

Project 4 Summary

Description:

My mobile application is designed to function as a currency converter, leveraging the currency information provided by the European Central Bank. It will enable users to seamlessly convert amounts between various currencies, and also access historical and time series data for a broad spectrum of available currencies.

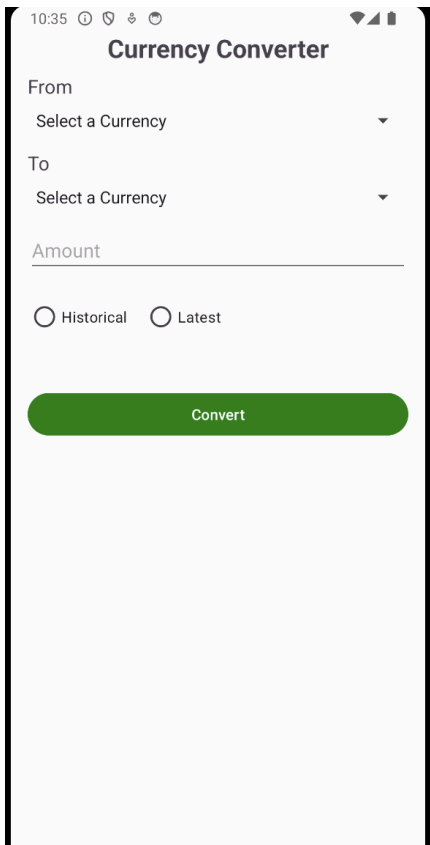
1) Native Android Application Implementation:

The name of my application in Android Studio is: Currency_Converter

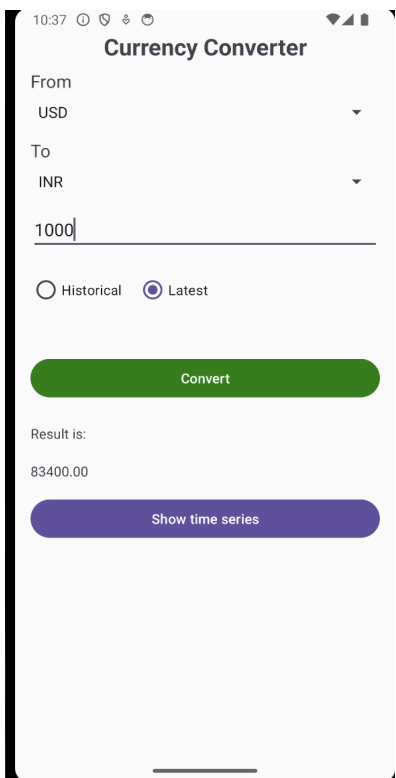
The Application uses 11 views as follows:

- ConstraintLayout
- TextView
- Spinner
- EditText
- RadioGroup
- RadioButton
- ImageButton
- Button
- FrameLayout
- ProgressBar
- LineChart (from MPAndroidChart library)

Application layout after opening:



Application Layout after converting USD to INR at the latest rate:



HTTP Request:

```
https://cuddly-lamp-p594qvpr427xrv-8080.app.github.dev/api/latest?to=" + to + "&from=" + from
```

Sample JSON output:

```
{
  "rates": {
    "INR": 83.4
  },
  "base": "USD"
}
```

Application Layout after converting USD to INR at a historical rate:

10:40

Currency Converter

From
USD

To
INR

100

☒ Historical ☐ Latest

2015-04-02

Convert

Result is:
6218.20

Show time series

HTTP Request:

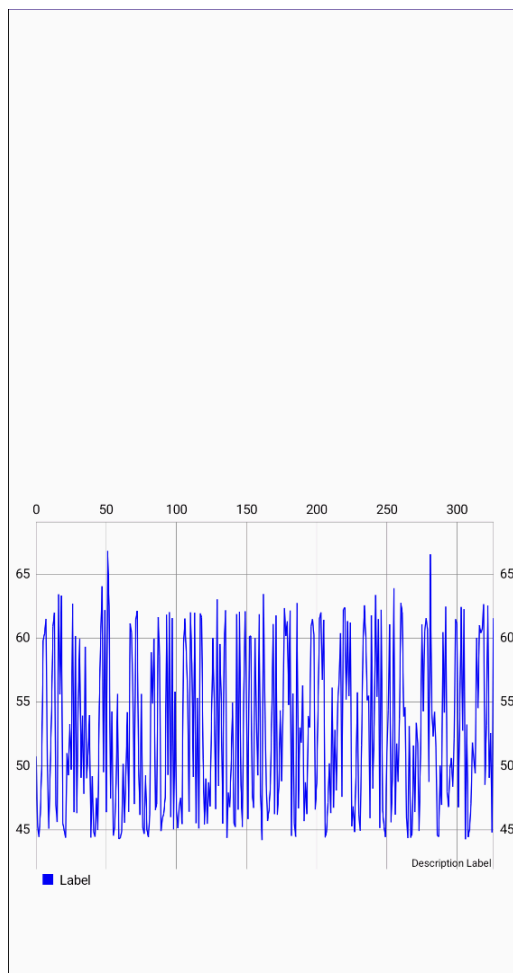
```
https://cuddly-lamp-p594qvpr427xrv-8080.app.github.dev/api/historical?date=%s&to=%s&from=%s
```

Sample JSON output:

```
{
```

```
"rate": 62.182
}
```

Time Series Layout:



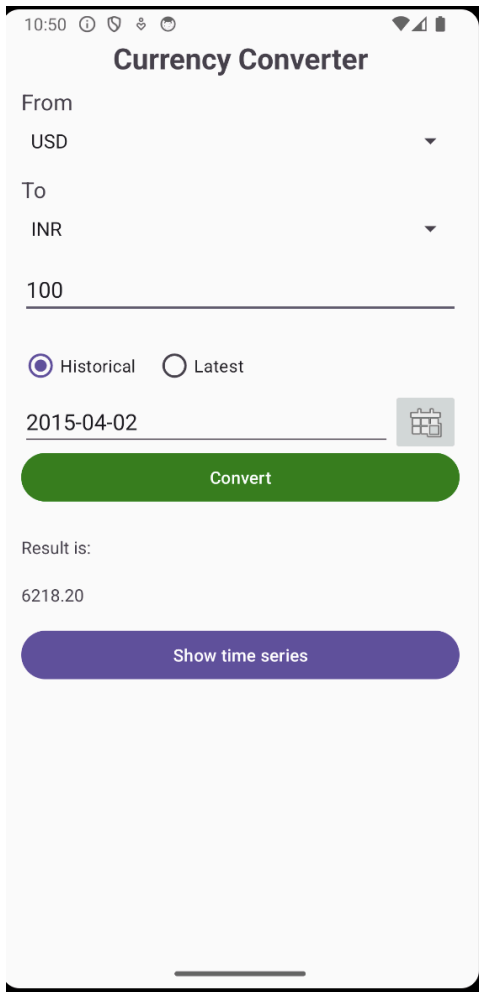
HTTP Request:

<https://cuddly-lamp-p594qvpr427xrv-8080.app.github.dev/api/historical?toDate=%s&to=%s&from=%s>

Sample JSON output:

```
[
  "50.771",
  "45.282",
  "44.451",
  "46.267",
  "50.179",
  "59.837",
  "60.367",
  "61.518",
]
```

The functionalities are repeatable, i.e., the user can reuse the app without needing to restart:



2) Web Application deployed on Codespace:

The URL of my web application: <https://cuddly-lamp-p594qvpr427xrv-8080.app.github.dev/>

The Project Directory Name is WebService

Project Files:

DashboardServlet.java: A HttpServlet class that will call fetch methods from the model class to get all the data from the MongoDB server and populate it on dashboard.jsp. URL patterns - "/"

HistoricalRatesServlet: A HttpServlet class that will receive GET requests from the client to get historical conversion rates. URL pattern - `"/api/historical"`

LatestRatesServlet: A HttpServlet class that will receive GET requests from the client to get latest conversion rate and all the currencies available for conversion - URL pattern - `"/api/latest/*"`

Model: A Java class responsible to perform the Business logic, i.e. communicate client and server and perform the logging of entries to MongoDB. Its function receives necessary values from HistoricalRatesServlet and LatestRatesServlet.

API calls associated: "<https://api.frankfurter.app/%s?from=%s&to=%s/>,
<https://api.frankfurter.app/%s..%s?from=%s&to=%s>, <https://api.frankfurter.app/latest?from=%s&to=%s>,
<https://api.frankfurter.app/latest>

MongoConnectionInstance: A Singleton class used to return mongo connection instance

Sample responses sent to the android device after processing by the webservice model:

```
{
  "rates": {
    "EUR": 0.92242
  },
  "base": "USD"
}
```

```
{
  "rate": 0.84976
}
```

```
[
  "50.771",
  "45.282",
  "44.451",
  "46.267",
  "50.179",
  "59.837",
  "60.367",
  "61.518",
  "50.138",
  "45.107",
  "49.469",
  "54.315",
  "60.916",

```

```
]
[
  "CHF",
  "MXN",
  "ZAR",
  "INR",
  "CNY",
  "THB",
  "AUD",
  "ILS",
  "KRW",
  "JPY",

```

"PLN",
"GBP",
"IDR",
"HUF",
"PHP",
"TRY",
"HKD",
"ISK",
"DKK",
"CAD",
"MYR",
"USD",
"BGN",
"NOK",
"RON",
"SGD",
"CZK",
"SEK",
"NZD",
"BRL"

]

3) Log Useful Information:

- StartTime and EndTime: To store calculate the average Response Time
- fromCurrency and toCurrency: To find the most frequent conversion pair
- Device Names: To Find top 5 devices

Client Request:

- EndPoint: To track which parts of the service are accessed.
- HTTP Method: To understand the types of operations being performed.
- Device Name: To analyze the variety of devices accessing the service.
- Operating System: Similar to Device Name, logging the OS can help in optimizing service compatibility
- IP Address: For security purposes, geographic analytics, and potentially customizing responses based on location.
- From Currency & To Currency: Logging these values helps understand user needs, popular currency pairs
- Date & To Date: To record for which date conversion is requested or find the currency values until a provided date.

Web-Service Request:

- Timestamp: Logs when requests are made.
- Endpoint: Identifies which service feature is accessed.
- HTTP Method: Shows request type, key for understanding user actions and API usage.

- To Date: Indicates the end period for data requests, essential for time-bound query analysis.
- From: The currency from which the amount has to be converted
- To: The currency to which the amount has to be converted.
- IP Address: Tracks the webservice location and network.

API Response:

- Response Time (ms): Measures how quickly the server processes a request, critical for performance monitoring.
- Status Code: Indicates the result of the request.
- Payload Size: The size of the data sent back.
- Base: The base currency.
- Start Date: Defines the startPeriod for time series values.
- End Date: Defines the endPeriod for time series values..
- Number Of Values: Shows how many currency points are included.
- Average Rate: Refers to the average currency value over the period of time
- To Currencies: Lists the target currencies of a query

Web Service Response:

- Response Time (ms): Measures the web-service processing speed for a request.
- Status Code: Indicates request success or failure, crucial for error diagnosis.
- Number Of Values: The count of data currencies fetched in response.
- Average Rate: Refers to the average currency value over the period of time
- To Currencies: Lists the target currencies of a query.
- Currency Values: Lists conversion rates or values provided, crucial for transactional accuracy.

4) MongoDB Connection String:

Connection String:

mongodb+srv://aaayush:QH3OrDIWx008btyY@cluster0.z9pcbas.mongodb.net/?retryWrites=true&w=majority&appName=Cluster0

Three Shards:

- ac-jqgfmlw-shard-00-00.z9pcbas.mongodb.net:27017
- ac-jqgfmlw-shard-00-01.z9pcbas.mongodb.net:27017
- ac-jqgfmlw-shard-00-02.z9pcbas.mongodb.net:27017

5) Dashboard View:

Average Response Time

269.34 ms

Most Frequent Conversion

INR to USD

Top 5 Devices

- Google SDK GPHONE64 ARM64
- Apple Macintosh
- Unknown

Client Request Data

EndPoint	HTTP Method	Device Name	Operating System	IP Address	From Currency	To Currency	Date	To Date
/WebService-1.0-SNAPSHOT/api/latest	GET	Unknown	Unknown ??	0:0:0:0:0:0:1	N/A	N/A	N/A	N/A
/WebService-1.0-SNAPSHOT/api/latest	GET	Unknown	Unknown ??	0:0:0:0:0:0:1	USD	INR	N/A	N/A
/WebService-1.0-SNAPSHOT/api/latest	GET	Unknown	Unknown ??	0:0:0:0:0:0:1	USD	INR	N/A	N/A
/WebService-1.0-SNAPSHOT/api/historical	GET	Unknown	Unknown ??	0:0:0:0:0:0:1	USD	INR	2022-01-31	N/A
/WebService-1.0-SNAPSHOT/api/historical	GET	Unknown	Unknown ??	0:0:0:0:0:0:1	USD	INR	N/A	2022-01-31
/WebService-1.0-SNAPSHOT/api/historical	GET	Unknown	Unknown ??	0:0:0:0:0:0:1	EUR	INR	N/A	2022-01-31
/WebService-1.0-SNAPSHOT/api/latest	GET	Apple Macintosh	Unknown ??	0:0:0:0:0:0:1	N/A	N/A	N/A	N/A
/WebService-1.0-SNAPSHOT/api/latest	GET	Apple Macintosh	Unknown ??	0:0:0:0:0:0:1	N/A	N/A	N/A	N/A
/api/latest	GET	Apple Macintosh	Unknown ??	172.17.0.1	N/A	N/A	N/A	N/A
/api/latest	GET	Apple Macintosh	Unknown ??	172.17.0.1	N/A	N/A	N/A	N/A
/api/latest	GET	Apple Macintosh	Unknown ??	172.17.0.1	USD	INR	N/A	N/A
/api/latest	GET	Apple Macintosh	Unknown ??	172.17.0.1	USD	EUR	N/A	N/A
/api/historical	GET	Apple Macintosh	Unknown ??	172.17.0.1	EUR	INR	N/A	2022-01-31
/api/historical	GET	Apple Macintosh	Unknown ??	172.17.0.1	EUR	INR	N/A	2022-01-31
/api/latest	GET	Apple Macintosh	Unknown ??	172.17.0.1	N/A	N/A	N/A	N/A
/api/latest	GET	Unknown	Unknown ??	172.17.0.1	N/A	N/A	N/A	N/A
/api/latest	GET	Unknown	Unknown ??	172.17.0.1	N/A	N/A	N/A	N/A
/api/latest	GET	Google SDK GPHONE64 ARM64	Android 14	172.17.0.1	N/A	N/A	N/A	N/A

Server Request Data

Timestamp	Endpoint	HTTP Method	To Date	From	To	IP Address
1711748883331	historical	GET	2022-01-31	USD	INR	172.26.36.135
1711749192859	latest	GET	null	null	null	127.0.0.1
1711749235036	latest	GET	null	USD	INR	172.26.36.135
1711825033488	latest	GET	null	USD	INR	169.254.37.71
1711825522022	historical	GET	2022-01-31	USD	INR	169.254.37.71
1711825539401	historical	GET	2022-01-31	USD	INR	169.254.37.71
1711828490367	historical	GET	2022-01-31	EUR	INR	172.26.36.135
1712087951869	latest	GET	null	null	null	172.26.36.135
1712088101189	latest	GET	null	null	null	172.26.36.135
1712089229304	latest	GET	null	null	null	172.17.0.2
1712089304154	latest	GET	null	null	null	172.17.0.2
1712089366364	latest	GET	null	USD	INR	172.17.0.2
1712089466681	latest	GET	null	USD	EUR	172.17.0.2
1712089849795	historical	GET	2022-01-31	EUR	INR	172.17.0.2

Server Response Data

Response Time (ms)	Status Code	Payload Size	Base	Start Date	End Date	Number Of Values	Average Rate	To Currencies	Currency Values
2263	200	70	USD	null	2022-01-31	1	74.731	INR	74.731
336	200	445	EUR	null	2024-03-28	30	656.5576599999999	CHF, MXN, ZAR, INR, CNY, THB, AUD, ILS, KRW, JPY, PLN, GBP, IDR, HUF, PHP, TRY, HKD, ISK, DKK, CAD, MYR, USD, BGN, NOK, RON, SGD, CZK, SEK, NZD, BRL	0.9766, 17.9179, 20.523, 90.14, 7.8144, 39.412, 1.6607, 3.9799, 1458.67, 163.45, 4.3123, 0.8551, 17158.0, 395.26, 60.797, 34.949, 8.4594, 150.3, 7.458, 1.4672, 5.1168, 1.0811, 1.9558, 11.699, 4.9735, 1.4587, 25.305, 11.525, 1.8092, 5.4032
359	200	69	USD	null	2024-03-28	1	83.38	INR	83.38
325	200	69	USD	null	2024-03-28	1	83.38	INR	83.38
324	200	70	USD	null	2022-01-31	1	74.731	INR	74.731
									72.961, 45.282, 44.451, 64.469, 59.837, 66.831, 75.019, 65.05, 68.943, 54.315, 68.758, 47.003, 65.27, 45.627, 65.411, 73.092, 55.606, 65.145, 66.504, 66.683, 45.525, 74.869, 73.228, 44.4, 53.271, 74.799, 46.381, 65.048, 60.152, 46.305, 55.142, 59.954, 53.948, 47.835, 69.025, 66.669, 64.971, 53.974, 66.503, 73.205, 44.407, 72.653, 66.519, 66.242, 44.847, 66.246, 44.985, 63.983, 54.694, 60.163, 71.288, 75.189, 65.045, 46.387, 70.808, 54.257, 75.449, 64.017, 45.22, 72.814, 66.492, 55.634, 44.291, 74.811, 72.956, 44.896, 65.142, 45.562, 74.725, 64.921, 54.21, 46.421, 74.605, 61.146, 60.424, 55.464, 71.636, 47.031,

Service Response Data

Response Time (ms)	Status Code	Number Of Values	Average Rate	To Currencies	Currency Values
2285	200	1	74.731		74.731
338	200	0	0.0	CHF, MXN, ZAR, INR, CNY, THB, AUD, ILS, KRW, JPY, PLN, GBP, IDR, HUF, PHP, TRY, HKD, ISK, DKK, CAD, MYR, USD, BGN, NOK, RON, SGD, CZK, SEK, NZD, BRL	
361	200	1	83.38	INR	[]
340	200	1	83.38	INR	[]
340	200	1	74.731		74.731
358	200	0	0.0	CHF, MXN, ZAR, INR, CNY, THB, AUD, ILS, KRW, JPY, PLN, GBP, IDR, HUF, PHP, TRY, HKD, ISK, DKK, CAD, MYR, USD, BGN, NOK, RON, SGD, CZK, SEK, NZD, BRL	
70	200	0	0.0	CHF, MXN, ZAR, INR, CNY, THB, AUD, ILS, KRW, JPY, PLN, GBP, IDR, HUF, PHP, TRY, HKD, ISK, DKK, CAD, MYR, USD, BGN, NOK, RON, SGD, CZK, SEK, NZD, BRL	
509	200	0	0.0	CHF, MXN, ZAR, INR, CNY, THB, AUD, ILS, KRW, JPY, PLN, GBP, IDR, HUF, PHP, TRY, HKD, ISK, DKK, CAD, MYR, USD, BGN, NOK, RON, SGD, CZK, SEK, NZD, BRL	
70	200	0	0.0	CHF, MXN, ZAR, INR, CNY, THB, AUD, ILS, KRW, JPY, PLN, GBP, IDR, HUF, PHP, TRY, HKD, ISK, DKK, CAD, MYR, USD, BGN, NOK, RON, SGD, CZK, SEK, NZD, BRL	
290	200	1	83.4	INR	[]
318	200	1	0.93032	EUR	[]
272	200	0	0.0	CHF, MXN, ZAR, INR, CNY, THB, AUD, ILS, KRW, JPY, PLN, GBP, IDR, HUF, PHP, TRY, HKD, ISK, DKK, CAD, MYR, USD, BGN, NOK, RON, SGD, CZK, SEK, NZD, BRL	
58	200	0	0.0	CHF, MXN, ZAR, INR, CNY, THB, AUD, ILS, KRW, JPY, PLN, GBP, IDR, HUF, PHP, TRY, HKD, ISK, DKK, CAD, MYR, USD, BGN, NOK, RON, SGD, CZK, SEK, NZD, BRL	
...	CHF, MXN, ZAR, INR, CNY, THB, AUD, ILS, KRW, JPY, PLN, GBP, IDR, HUF, PHP, TRY, HKD, ISK, DKK, CAD, MYR, USD, BGN, NOK, RON, SGD, CZK, SEK, NZD, BRL	