



# Affordmed URL Shortener Web Application – Design & Implementation Document



## Project Overview

This project is a **React-based URL Shortener** web app developed as part of the Affordmed Campus Hiring Evaluation. It allows users to shorten URLs, optionally set custom shortcodes and expiry times, and view detailed statistics of link usage—all using client-side storage and logic. The app is responsive and styled with Material UI.

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## Tech Stack

Layer	Technology	Purpose
Frontend	<b>React (v19)</b>	Component-based SPA
UI Library	<b>Material UI (MUI)</b>	Responsive and styled UI components
Routing	<b>React Router (v7)</b>	Page navigation and redirection
State/Storage	<b>LocalStorage</b>	Client-side URL persistence
Logging	<b>Custom Middleware</b>	Logs actions (SHORTEN, REDIRECT)
Unique IDs	<b>uuid</b>	For generating log keys

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## Folder & File Structure

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affordmed-url-shortener/

└─ public/

| └─ index.html

└─ src/

| └─ components/

| | └─ HomePage.jsx // Main URL shortener UI

| | └─ StatsPage.jsx // View analytics for all links

| | └─ RedirectPage.jsx // Redirect logic + logging

| └─ utils/

| | └─ logger.js // Custom log middleware using localStorage

| | └─ helpers.js // Utility functions (URL validation, shortcode gen)

| └─ App.jsx // Routing setup

| └─ index.js // Entry point

| └─ styles.css // Basic global styles

└─ package.json

└─ README.md

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## Core Features

### URL Shortening

- Users can input up to **5 URLs at once**.
- Optionally specify:
  - **Custom shortcode** (alphanumeric, unique)
  - **Expiry time** in minutes (defaults to 30 if not given)
- The short URL is generated in the form:

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<http://localhost:3000/abcde>

### Redirection

- Visiting the short URL via the browser will:
  - Check expiry.
  - Log timestamp, referrer source, and location (dummy as “India”).
  - Redirect to the original long URL.
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### Statistics

- Lists all URLs created so far.
- Displays:
  - Short URL, expiry, creation time
  - Number of times the URL has been clicked
  - Click logs: timestamp, source, location
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### Error Handling

- Invalid URLs are flagged before processing.
  - Duplicate shortcodes trigger an error message.
  - Expired URLs won't redirect and instead show an alert.
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## Design Decisions

Area	Choice
State Management	<b>useState, localStorage</b> for simplicity (no backend required)
Logging	Custom logMiddleware() using uuid and localStorage
URL Validation	Native URL constructor wrapped in try-catch
Shortcode Generation	Random base-36 string (Math.random().toString(36))
Redirection Safety	Date comparison for expiry + client-side redirects using window.href
Click Insights	Collected using document.referrer and hardcoded location

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## Routing Strategy

Route	Pattern	Component	Purpose
/		HomePage	Add and shorten URLs
/stats		StatsPage	View analytics of all created links
/:shortcode		RedirectPage	Handle redirect with logging

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## How to Run the Project

### 1. Clone the Repo

bash

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```
git clone <your-repo-url>
```

```
cd affordmed-url-shortener
```

### 2. Install Dependencies

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```
npm install
```

### 3. Start the App

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```
npm start
```

This will launch the app at:

arduino

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<http://localhost:3000>

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### Production Build

To generate a production-optimized build:

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```
npm run build
```

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### Assumptions & Constraints

- The application is fully client-side (no authentication or server calls).
- All data persists **only in the browser's localStorage**.
- Click location is hardcoded due to no backend API for IP geolocation.
- This is an evaluation project and not meant for public deployment.