

Project 4 Task 2 – Distributed Application and Dashboard

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Description: My mobile application allows users to search for a cryptocurrency by name or symbol, and view real-time information such as price, market cap, daily change percentage, and coin icon. It fetches data using the Coinranking API and displays the top 50 coins or details for a selected coin. All user search logs are stored in MongoDB Atlas for operational analytics, including top searched coins, error logs, total and daily successful searches and slowest responses.

1. Implement a native Android application

The name of my native Android application project in Android Studio is:
Project4Task2_AndroidApp

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

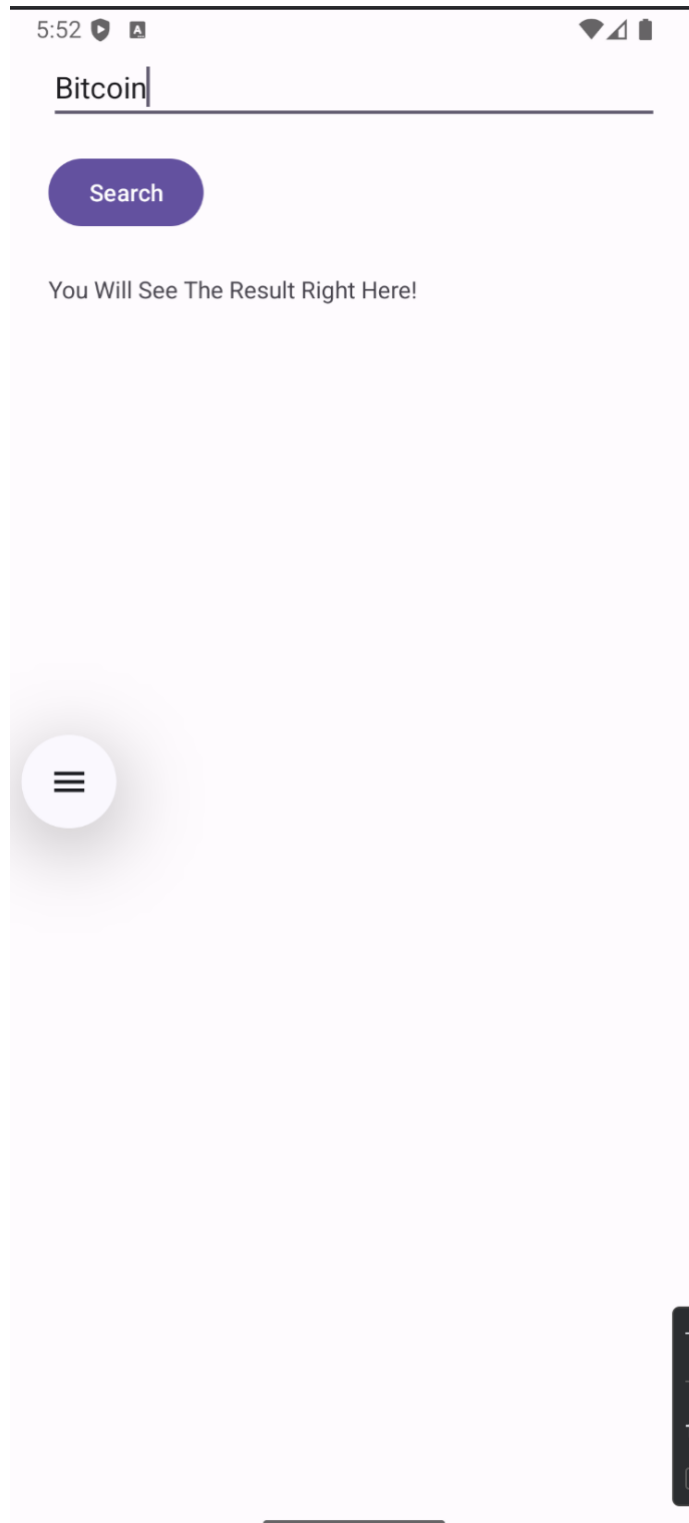
My layout includes TextView, EditText, and Button. Please refer to activity_main.xml for complete UI definitions.

Here is a screenshot of the layout before the coin information has been fetched:



- b. Requires input from the user The user must enter a coin name or symbol in the EditText field to search.

Here is a screenshot of the user searching for information of Bitcoin



- c. Makes an HTTP request (using an appropriate HTTP method) My app makes a POST request to: <https://fantastic-umbrella-gv9p7g96vpqcwr64-8080.app.github.dev/>
The payload includes the coin query and device model in JSON format.

Example POST body: { "coin": "bitcoin", "deviceModel": "Google Pixel 5" }

- d. Receives and parses a JSON formatted reply from your web service

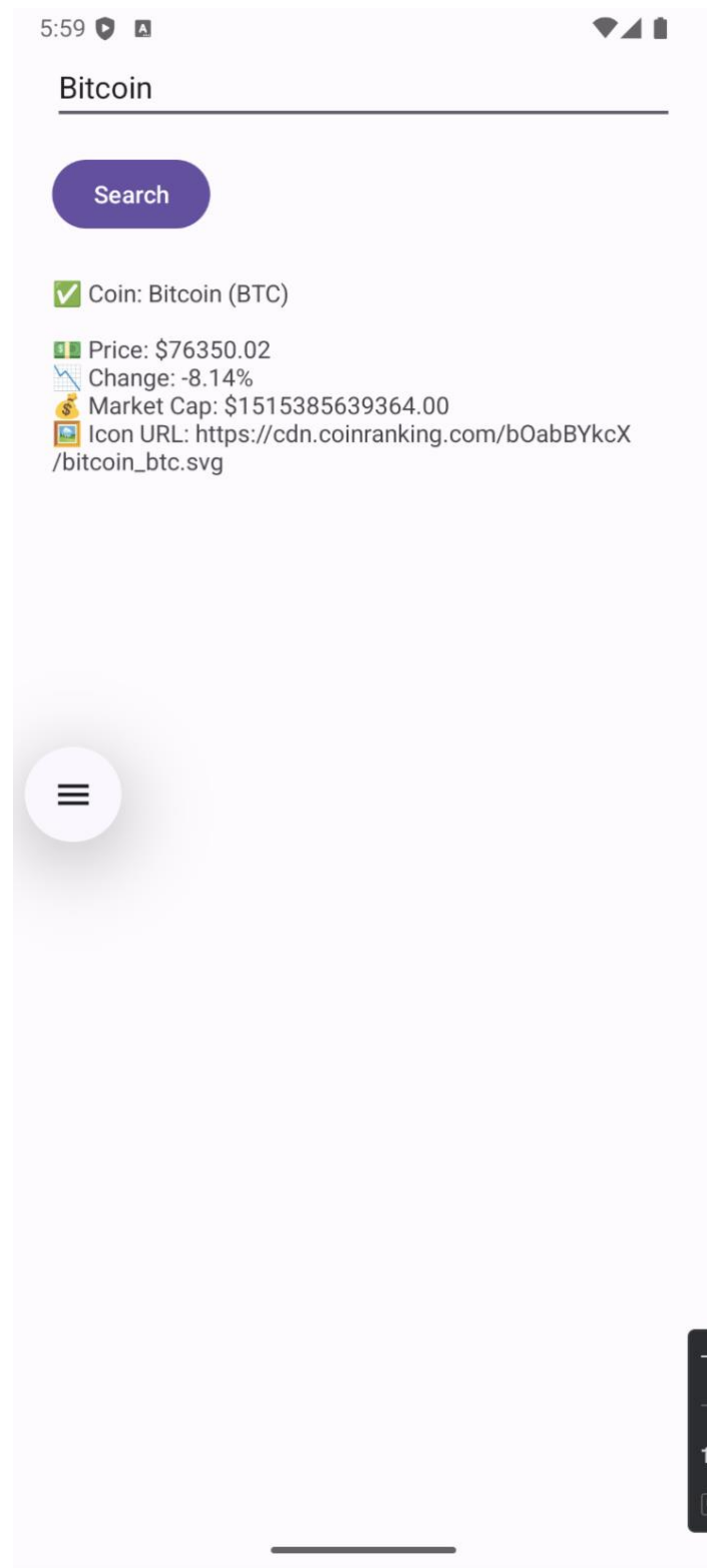
The response includes coin name, symbol, price, change, market cap, icon URL, and status.
Parsing is done using Gson.

Example JSON response:

```
{ "name": "Bitcoin",  
  "symbol": "BTC",  
  "price": 76435.77,  
  "change": -8.04,  
  "marketCap": 1517087584178.00,  
  "iconUrl": "https://cdn.coinranking.com/B1nb2Q5dY/bitcoin.svg" }
```

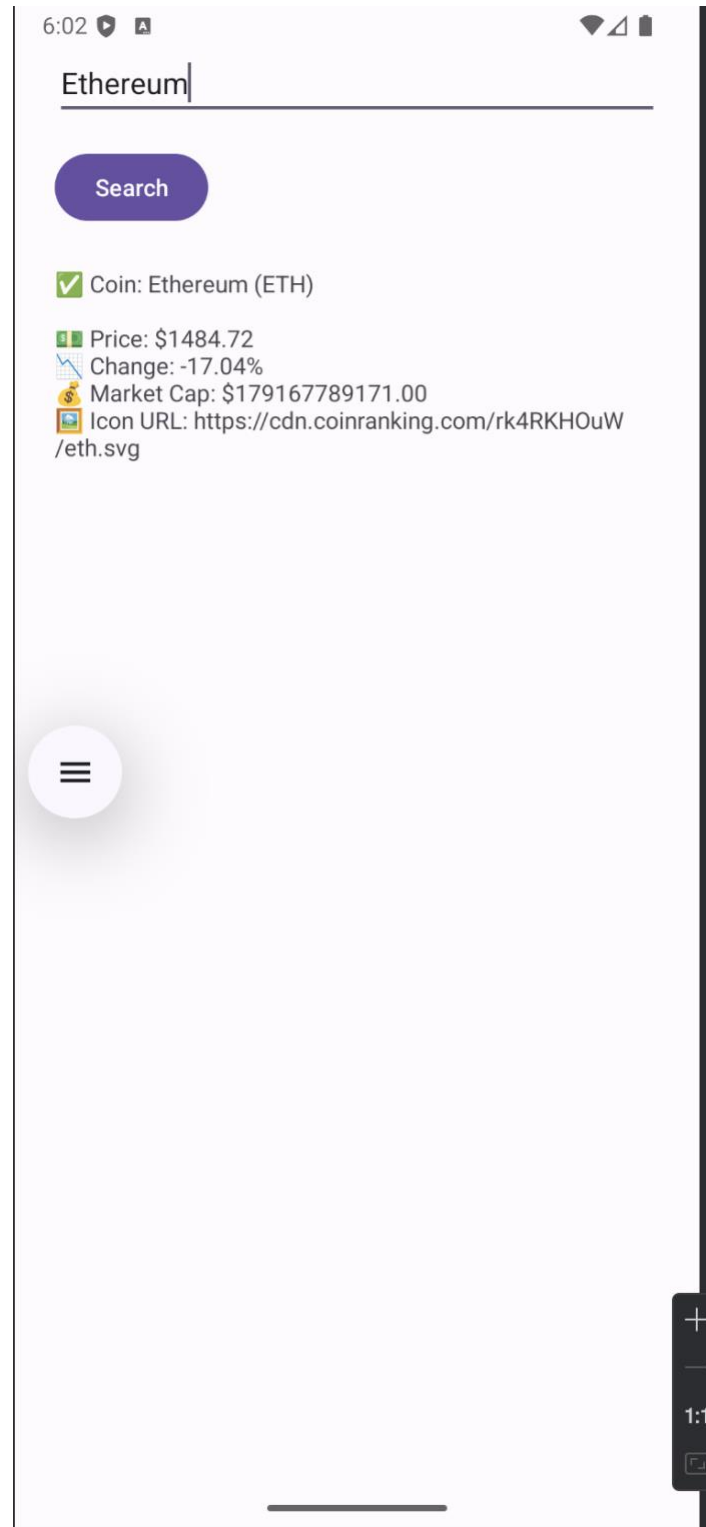
- e. Displays new information to the user

Here is the screenshot after the information of Bitcoin has been returned.



f. Is repeatable

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



2. Implement a web service

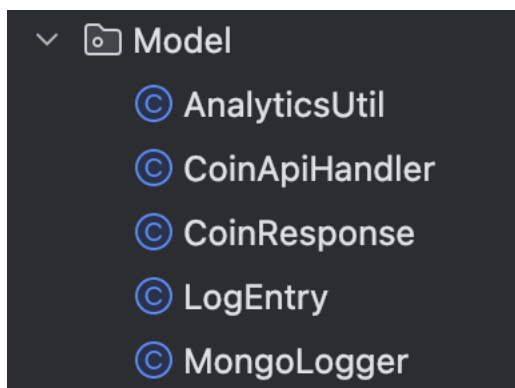
The URL of my web service deployed to Dashboard is: <https://fantastic-umbrella-gv9p7g96vpqcwr64-8080.app.github.dev/>

The project directory name is Project4Task2_WebService

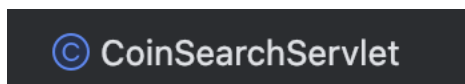
- a. Using an HttpServlet to implement a simple API

In my web app project:

Model: AnalyticsUtil.java, CoinApiHandler.java, CoinResponse.java, LogEntry.java, MongoLogger.java



Controller: CoinSearchServlet.java



View: Index.jsp



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

The CoinSearchServlet receives POST requests from the Android app via the "/coin" endpoint. It reads the JSON request body containing the coin query and device model, parses it into Java objects using Gson, and then forwards the query to the Coinranking API for processing. The response is used to construct a result object and is logged into MongoDB Atlas.

- c. Executes business logic appropriate to your application Upon receiving the coin query, the servlet calls the Coinranking API to fetch data and logs each search entry into MongoDB.

API Usage:

```
String apiUrl = "https://api.coinranking.com/v2/coins?limit=50";  
HttpRequest request = HttpRequest.newBuilder()
```

Steps:

1. Parse JSON input (coin name + device model)
 2. Query Coinranking API
 3. Construct CoinResponse object
 4. Log data to MongoDB
 5. Send JSON reply to client
-
- d. Replies to the Android application with a JSON formatted response The servlet constructs a JSON response using Gson and returns it to the Android app. The response includes fields such as coin name, symbol, price, change, market cap, and icon URL, structured in JSON format. The following snippet shows part of the code used in CoinSearchServlet.java:

Example from (CoinSearchServlet):

```
response.setContentType("application/json"); PrintWriter out = response.getWriter();  
out.print(gson.toJson(coinResponse)); out.flush();
```

3. **Handle error conditions - Does not need to be documented.**

4. Log useful information - Itemize what information you log and why you chose it. Each request logs the following fields in MongoDB Atlas:

- timestamp: to track when the request was made.
- clientIP: to identify the request origin.
- coinQuery: to understand which coins are most frequently searched.
- deviceModel: to analyze access trends by device.
- status: to determine the success or failure of the search.
- responseTime: to monitor system performance and latency.
- searchSuccess: to track effectiveness of search matching logic.

5. Store the log information in a database.

Log entries are stored in the MongoDB Atlas collection "coinSearches" in the "coinAppDB" database. Connection handled via MongoClient.

MongoDB Connection

Connection Instructions

1. Select driver

Java ▼

2. Install your driver

[View MongoDB Java Driver installation instructions.](#)

3. Add connection string into your application code.

☐ Get legacy (standard) connection string

String

Sample Code

```
mongodb+srv://hojoonle:<db_password>@cluster0.w7acn.mongodb.net/?retryWrites=true&w=majority&appName=Cluster0
```

Replace **<db_password>** with the password for the **hojoonle** user. Ensure any option params are [URL encoded](#).

My Mongo DB

The screenshot displays the MongoDB Atlas web interface. The top navigation bar includes the Atlas logo, a user profile dropdown for 'Hojoon's Or...', and links to 'Access Manager' and 'Billing'. The main header shows 'Project 0' and 'Data Services' with a 'Charts' tab. The left sidebar contains a navigation menu with categories: Overview, DATABASE, Clusters, SERVICES, SECURITY, and Goto. The 'Clusters' section is expanded, showing 'coinAppDB' and its collection 'coinSearches'. The main content area displays the 'coinAppDB.coinSearches' collection with statistics: STORAGE SIZE: 36KB, LOGICAL DATA SIZE: 2.09KB, TOTAL DOCUMENTS: 11, and INDEXES TOTAL SIZE: 36KB. Below the statistics are tabs for 'Find', 'Indexes', 'Schema Anti-Patterns', 'Aggregation', and 'Search Indexes'. A search bar with the placeholder 'Type a query: { field: 'value' }' and buttons for 'Filter', 'Reset', 'Apply', and 'Options' is present. The 'QUERY RESULTS: 1-11 OF 11' section shows two document snippets. The first document has fields: _id, timestamp, clientIP, coinQuery, deviceModel, status, responseTime, and searchSuccess. The second document has similar fields but with different values for timestamp, clientIP, coinQuery, and responseTime.

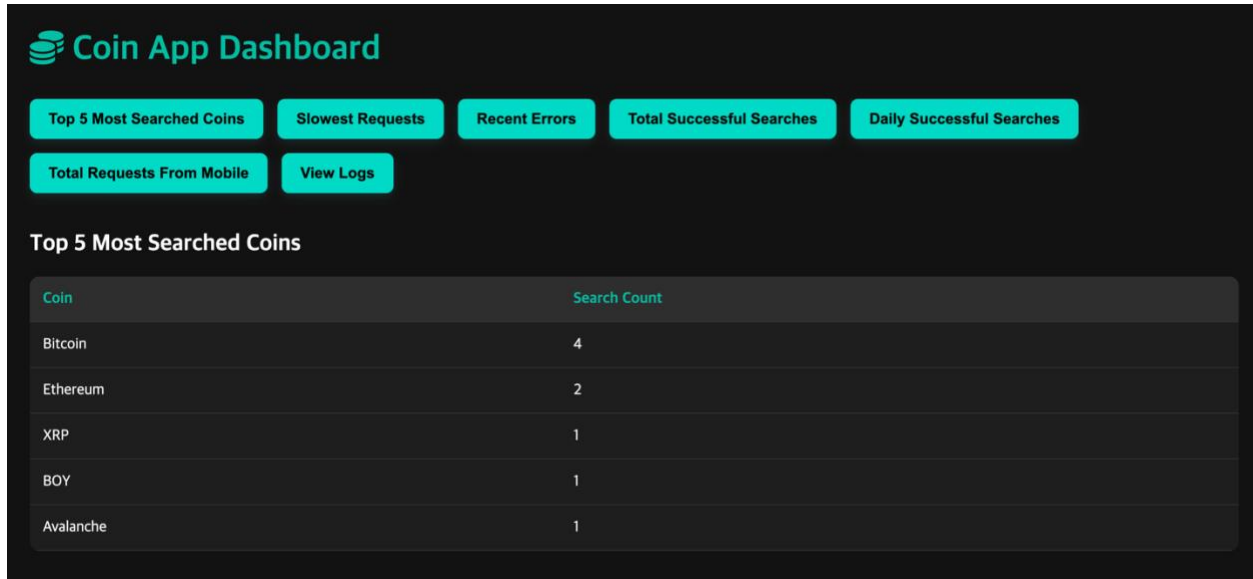
Atlas Connection String:

```
private static final String MONGO_URI = "mongodb+srv://hojoonle:Jacob842455@cluster0.w7acn.mongodb.net/?retryWrites=true&w=majority&appName=Cluster0";
private static final String DB_NAME = "coinAppDB"; 2 usages
private static final String COLLECTION_NAME = "coinSearches"; 2 usages
```

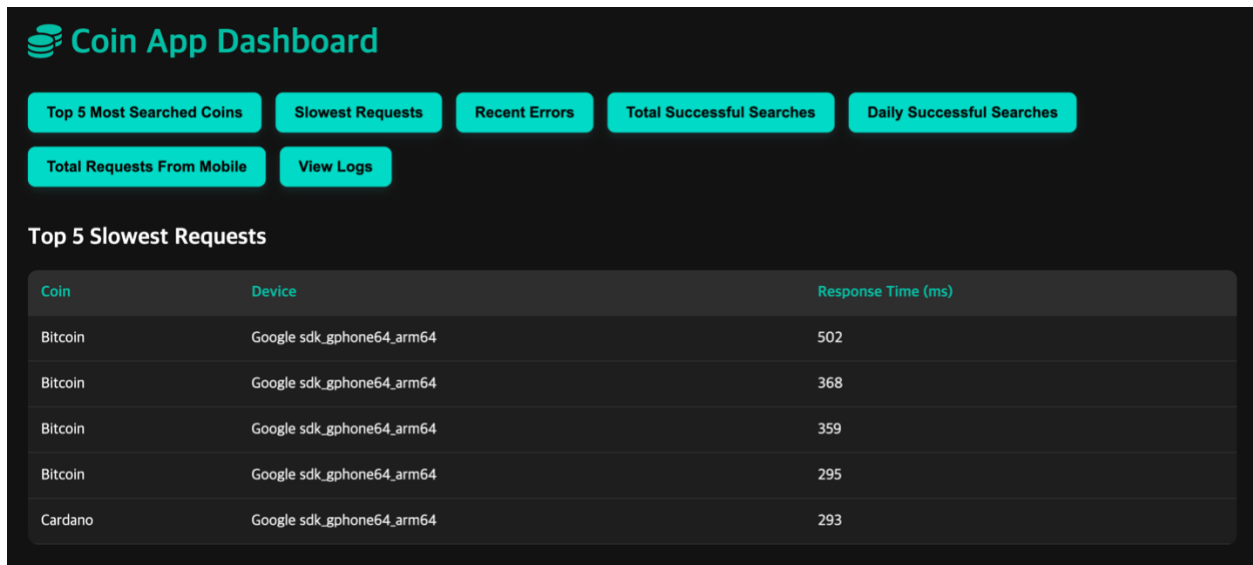
6. Display operations analytics and full logs on a web-based dashboard - Provide a screenshot.

Operations Analytics


Top 5 Most Searched Coins



Slowest Requests



Recent Errors

 **Coin App Dashboard**

Top 5 Most Searched Coins

Slowest Requests

Recent Errors

Total Successful Searches

Daily Successful Searches


Total Requests From Mobile

View Logs

Recent Errors

Coin	Device	Status
BOY	Google sdk_gphone64_arm64	not_found

Total Successful Searches

 **Coin App Dashboard**

Top 5 Most Searched Coins

Slowest Requests

Recent Errors

Total Successful Searches

Daily Successful Searches


Total Requests From Mobile

View Logs

Total Successful Searches

10

Daily Successful Searches

 **Coin App Dashboard**

Top 5 Most Searched Coins

Slowest Requests

Recent Errors

Total Successful Searches

Daily Successful Searches

Total Requests From Mobile

View Logs

Daily Successful Searches

Date	Successful Count
2025-04-07	10

Total Requests From Mobile

Coin App Dashboard

Top 5 Most Searched Coins

Slowest Requests

Recent Errors

Total Successful Searches

Daily Successful Searches

Total Requests From Mobile

View Logs

Total Requests Per Day

Date	Request Count
2025-04-07	11

View Logs

Coin App Dashboard

Top 5 Most Searched Coins

Slowest Requests

Recent Errors

Total Successful Searches

Daily Successful Searches

Total Requests From Mobile

View Logs

Log Entries

Search by coin name...

Timestamp	Client IP	Coin	Device	Status	Time (ms)
Mon Apr 07 09:16:07 UTC 2025	0:0:0:0:0:0:1	Bitcoin	Google sdk_gphone64_arm64	success	502
Mon Apr 07 09:16:33 UTC 2025	0:0:0:0:0:0:1	Ethereum	Google sdk_gphone64_arm64	success	282
Mon Apr 07 09:16:39 UTC 2025	0:0:0:0:0:0:1	Cardano	Google sdk_gphone64_arm64	success	293
Mon Apr 07 09:16:45 UTC 2025	0:0:0:0:0:0:1	XRP	Google sdk_gphone64_arm64	success	281
Mon Apr 07 09:16:51 UTC 2025	0:0:0:0:0:0:1	Avalanche	Google sdk_gphone64_arm64	success	283
Mon Apr 07 09:16:58 UTC 2025	0:0:0:0:0:0:1	PEPE	Google sdk_gphone64_arm64	success	280
Mon Apr 07 09:17:04 UTC 2025	0:0:0:0:0:0:1	BOY	Google sdk_gphone64_arm64	not_found	286
Mon Apr 07 09:17:48 UTC 2025	0:0:0:0:0:0:1	Bitcoin	Google sdk_gphone64_arm64	success	295
Mon Apr 07 09:57:15 UTC 2025	0:0:0:0:0:0:1	Bitcoin	Google sdk_gphone64_arm64	success	368