**Distributed Systems for Information Systems Management**
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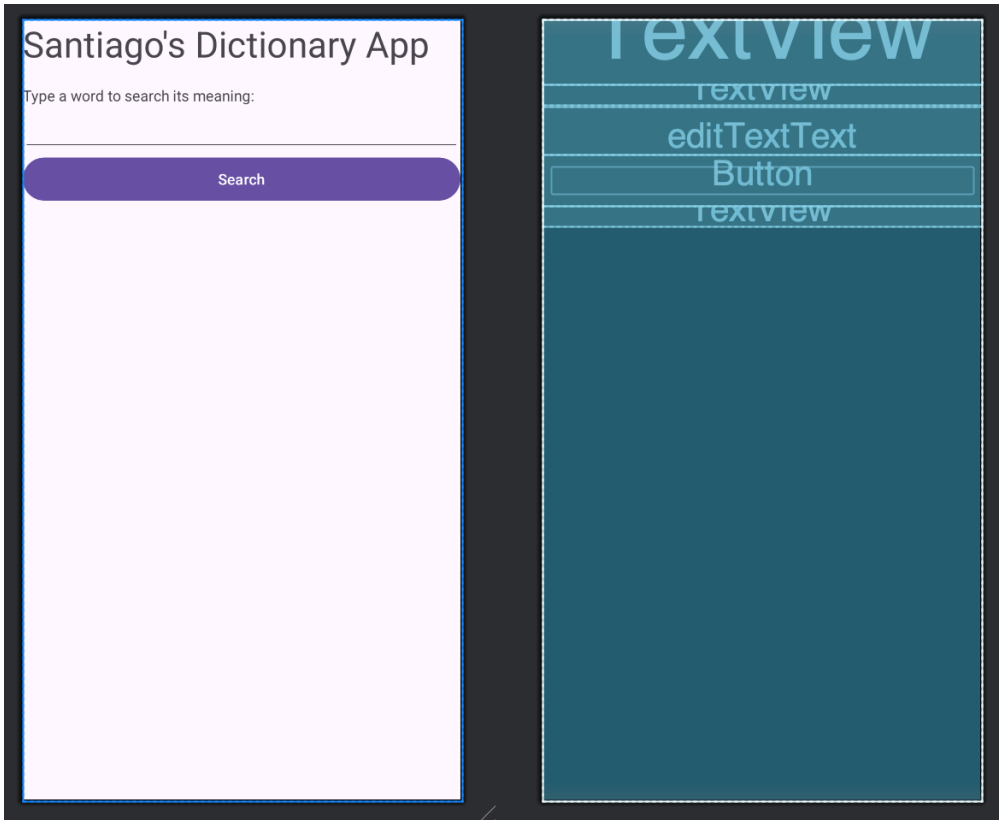
## Project 4 Task 2 – Distributed Application Requirements

### 1. Implement a Native Android Application

The name of my native Android application project in Android Studio is: DictionaryApp. My mobile app will be a pocket dictionary. It will prompt the user for a string and then use the API to return the definition(s) associated with it.

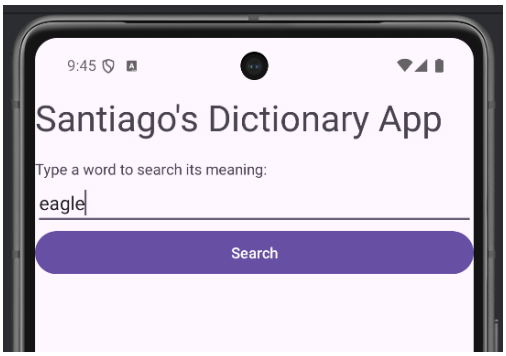
a. **Has at least three different kinds of Views in your Layout (TextView, EditText, ImageView, or anything that extends android.view.View).**

My application uses TextView, Edit Text, and Button. See content_main.xml for details of how they are incorporated into the LinearLayout. Please see a screenshot of the layout.



**b. Requires input from the user**

Here is a screenshot of the user searching for the definition of an eagle.




**c. Makes an HTTP request (using an appropriate HTTP method) to your web service**

My application does an HTTP GET request in GetWord.java. The HTTP request is: https://glowing-goldfish-97j76p6ww59jcpgr4-8080.app.github.dev/word/ + search_word where search_word is the user's search term.

The search method makes this request to my Web Application, parses the returned JSON, and returns de possible definitions of the word.

**d. Receives and parses an XML or JSON formatted reply from your web service**

An example if the JSON reply is:

{ status": "ok",
"body":
"{\"word\":\"eagle\",\"phonetic\":\"/ˈiːgəl/\",\"meanings\":[{\"partOfSpeech\":\"noun\",\"definition\":\"Any of several large carnivorous and carrion-eating birds in the family Accipitridae, having a powerful hooked bill and keen vision.\"},{\"partOfSpeech\":\"noun\",\"definition\":\"A gold coin with a face value of ten dollars, formerly used in the United States.\"},{\"partOfSpeech\":\"noun\",\"definition\":\"A 13th-century coin minted in Europe and circulated in England as a debased sterling silver penny, outlawed under Edward I.\"},{\"partOfSpeech\":\"noun\",\"definition\":\"A score of two under par for a hole.\"},{\"partOfSpeech\":\"verb\",\"definition\":\"To score an eagle.\"}]}"
}

**e. Displays new information to the user**

Here is the screenshot after the possible definitions have been returned.


**f. Is repeatable (I.e. the user can repeatedly reuse the application without restarting it.)**

The user can type in another search term and hit the Search button. Here is an example of having typed in hat.


## 2. Implement a web service

The project directory name is DictionaryWebService

**a. Implement a simple (can be a single path) API.**

The URL of my web service deployed in Codespaces is: https://glowing-goldfish-97j76p6ww59jcpgr4-8080.app.github.dev/. It has 2 types of services:

- word: Returns the possible definitions of a word (max 7).

- dashboard: Displays some analytics metrics and logs.

In my web server project:
- Model: DictionaryModel.java
- Controller: DictionaryServlet.java
- View: dashboard.jsp (just for the analytics and logs)

**b. Receives an HTTP request from the native Android application**

My DictionaryServlet.java receives the HTTP request with the parameter (path info) containing the word the user wants to know its possible definitions. It passes the word as a string to the model.

**c. Executes business logic appropriate to your application. This includes fetching XML or JSON information from some 3rd party API and processing the response.**

DictionaryModel.java makes an HTTP request to https://api.dictionaryapi.dev/api/v2/entries/en/. Then it parses the JSON response and extracts the parts of the answer it needs to respond to the Android application.

**d. Replies to the Android application with an XML or JSON formatted response. The schema of the response can be of your own design.**

The adjustResponse method adjusts the word in the required format. Then the Gson libraries convert it into JSON format following the attributes of the Word and Meaning classes.

### 3. Handle error conditions

No documentation required

### 4. Log Useful Information

The information that is stored is the following:

**Request-Related Attributes**

- **word (Searched Word):** This represents the specific word or term entered by the user in the application. It's critical for tracking user behavior, analyzing search patterns, and debugging search-related issues.

- **appRequestTime (App Request Time):** The timestamp when the server receives a request from the app. It marks the beginning of the request lifecycle, essential for tracking end-to-end response time.

- **deviceType (Device Type):** Indicates the type of device used to make a call to the web server (e.g., mobile, desktop, tablet). This could be useful for understanding user demographics and optimizing the exposed services for different devices.

**API-Related Attributes**

- **apiRequestTime (API Request Time):** The timestamp when the app sends a request to the external API. It's used to measure the time taken to initiate communication with the API.

- **apiReplyTime (API Reply Time):** The timestamp when the external API responds to the app's request. This helps measure API latency and diagnose issues related to slow API responses.

- **apiResponseCode (API Response Code):** A numeric code representing the status of the API response. It provides a quick overview of the API's health and response quality.

- **apiResponseCodeDescription (API Response Message):** A textual description of the apiResponseCode, giving more context about the response. Useful for logging and debugging API interactions.

**Reply-Related Attributes**

- **appReplyTime (App Reply Time):** The timestamp when the app sends a reply back to the user. This marks the end of the request lifecycle and helps calculate the total request-response duration.

- **appResponseCode (App Response Code):** A numeric code that indicates the result of the app's processing of the user's request. This is crucial for debugging issues at the application layer.

- **appResponseCodeDescription (App Response Message):** A textual description of the appResponseCode, providing additional details about the outcome of the request. This enhances the log's readability and aids in debugging.

## 5. Store the log information in a database

- **Connection String:** "mongodb+srv://jsantiagobv:SHIRO123@cluster.y4hq5.mongodb.net/?retryWrites=true&w=majority&appName=Cluster"
- **Primary Shard:** cluster-shard-00-01.y4hq5.mongodb.net:27017
- **Secondary Shard:** cluster-shard-00-00.y4hq5.mongodb.net:27017
- **Secondar Shard (III):** cluster-shard-00-02.y4hq5.mongodb.net:27017

## 6. Display operations analytics and full logs on a web-based dashboard

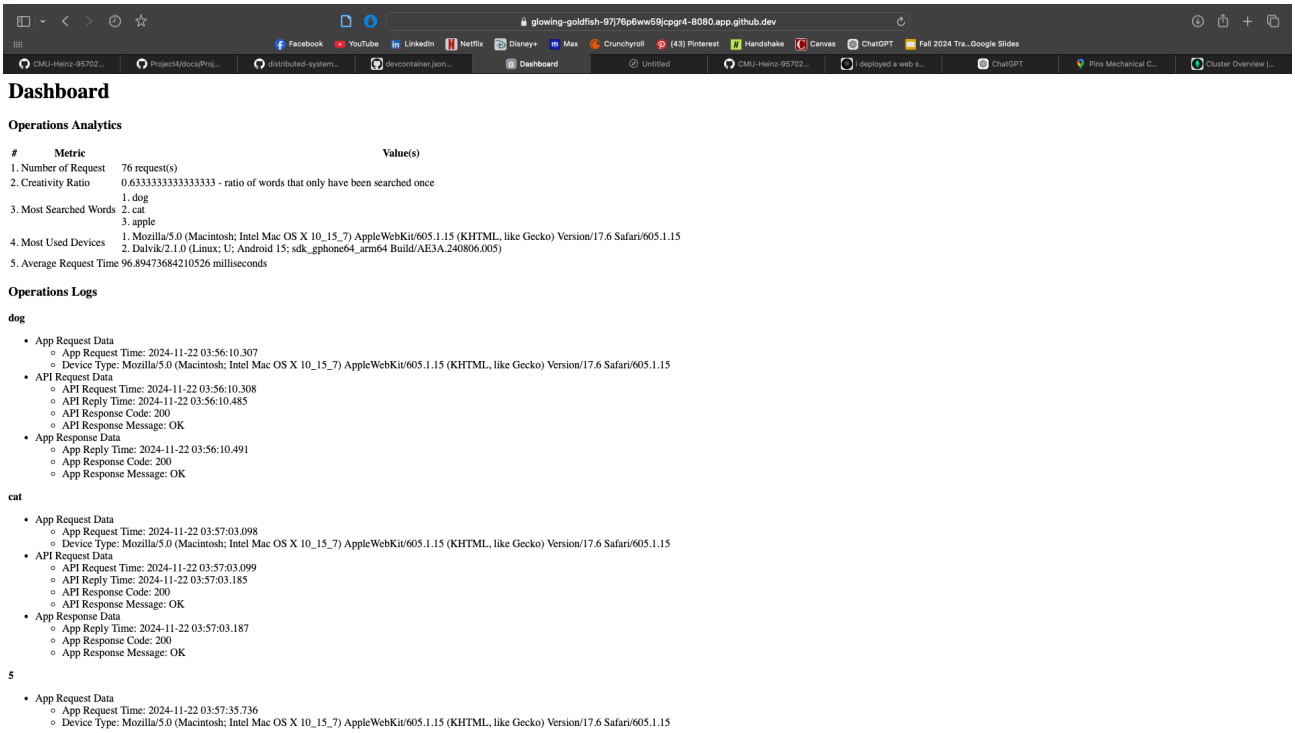
a. **A unique URL addresses a web interface dashboard for the web service.**

   The URL for the dashboard is: https://glowing-goldfish-97j76p6ww59jcpgr4-8080.app.github.dev/dashboard

**b. The dashboard displays at least 3 interesting operations analytics.**

**c. The dashboard displays formatted full logs.**

For literals b and c, see image below:




## 7. Deploy the web service to GitHub Codespaces

All the steps have been followed. Please find in Github the following files:

- .devcontainer.json
- Dockerfile
- ROOT.war