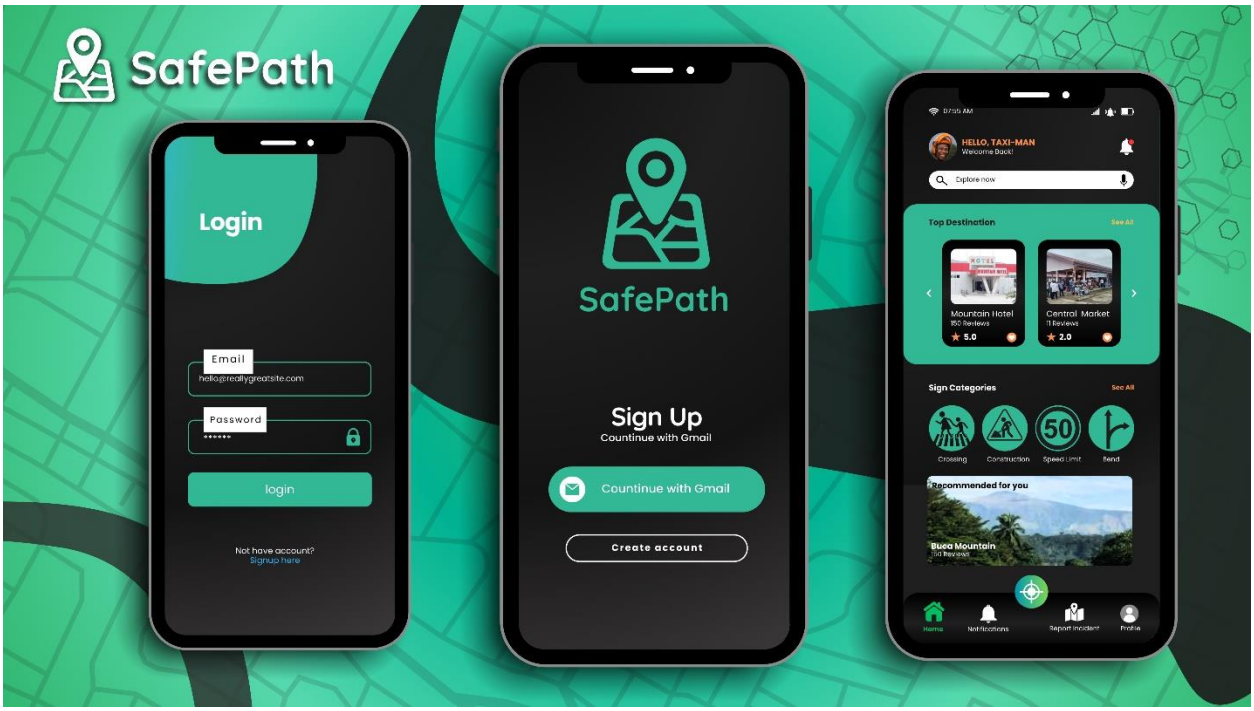
A consistent icon set was used to represent:

- Road sign categories (e.g., Stop, No Entry, Speed Limit)
- Navigation (home, alert, settings)
- Alerts (⚠, 🚧, ⛔)

Icons are vector-based and optimized for high-resolution mobile screens.



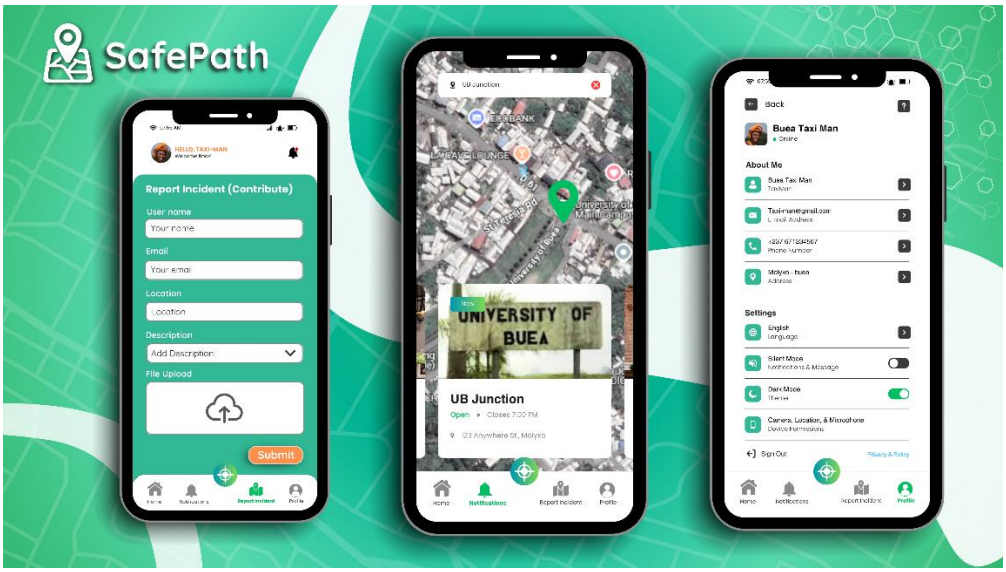
1. **Splash Screen**
    - **Background:** SafePath Green (#32B895)
    - **Logo Placeholder:** Centered Quicksand text (“SafePath”) in white
2. **Onboarding Screen**
    - **Layout:** 3-panel carousel
        1. “Explore Interactive Road Signs” (icon + short description)
        2. “Receive Real-Time Alerts” (map snippet + text)
        3. “Report Incidents Instantly” (camera icon + text)
    - **Background:** White
    - **Primary CTA Button:** “Get Started” (Green fill, white Poppins Semibold text)
    - **Secondary Link:** “Skip” (Text-only, Poppins Regular, Dark)
3. **Home / Dashboard**
    - **Top Bar:**
        - Left: Hamburger menu icon (Dark)
        - Center: “SafePath” (Poppins Bold, 18pt, White on Green background)
        - Right: Location icon (Dark)
    - **Search Bar:**
        - Placeholder: “Search road signs or locations…” (Poppins Regular, 14pt, Dark)
        - Background: White, with subtle light-gray border (#E0E0E0)
    - **“Quick Access” Section:**
        - Four circular icons (Home, Alerts, Report, Profile), each with a label (Poppins Regular, 12pt)
        - Icon backgrounds: White circles with Dark icon, subtle shadow
    - **“Latest Alerts” Feed:**
        - Cards stacked vertically, each 16pt margin apart
        - Color-coded left border:
            - Red for High Risk, Orange for Caution, Green for Informational
        - Card Content:
            - Icon (e.g., traffic cone), Title (Poppins SemiBold, 16pt), Subtitle (Poppins Regular, 14pt), Time stamp (Poppins Light, 12pt)

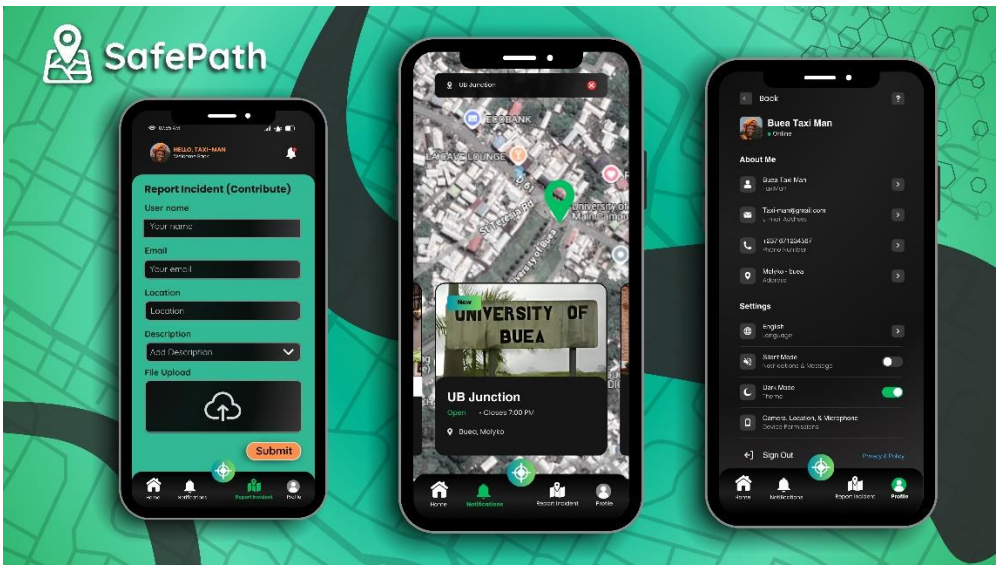


4. **Alerts / Notifications Screen**
    - **Tab Bar:**
        - "All," "Traffic," "Weather," "Road Signs" (Poppins Medium, 14pt)
        - Active tab underline: SafePath Green
    - **Alert Card Example:**
        - Header: "Accident on Main St." (Poppins Bold, 16pt, Red left border)
        - Body: Short description (Poppins Regular, 14pt)
        - "View Details" link (Poppins Medium, 14pt, Green)
5. **Report Incident / Emergency Contact Screen**
    - **Top Section:**
        - Instruction: "Tap to Submit a New Incident" (Poppins Regular, 14pt, Dark)
        - Camera Icon button (Circle, Orange background, white icon) to attach photo
    - **Form Fields:**
        - Dropdown: Select Sign Type (Speed Limit, Stop, Construction, etc.)
        - Text Input: "Describe the issue…" (Poppins Regular, 14pt)
        - Location Button: "Use Current Location" (Green fill, white text)
    - **Submit Button:**
        - "Submit Report" (Orange fill, Poppins Semibold, 16pt)
6. **Settings / User Profile Screen**
    - **Profile Header:**
        - Circular avatar placeholder

- Name (Poppins SemiBold, 18pt)
- Email (Poppins Regular, 14pt)

- **Toggle List:**
  - “Traffic Alerts” (Poppins Regular, 16pt) — Toggle switch on/off
  - “Weather Alerts” (Poppins Regular, 16pt) — Toggle switch on/off
  - “Road Sign Updates” (Poppins Regular, 16pt) — Toggle switch on/off
  - “Dark Mode” (Poppins Regular, 16pt) — Toggle switch on/off (switches background to Charcoal Black)
- **Feedback & Support:**
  - “Send Feedback” (List item with right arrow)
  - “Help & FAQ” (List item with right arrow)
  - “Log Out” (Poppins Medium, 16pt, Red text)





2.6 Tools & Rationale

- **Figma:**
  - **Why Figma?**
    - Industry-standard for UI/UX design and prototyping.
    - Real-time collaboration (if teammates join).
    - Easy export of design assets (SVG, PNG) for Flutter.
    - Built-in “Prototype” mode to simulate app navigation.
- **Canva:**
  - **Why Canva?**
    - Rapid mockup creation for stakeholders who prefer quick visual previews.
    - Large repository of mobile templates, icons, and illustrations.
    - Easy to export high-quality PNGs for inclusion in presentations or initial style explorations.
  - **Usage:**
    - Initial concept screens (Splash, Onboarding) to finalize high-level layout.
    - Color palette presentations (as shown in the Brand Identity slide).
- **Low-Fidelity Sketches → Figma Vectorization:**
  - Sketched wireframes on paper.
  - Imported into Figma as a semi-transparent guide layer.
  - Built hi-fidelity components (buttons, cards, icons) on top, ensuring pixel-perfect alignment.

3. Frontend Implementation

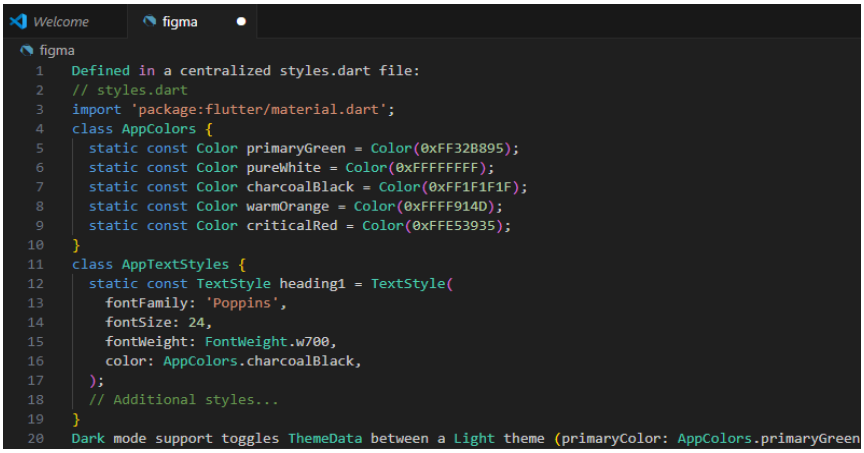
3.1 Chosen Framework: Flutter

- **Cross-Platform Support:**
  - A single Dart codebase outputs native ARM binaries for both iOS and Android—maximizing reach with minimal duplication.
- **UI-Centric Architecture:**
  - Flutter's widget-based system aligns perfectly with our Figma component-driven design—each UI element (e.g., Container, Text, IconButton) has a direct counterpart in the design.
- **Hot Reload:**
  - Immediate preview of design changes accelerates development—critical for someone learning as they build.
- **Package Ecosystem:**
  - Prebuilt packages for maps (google_maps_flutter), geolocation (geolocator), notifications (firebase_messaging or flutter_local_notifications), and HTTP calls (http or dio) allow us to focus on core features rather than plumbing

3.2 Asset Preparation & Export

- **Icons & Illustrations:**
  - All icons were exported from Figma and canva as SVGs (for minimal file size) and converted to Flutter-compatible icon fonts (using flutter_svg when needed).
  - PNG versions (2×, 3×) exported for any bitmapped images (e.g., location illustrations).

- **Color Variables & Text Styles:**



3.3 Widget Hierarchy & Screen Implementation (Moved to Task 7)

Conclusion

The UI design of SafePath application was developed to be clean, intuitive, and visually aligned with the purpose of delivering important road-related notifications to users in a fast, recognizable format. The use of yellow as a primary color, supported by clear iconography and structured layouts, ensures both functionality and aesthetic appeal. The design is ready for frontend integration and subsequent testing.

[Appendix]

Canva Prototype Link

Logo and Mockup

https://www.canva.com/design/DAGo2V1dWA4/NIgD7285J3NARIGke9FfSA/edit?utm_content=DAGo2V1dWA4&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

User Interface Pages

https://www.canva.com/design/DAGo2hpH3Zo/1Bw5qMKnsGqdUjWIksmTtw/edit?utm_content=DAGo2hpH3Zo&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton