

## Project 4

### Currency Conversion App

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#### Description :

This application facilitates seamless currency conversion by allowing users to:

1. **Input the Amount:** Enter the amount they wish to convert.
2. **Select Currencies:** Choose the base currency (from which the amount is converted) and the target currency (to which the amount is converted).
3. **Real-Time Conversion:** Instantly calculate the converted amount based on the latest exchange rate.

In addition to providing accurate conversion results, the app offers the following features:

- **Current Exchange Rate Display:** Displays the most recent conversion rate used in the calculation.
- **Historical Comparison:** Retrieves and displays the exchange rate from the last time the same base and target currency pair was queried.
- **Rate Difference Analysis:** Highlights the difference between the previous exchange rate and the current rate.
- **Timestamp Tracking:** Displays the date and time of the previous query for the selected currency pair.

By combining real-time accuracy with historical insights, the app enables users to make more informed decisions in currency conversion.

The name of the native Android application in the Android Project is Projec\_4

- a. **Has at least three different kinds of Views in your Layout .**

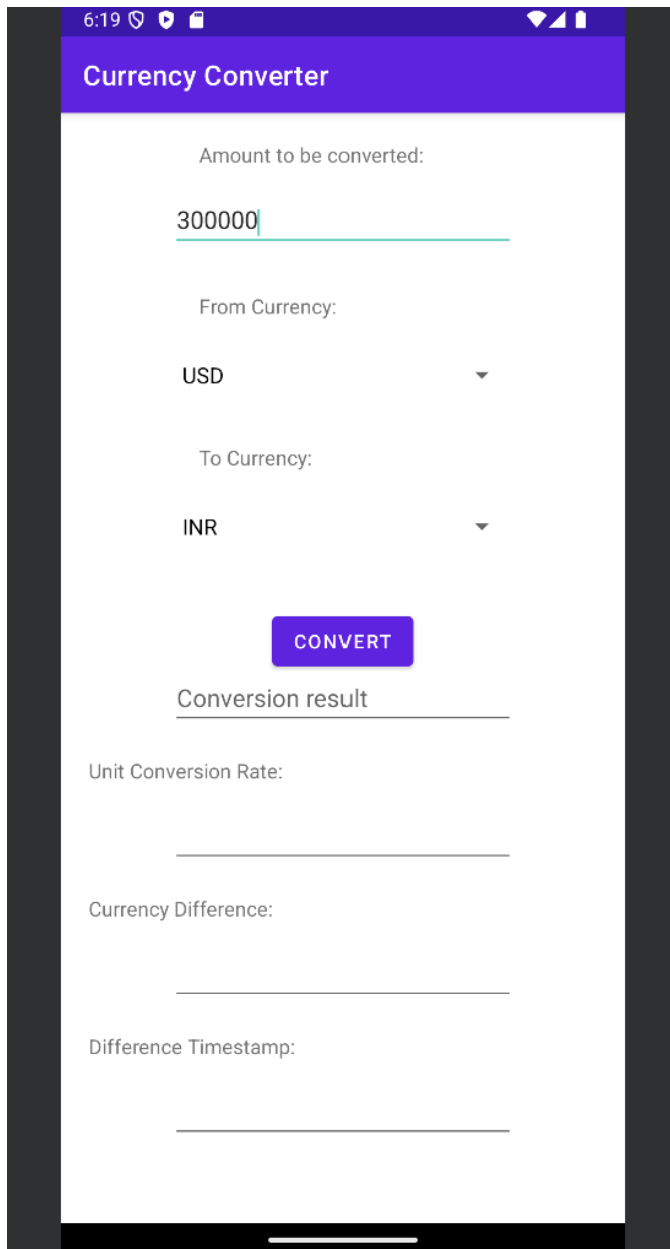
My application uses -

- **TextView**: Used for displaying static text, such as the title and labels (e.g., TextView with ID @+id/textView).
- **EditText**: Used for user input fields (e.g., EditText with ID @+id/currency\_to\_be\_converted).
- **Spinner**: Used for dropdown lists to select an item from a list (e.g., Spinner with ID @+id/convert\_from).
- **Button**: Used for triggering an action, like converting currencies (e.g., Button with ID @+id/button).

Layout when app starts :

b. **Requires input from the user**

The user is required to select the base currency, target currency and the amount they want to get converted :



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

The application makes an HTTP POST request using the `SendRequestTask` class in `MainActivity.java`. The HTTP request is sent to the server endpoint:

`https://crispy-space-couscous-v6pg9jx6ggjq3pv7w-8080.app.github.dev/api/currency-conversion`

The request contains the following fields as JSON payload:

- **requestTimestamp**: Current timestamp in dd-MM-yyyy, HH:mm:ss format.
- **androidModel**: Model of the user's Android device.
- **baseCurrency**: The currency the user is converting from.
- **targetCurrency**: The currency the user is converting to.
- **baseValue**: The amount of the base currency the user wants to convert.

d. **Receives and parses a JSON formatted reply from web service in the format :**

- **targetCurrencyValue**: Represents the converted value in the target currency (e.g., 90.50).
- **unitConversionRate**: Shows the exchange rate used for the conversion (e.g., 0.905).
- **difference**: Indicates the difference between the current and previous exchange rates (e.g., 0.005).
- **previousTimestamp**: Provides the timestamp of the last exchange rate update in ISO 8601 format .

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

The screenshot shows a mobile application titled "Currency Converter" with a purple header. The interface includes several input fields and a central button. The "Amount to be converted:" field contains the value "300000". The "From Currency:" dropdown menu is set to "USD", and the "To Currency:" dropdown menu is set to "INR". A purple "CONVERT" button is positioned below these dropdowns. Below the button, the converted amount is displayed as "2.534651156331E7". Further down, the "Unit Conversion Rate:" field shows "84.4883718777", the "Currency Difference:" field shows "0.0", and the "Difference Timestamp:" field shows "22-11-2024, 06:51:10". The app is running on a device with a status bar at the top showing the time as 6:26.

6:26

### Currency Converter

Amount to be converted:

300000

From Currency:

USD ▼

To Currency:

INR ▼

CONVERT

2.534651156331E7

Unit Conversion Rate:

84.4883718777

Currency Difference:

0.0

Difference Timestamp:

22-11-2024, 06:51:10

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

Yes. The user can change the values and selections and hit "Convert" again and the app still works.

6:28

### Currency Converter

Amount to be converted:

800

From Currency:

BGN

To Currency:

INR

CONVERT

36309.405374559996

Unit Conversion Rate:

45.3867567182

Currency Difference:

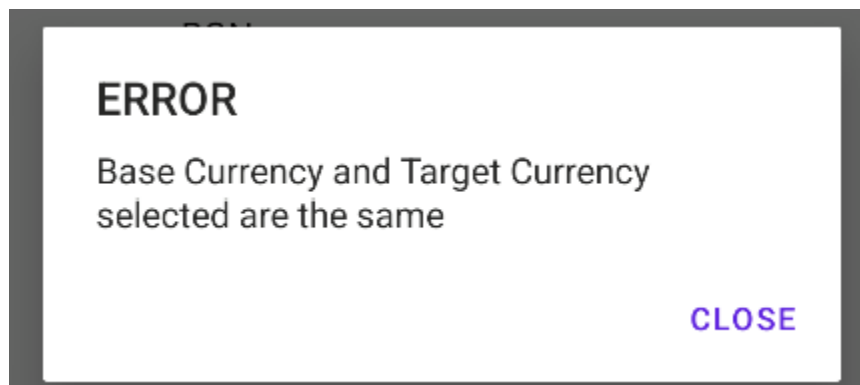
0.0

Difference Timestamp:

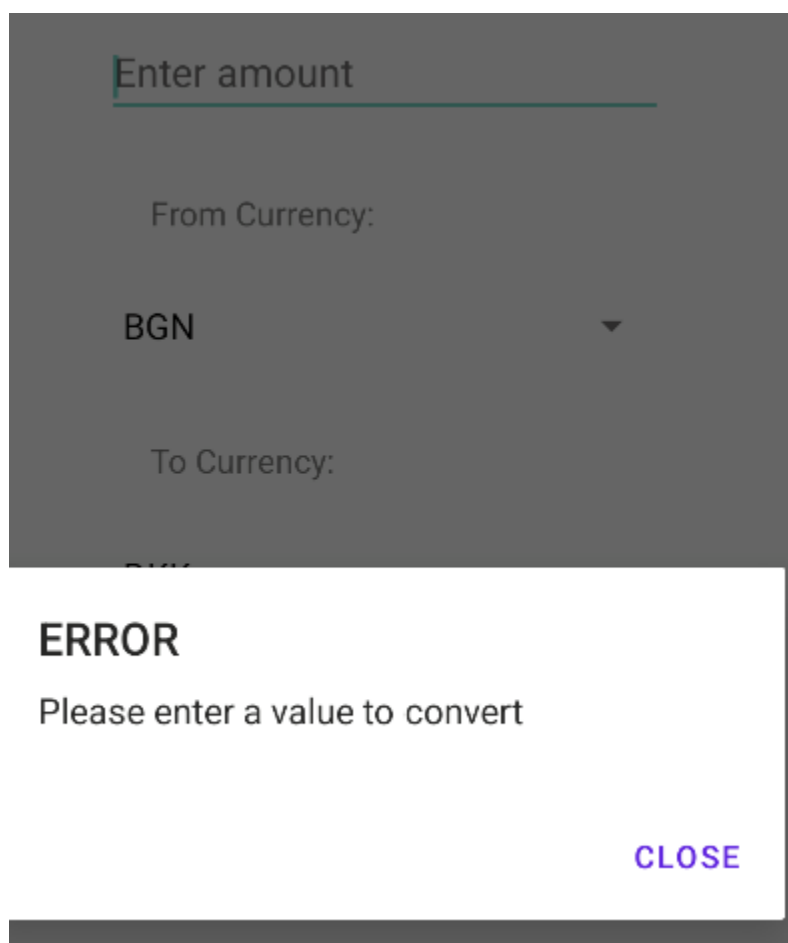
N/A

## ERROR LOGGING

If the same base currency and target currency is selected, an error dialog pops up asking the user to enter different selections.



The app does not allow you to enter letters in amount to be converted. And if the Amount is left blank – it shows another dialog to enter a value.





## 2. Implement a web service

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

The web app is deployed on codespaces with the URL :

```
https://crispy-space-couscous-v6pg9jx6ggjq3pv7w-8080.app.github.dev/api/currency-conversion
```

In my web app project :

#### **Model :**

Request

MobileAppRequest

FreeCurrencyAppRequest

Response

MobileAppResponse

FreeCurrencyAppResponse

LogInformation

#### **Database Connection:**

Db.connection

MongoDBConnection.

#### **Controller :**

web

App

CurrencyConversion Servlet.

Dashboard

DashboardServlet

#### **View :**

Index.jsp

Dashboard.jsp

## Project Structure in IntelliJ

- ▼ java
  - ▼ ds.project4webapp
    - ▼ db.connection
      - © MongoDBConnection
    - ▼ model
      - ▼ request
        - © FreeCurrencyAppRequest
        - © MobileAppRequest
      - ▼ response
        - © FreeCurrencyAppResponse
        - © MobileAppResponse
      - © LogInformation
    - ▼ web
      - ▼ app
        - © CurrencyConversionServlet
      - ▼ dashboard
        - © DashboardServlet
  - > resources
  - ▼ webapp
    - JSP dashboard.jsp
    - JSP index.jsp

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

The CurrencyConversionServlet receives request from the Android Application HTTP POST request. Android App converts all the data in JSON format and sends it to the servlet for processing.

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

The application is designed to handle business logic efficiently, ensuring smooth integration with third-party APIs and seamless communication with client applications. The process includes the following steps:

**1. Receiving the Request:**

- a. Accepts a JSON-formatted request from the Android application.
- b. Parses the JSON data to create a MobileAppRequest object.

**2. Data Transformation:**

- a. Extracts the necessary parameters from the MobileAppRequest object.
- b. Uses these parameters to construct a FreeCurrencyAppRequest object, which serves as the core representation of the user's request.

**3. API Interaction:**

- a. Constructs the API URL based on the parameters in the FreeCurrencyApp Request object.
- b. Sends a request to the third-party API (via XML or JSON format) to fetch the necessary data.

**4. Processing the Response:**

- a. Receives the response from the API and processes it.
- b. Converts the processed data into a MobileAppResponse object.

**5. Returning the Response:**

- a. Sends the MobileAppResponse object back to the Android application in JSON format, ensuring compatibility with the client.

# Welcome to the Currency Conversion App

Our Currency Conversion App provides real-time exchange rates and conversion capabilities for a wide range of currencies. Whether you're traveling, managing international business, or just curious about currency values, our app has you covered.

## About Free API Currency Conversion

Our app utilizes a free currency converter API to provide up-to-date exchange rates. Here are some key features:

- Real-time exchange rates for 170+ currencies
- Historical exchange rate data available
- Supports major currencies including EUR, USD, GBP, JPY, and more
- Regular updates ensure accuracy of conversion rates
- Easy integration with various programming languages

Want to check out our Dashboard for some analytics:

[Go to Currency Conversion Dashboard](#)

## How It Works

## About Free API Currency Conversion

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## How It Works

Our app connects to a reliable currency API that provides real-time exchange rates. When you use the dashboard, you can:

1. Select your base currency
2. Choose the target currency
3. Enter the amount you want to convert
4. Get instant, accurate conversion results

Dashboard -

# Currency Conversion Dashboard

## Analytics

### Requests

Total Requests: 34  
Success Requests: 32  
Failed Requests: 2  
Total Requests Today: 0

### Currency

Top Base Currencies:

INR (17)  
USD (9)  
EUR (3)  
BGN (2)  
HUF (1)

Top Target Currency:

EUR (17)  
INR (7)  
USD (3)  
RON (1)  
JPY (1)  
GBP (1)  
DKK (1)  
SEK (1)

### Top 3 Android Models

Google Pixel5 (14)  
sdk\_gphone64\_x86\_64 (13)  
Samsung Note10 (5)

## Historical Data

Sr. No.	Request ID	Status	Base Currency	Target Currency	Unit Conversion Rate	Previous Unit Conversion Rate	Difference
1	req-1732082297549	success	USD	INR	84.2632856476	84.2632856476	0.0
2	req-1732083237387	success	USD	INR	84.2632856476	84.2632856476	0.0
3	req-1732083298288	success	INR	USD	0.0118675648	0.0118675648	0.0
4	null	failure	INR	USD	0.0	0.0	0.0
5	req-1732083423953	success	INR	USD	0.0118675648	0.0118675648	0.0

MongoDB :

CARNEGIE MELLON UNIVERSITY > PROJECT 0 > DATABASES

distributedProject

VERSION8.0.3REGIONAZURE Virginia-East2 (eastus2)

OverviewReal TimeMetricsCollectionsAtlas SearchPerformance AdvisorOnline ArchiveCmd Line Tools

DATABASES: 3COLLECTIONS: 9

View your schema example(s)

VISUALIZE YOUR DATA

REFRESH

+ Create Database

Search Namespaces

CurrencyDB

ConversionLogs

LogInformation

myDatabase

sample\_mflix

CurrencyDB.LogInformation

CLUSTERED

STORAGE SIZE: 36KBLOGICAL DATA SIZE: 14.79KBTOTAL DOCUMENTS: 34INDEXES TOTAL SIZE: 0B

FindIndexesSchema Anti-Patterns0AggregationSearch Indexes

Generate queries from natural language in Compass

INSERT DOCUMENT

Filter

Type a query: { field: 'value' }

Reset

Apply

Options

QUERY RESULTS: 1-20 OF MANY

```
_id: ObjectId('673d7a7989bf9820bbc6e66c')
status: "success"
requestTimestamp: "17-11-2024, 21:32:34"
requestId: "req-1732682297549"
requestReceivedTimestamp: 2024-11-20T05:58:14.890+00:00
processingTime: 2659
baseCurrency: "USD"
baseValue: "701"
```

Log Information stored in MongoDB :



```
_id: ObjectId('673d7a7989bf9820bbc6e66c')
status: "success"
requestTimestamp: "17-11-2024, 21:32:34"
requestId: "req-1732082297549"
requestReceivedTimestamp: 2024-11-20T05:58:14.890+00:00
processingTime: 2659
baseCurrency: "USD"
baseValue: "201"
targetCurrency: "INR"
targetValue: 16936.9204151676
unitConversionRate: 84.2632856476
difference: 0
previousTimestamp: null
responseTimestamp: 2024-11-20T05:58:17.549+00:00
```

```
Connection String : DATABASE_URI =
"mongodb+srv://jkhancha:VarshaG1702@distributedproject.wsjs5.mongodb.net/?retryWrites=true&w=majority&appName=distributedProject"; // Adjust if needed
/**
```

```
DATABASE_NAME = "CurrencyDB";
COLLECTION_NAME = "LogInformation";
```