**Local House Prices App**

*Specification Document*

**Epic:** ***As*** *a Property Development Firm* ***I want*** *to display Local House Price Data* ***so that*** *my staff are better informed about potential development opportunities*

User Stories

1. Price Paid Data ETL
2. Pre-fetch and calculate Postcode data (boundaries & averages)
3. Postcode House Price API
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11. Return map to user’s current location
12. *(Roadmap – later phase)* Specific House Prices

**1) Price Paid Data ETL**

***As*** *a Software Engineer* ***I want*** *to transform Land Registry CSV data and load it into a database* ***so that*** *I can use it for my application.*

Acceptance/Test Criteria

* The process should be repeatable, so that it can be tested and so that the CSV file can be updated or replaced in future
* The transformation should take a subset of data for application performance – this subset should be addresses with postcodes in the BN1, BN2 and BN3 regions
* The code should be written so that only minor adjustments need to be made in order to increase the size of the subset of data in future
* Reloading the CSV through this data should remove existing data before insertion in order to avoid legacy or duplicate affecting the application accuracy
* ETL should initially save data to a NoSQL database. Other database types may be required at a later date, but this is not an initial requirement.

**2) Pre-fetch and calculate Postcode data (boundaries & averages)**

***As*** *a Software Engineer* ***I want*** *to pre-calculate postcode boundaries and sale-price averages on the server* ***so that*** *I can load data quickly on the android application without processing time*

Acceptance/Test Criteria

* Postcode boundaries should be stored as longitude and latitude coordinates
* Average sale price data should be stored as a two-decimal float, which can be used later as either a formatted sale-price or a [heatmap location weight](https://developers.google.com/maps/documentation/android-api/utility/heatmap#weighted) in the Android heatmap
* Pre-calculated data should be stored to a database for later retrieval via the API

**3) Postcode House Price REST API**

***As*** *an android developer* ***I want*** *to retrieve relevant house price and postcode data for a given area* ***so that*** *I can optimise performance by displaying this information without processing it on the phone*

Acceptance/Test Criteria

* The API should follow JSON API Specification v1.0 <http://jsonapi.org/format/1.0/>
* The API should be available for multiple phones with the House Price application installed to connect
* The API should require OAuth2 authentication in order to connect
* The API should successfully handle 99.9% of requests in order to support reliable applications
* The API should include logs and application reporting in order to monitor performance

See REST API documentation: <https://github.com/SoftwareEngineeringG02/Project01/blob/master/server/ReadMe.md>

**4) API Distributed Tracing**

***As*** *a server administrator* ***I want*** *the tools to distribute API connections across multiple EC2 instances* ***so that*** *I can scale hardware to meet service demand*

Acceptance/Test Criteria

* API should assign external requests with a unique request ID
* API should record information about the request, including:
  + Request start timestamp
  + Request end timestamp
  + IP address

Note: During development only one EC2 instance will be in use due to AWS free tier limitations. The requirement here is for the tools for hardware scaling to be in place, rather than for the scaling itself to be in place.

**5) API Security & Data Privacy**

***As*** *a trading business* ***I want*** *to encrypt data and limit access* ***so that*** *I meet EU Data security regulations*

Acceptance/Test Criteria

* API data should be served on a https URL with a valid SSL certificate
* API should require OAuth2 authentication in order to connect
* SSH access should be locked to whitelisted IP addresses and require SSH keys to connect
* The application and/or server should not store any Personally Identifiable Information (PII) without the user’s explicit permission. PII is defined as “a name, an identification number, location data, an online identifier, one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person”

Note: GPS location is an explicit application permission in Android, which the user needs to actively grant for the application to have access to this data.

**6) Heatmap House Prices**

***As*** *an Architect/Builder/Property Developer* ***I want*** *to use the android app to see a heatmap of house prices* ***so that*** *I can quickly assess opportunities for a given area*

Acceptance/Test Criteria

* The Android app should show a map of a given area (user’s location, user searched location, or user explored location)
* The displayed map should show a heatmap overlay, representing the relative sale value of each house sold since 1995, averaged for each postcode and using a colour scale of low to high house prices
* The heatmap should also display a ticker tape banner displaying the last selected postcode and £ value average house price for that postcode.
* The initial selection for the ticker tape banner should by default be the postcode that the user is currently located within
* Only BN1, BN2 and BN3 data should initially be available – the heatmap overlay should not display beyond these regions, however the map can still be viewable and explorable beyond these regions without price data

Wireframe: <https://balsamiq.cloud/s18sd/pjvhi/r69AC>

**7) Heatmap House Prices: User’s current location**

***As*** *an Architect/Builder/Property Developer* ***I want*** *to use the android app to see a heatmap of house prices for the postcode I’m in* ***so that*** *I can quickly assess opportunity in the area I am in*

Acceptance/Test Criteria

* The Android app should show the map of the immediate area around the user’s location by default when the app loads
* When displaying the user’s current location, the map’s displayed area should follow the user’s location as the users themselves change location
* The Android app should display an icon showing the user’s actual GPS location
* The Android app should display the £ value of the average house sale in the postcode that the user is currently standing in
* The user’s current location should update on-change, when a change is over 10 meters
* In the event that the user is offline or cannot connect to the API, the app should display the user’s last known location until the app is able to reconnect

**8) Heatmap House Prices: Explore nearby postcodes on map**

***As*** *an Architect/Builder/Property Developer* ***I want*** *to use the android app to explore a heatmap of house prices for postcodes around the area I am located* ***so that*** *I can assess opportunity in nearby areas*

Acceptance/Test Criteria

* The Android app should allow a user to scroll the displayed map horizontally and vertically
* The app should allow a user to zoom in & out of the displayed map
* The app should allow a user to click on other postcodes to change the ticker tape banner to display the selected postcode and the £ value of the average house sale in that postcode

**9) Heatmap House Prices: Postcode Search**

***As*** *an Architect/Builder/Property Developer* ***I want*** *to use the android app to see a heatmap of house prices for a postcode that I have searched for,* ***so that*** *I can assess opportunity in other areas*

Acceptance/Test Criteria

* The Android app should move the displayed map to the desired postcode
* The ticker tape banner should be changed to display the searched postcode and the £ value of the average house sale in the searched postcode
* The Android app should indicate the location of the searched postcode (i.e. via dropped pin)
* User input field accepts alphanumeric input only (postcode format is slightly ambiguous so we are not very strict on the exact format required)
* User submitted postcode should be checked as an existing postcode on postcode.io
* Error message informs the user if they have not entered a correct postcode (i.e. not alphanumeric or does not exist)
* Only BN1, BN2 and BN3 data should be initially searchable – an error message should be displayed if a user searches for a postcode outside of this region

Postcode search wireframe: <https://balsamiq.cloud/s18sd/pjvhi/r3F99>

**10) Heatmap House Prices: Local caching**

***As*** *an android developer* ***I want*** *to cache recently retrieved postcode and heatmap information* ***so that*** *I can quickly reload it if a user returns to the same location*

Acceptance/Test Criteria

* Heatmap areas displayed should be cached locally so that subsequent visits to the same location load quicker
* Local cache storage should include clean-up functionality and expiration so that the app does not exceed 1mb of stored cache data

**11) Return map to user’s current location**

***As*** *a user* ***I want*** *an option to quickly return to viewing my current location* ***so that*** *I can find my bearings and begin new searches*

Acceptance/Test Criteria

* A return to current location button should be visible at all times and easily identifiable (i.e. crosshairs)
* The return to current location button should also be greyed out and inoperable when the user is viewing their current location, and highlighted as active when the user has “taken control” by scrolling or searching away from their current location
* The return to current location does not need to be fully visible or usable if the map itself is currently obscured by the UI, as the button should re-orientate the map
* Activating the return to current location button, should also change the postcode & average within the ticker tape banner to the postcode and average of the user’s current location

**12) (Roadmap – later phase) Specific House Prices**

***As*** *an Architect/Builder/Property Developer* ***I want*** *to select a specific address within a postcode* ***so that*** *I can view an individual building or plot*

Acceptance/Test Criteria

* On postcode search, the Android app should display addresses from the searched postcode as options for the user to select from
* The Android app should make it clear to the user that the addresses available are a limited list of available data, not every address within the postcode
* The number of addresses visible on screen will be dependent on device screen size. A minimum of 3 address items should be at least partially visible, with additional items viewable using a scroll action. More addresses should be visible where the screen size allows.
* Addresses can be cut-off with an ellipsis (see wireframes) however in this situation the addresses must display a minimum of 20 characters to allow users a reasonable chance of recognising the address.
* A user should be able to cancel the search and remove the search window using an “X” close button.
* The user should also be presented with an option to view the heatmap and average price for the postcode, as an alternative to viewing a specific address
* The input field should remain populated with the searched postcode during this selection

Select Address wireframe: <https://balsamiq.cloud/s18sd/pjvhi/rE5AF>

Display address sale details wireframe: <https://balsamiq.cloud/s18sd/pjvhi/rD64C>