**CIS 2286. Lab Assignment 2.**

**Conditions, Loops**

**Strings**

**Testing**

**Error handling**

Goal: Load currency quotes from external service. Add input validation methods and error handling. Add unit tests.

***Detailed requirements:***

1. Allow Currency Exchange service (CE) run in a loop to collect user input.
2. Add an “action” parameter. Display a menu to allow selection of the following actions. Depending on the action collect the following input fields

* save the new convertion rate

**action=’S’**

**currency\_from**

**currency\_to**

**convertion\_rate**

* display available quotes

**action=’D’**

* exchange an amount in one currency to an amount in the other currency

**action=’X’**

**currency\_from**

**currency\_to**

**amount**

* get currency quote for the two currencies

**action=’Q’**

**currency\_from**

**currency\_to**

* exit application

**action=’E’**

1. Currency quote is loaded from the external service <https://free.currencyconverterapi.com/>

“JSON support” link on this page is the REST API endpoint we are using. Please do not abuse this free service . Your goal is to extract value of **convertion\_rate** from the JSON string returned by the service

1. Implement validation of user input: amount, currencies, action. Normalize action. Details of the new functions are in **app.py** specs
2. Implement storage and display of quotes through a global list **quote**.**quote\_list**
3. \*Extra: implement additional logging of timing of the call and input parameters by adding decorator common.log to methods
4. Add 5 more success and fail unit tests for the validation functions. Unit tests are in

**tests/currency\_exchange\_tests**

to run all tests:

**python -m unittest tests.currency\_exchange\_tests**

to run group of tests:

**python -m unittest tests.currency\_exchange\_tests.TestConvertionMethods**

1. While connecting to remote service always wrap the service call in **try–except** clauses
2. Run your application with the use cases below logging to a log file:

**python3 app.py 2>log**

**python3 app.py 2>>log appends to an existing file**

***Test use cases:***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **#** | **action** | **currency\_from** | **currency\_to** | **amount** | **convertion\_rate** |
| 1 | Q | USD | EUR | ---- | ---- |
| 2 | S | USD | GBP | ---- | 0.74 |
| 3 | D | ---- | ---- | ---- | ---- |
| 4 | X | GBP | AUD | 12.12 | ---- |
| 5 | Q | AUD | EUR | ---- | ---- |
| 6 | X | AUD | GPB | 109.09 | ---- |
| 7 | S | EUR | AUD | ---- | 1.59 |
| 8 | D | ---- | ---- | ---- | ---- |
| 9 | S | JPY | AUD | ---- | 0.012 |
| 10 | Q | JPY |  | ---- | ---- |
| 11 | X | USD | AUD | 237 | ---- |
| 12 | D | ---- | ---- | ---- | ---- |
| 13 | E | ---- | ---- | ---- | ---- |

***My script produces the following output:***

LAPIN:CIS2886 sab$ python currency-exchange-lab2/app.py 2>log

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> q

Currency from [USD]:

Currency to [EUR]:

{"USD\_EUR:{"val":0.8381}}

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> s

Currency from [USD]: GBP

Currency to [EUR]:

User-defined conversion rate: 0.74

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> D

['{"USD\_EUR:{"val":0.8381}}', '{"GBP\_EUR:{"val":0.74}}']

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> x

Currency from [USD]: GBP

Currency to [EUR]: AUD

Amount to convert [0.0]: 12.12

{ "success" : true, "error" : false, "source" : {"amount" : "12.12 ", "currency" : "GBP"}, "target" : {"amount" : "21.83 ", "currency" : "AUD"}}

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> q

Currency from [USD]: AUD

Currency to [EUR]: EUR

{"AUD\_EUR:{"val":0.631002}}

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> x

Currency from [USD]: AUD

Currency to [EUR]: GBP

Amount to convert [0.0]: 109.99

{ "success" : true, "error" : false, "source" : {"amount" : "109.99 ", "currency" : "AUD"}, "target" : {"amount" : "61.07 ", "currency" : "GBP"}}

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> s

Currency from [USD]: EUR

Currency to [EUR]: AUD

User-defined conversion rate: 1.59

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> d

['{"USD\_EUR:{"val":0.8381}}', '{"GBP\_EUR:{"val":0.74}}', '{"GBP\_AUD:{"val":1.801383}}', '{"AUD\_EUR:{"val":0.631002}}', '{"AUD\_GBP:{"val":0.555217}}', '{"EUR\_AUD:{"val":1.59}}']

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> sJPY

Currency from [USD]: AUD

Currency to [EUR]:

User-defined conversion rate: 0.012

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> d

['{"USD\_EUR:{"val":0.8381}}', '{"GBP\_EUR:{"val":0.74}}', '{"GBP\_AUD:{"val":1.801383}}', '{"AUD\_EUR:{"val":0.631002}}', '{"AUD\_GBP:{"val":0.555217}}', '{"EUR\_AUD:{"val":1.59}}', '{"AUD\_EUR:{"val":0.012}}']

\*\*\*\* Welcome to Currency Converter App \*\*\*\*

What do you want to do:

D Display available quotes [default]

Q get Quote

S Save the new convertion rate

X Exchange amount into the new currency

E Exit

> e

***The content of the log file:***

2018-05-14 16:09:35.110875 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local Started

2018-05-14 16:09:45.043973 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=0.00, in=USD, out=EUR, rate=0.0, action=Q

2018-05-14 16:09:45.044021 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local USD EUR 0

2018-05-14 16:09:45.287987 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local server response: [{"USD\_EUR":{"val":0.8381}}]

2018-05-14 16:09:45.288084 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local {"USD\_EUR:{"val":0.8381}}

2018-05-14 16:10:13.457414 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=0.00, in=GBP, out=EUR, rate=0.74, action=S

2018-05-14 16:10:13.457482 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local GBP EUR 0

2018-05-14 16:10:16.449421 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=0.00, in=, out=, rate=0.0, action=D

2018-05-14 16:10:16.449481 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local 0

2018-05-14 16:10:32.945267 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=12.12, in=GBP, out=AUD, rate=0.0, action=X

2018-05-14 16:10:32.945328 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local GBP AUD 12.12

2018-05-14 16:10:33.114358 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local server response: [{"GBP\_AUD":{"val":1.801383}}]

2018-05-14 16:10:33.114447 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local 1.801383 21.83

2018-05-14 16:10:33.114478 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local { "success" : true, "error" : false, "source" : {"amount" : "12.12 ", "currency" : "GBP"}, "target" : {"amount" : "21.83 ", "currency" : "AUD"}}

2018-05-14 16:10:46.184385 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=0.00, in=AUD, out=EUR, rate=0.0, action=Q

2018-05-14 16:10:46.184434 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local AUD EUR 0

2018-05-14 16:10:46.349733 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local server response: [{"AUD\_EUR":{"val":0.631002}}]

2018-05-14 16:10:46.349809 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local {"AUD\_EUR:{"val":0.631002}}

2018-05-14 16:11:12.188267 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=109.99, in=AUD, out=GBP, rate=0.0, action=X

2018-05-14 16:11:12.188316 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local AUD GBP 109.99

2018-05-14 16:11:12.357897 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local server response: [{"AUD\_GBP":{"val":0.555217}}]

2018-05-14 16:11:12.357967 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local 0.555217 61.07

2018-05-14 16:11:12.357988 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local { "success" : true, "error" : false, "source" : {"amount" : "109.99 ", "currency" : "AUD"}, "target" : {"amount" : "61.07 ", "currency" : "GBP"}}

2018-05-14 16:11:42.829524 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=0.00, in=EUR, out=AUD, rate=1.59, action=S

2018-05-14 16:11:42.829592 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local EUR AUD 0

2018-05-14 16:11:44.996106 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=0.00, in=, out=, rate=0.0, action=D

2018-05-14 16:11:44.996164 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local 0

2018-05-14 16:12:11.478593 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=0.00, in=AUD, out=EUR, rate=0.012, action=S

2018-05-14 16:12:11.478653 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local AUD EUR 0

2018-05-14 16:12:18.519933 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=0.00, in=, out=, rate=0.0, action=D

2018-05-14 16:12:18.519989 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local 0

2018-05-14 16:12:28.005550 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local amount=0.00, in=, out=, rate=0.0, action=E

2018-05-14 16:12:28.005634 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local 0

2018-05-14 16:12:28.005657 currency-exchange 37704 1cc51c0a-484d-4340-aee0-79db84b1c70d LAPIN.local Ended

***Code structure for lab2***

The project code contains several files with functions prototypes for Lab1 solution. The goal is to implement these methods.

**currency-exchange**

**├── \_\_init\_\_.py**

**├── app.py**

**├── common**

**│   ├── \_\_init\_\_.py**

**│   └── utils.py**

**├── log**

**├── resources**

**│   ├── \_\_init\_\_.py**

**│   ├── quote.py**

**│   └── transaction.py**

**└── tests**

**└── currency\_exchange\_tests.py**

The structure of this tree is designed for the future move from a command line script to a Flask application. We will start outlining our project as a RESTful application from the beginning.

**currency-exchange/** is the root directory for this project and the name of the service (application)

**app.py** is the main entry point of the application. The logic is outlined in app.main\_command\_line()

**common**/ consists of common classes and functions that are useful for all the modules. Some examples are global constants, global helper functions or logging utilities. Currently we have util.py module with log function

**resources/** - collection of modules representing resources. Resource is the fundamental concept in any RESTful application. A resource is a unit of a REST API that you can call. It has some type, associated data, methods operating on it and relationships with other resources. In our project we will be defining two resources:

- **quote**: an exchange rate between two currencies

- **transaction**: a transfer of a given amount from one currency to another

**\_\_init\_\_.py** - files are required to make Python treat the directories as containing packages; this is done to prevent directories with a common name, such as string, from unintentionally hiding valid modules that occur later (deeper) on the module search path

**tests/currency\_exchange\_tests.py -** unit tests