While folks are joining

- Get you laptops ready and login to www.crio.do
- Open Qmoney ME and start your workspace.
- Open Terminal and type
  - cd ~/workspace
- Clone the repo in ~/workspace directory
  - git clone git@gitlab.crio.do:bdt-sprint-codes/core-java-i/core-java-i-session-activities.git
- Open session-1 folder.
- Wait for Java Language Server Setup to complete.
- Setup Video for Reference

Crio Sprint: CORE-JAVA-1

Session 1

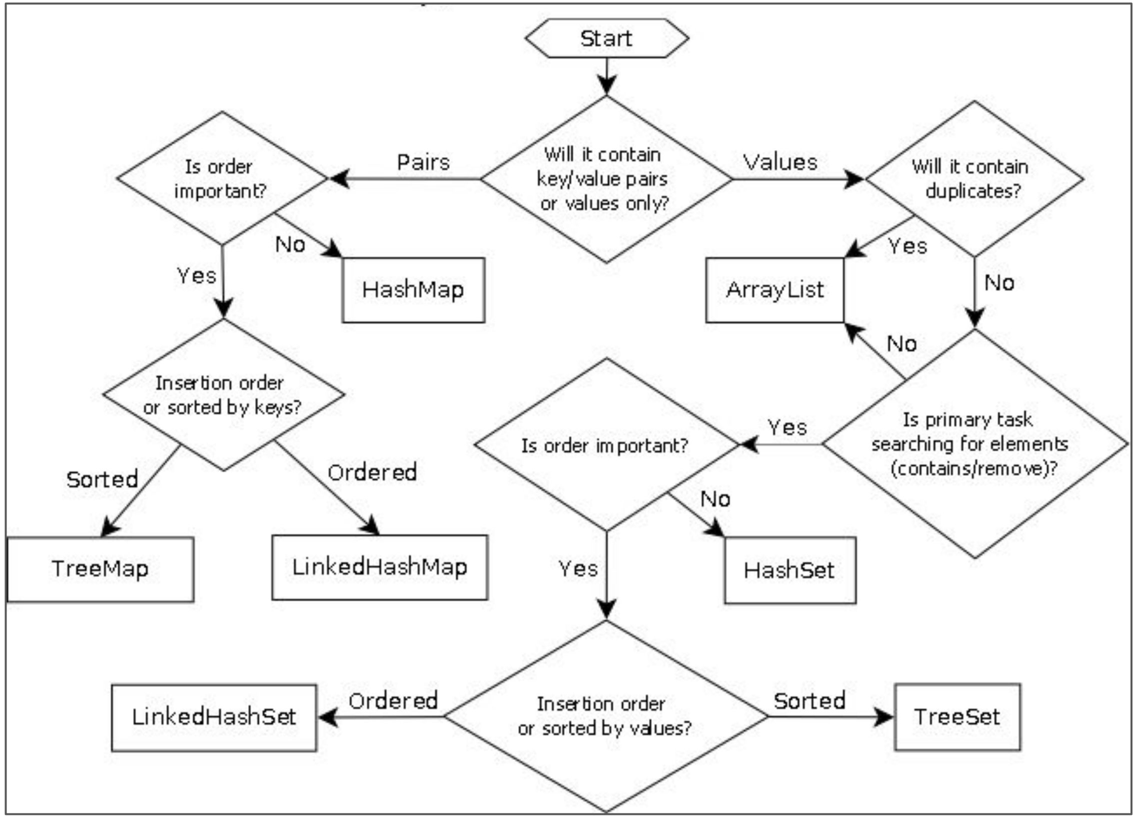
Contents of CORE-JAVA-1 Sprint

- ME: QMoney
- JSON
- Jackson
- HTTP & REST API Basics
- Comparator & Comparable
- Builder Design Pattern
- Java Streams
- Factory Design Pattern
- Gradle
- Exception Handling
- MultiThreading

Today’s Session Agenda

- Recap
    - Java Collection
- JSON
- Jackson
- ME: QMoney Intro
- ME: QMoney Module 1 Intro

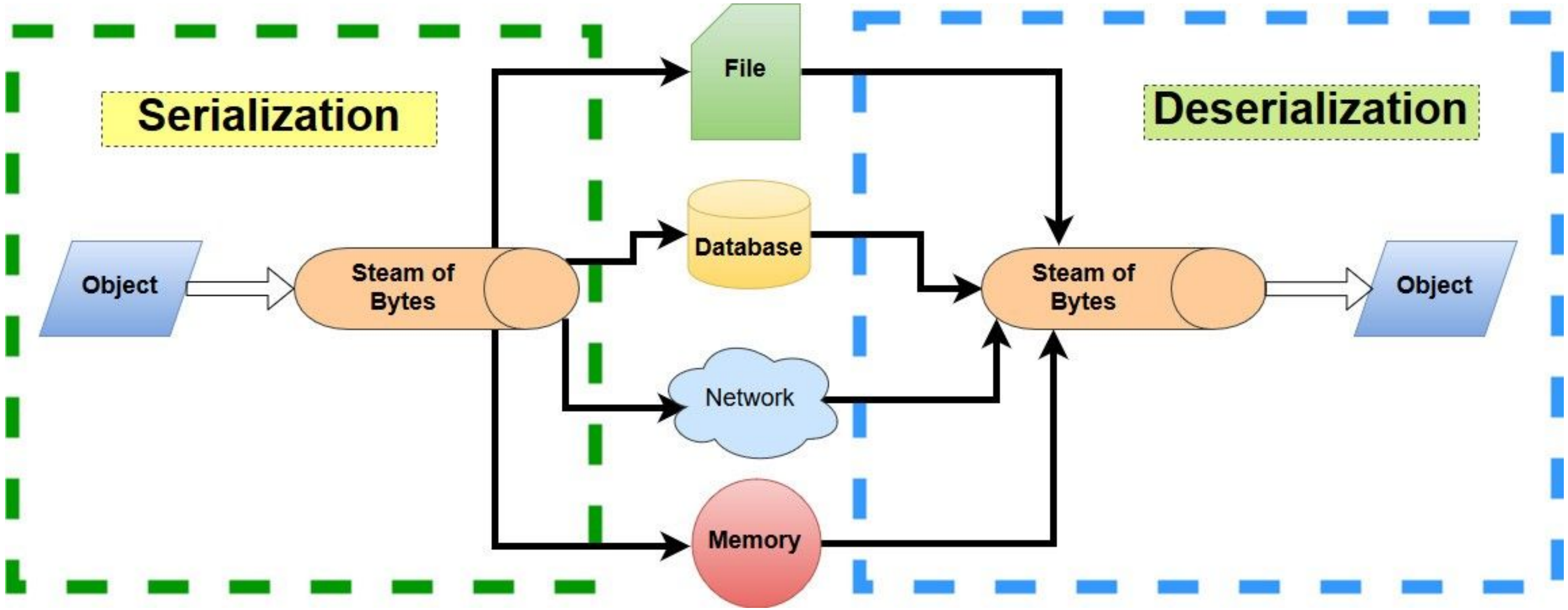
Recap - Java Collection


Start
Will it contain key/value pairs or values only?
Pairs
Values
Is order important?
No
HashMap
Yes
Insertion order or sorted by keys?
Sorted
TreeMap
Ordered
LinkedHashMap
Will it contain duplicates?
Yes
ArrayList
No
Is primary task searching for elements (contains/remove)?
No
Yes
Is order important?
No
HashSet
Yes
Insertion order or sorted by values?
Ordered
LinkedHashSet
Sorted
TreeSet

Thinking Caps

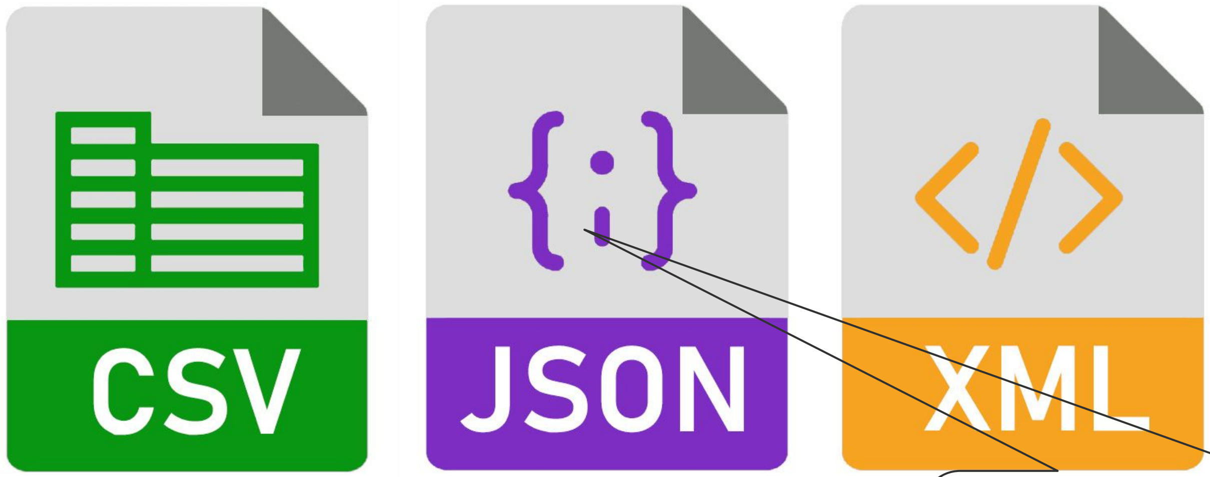
- What happens to data stored in Java Collections when program execution is completed?
- How can we persist the data even after completion of the program?
- Can persistent data be utilized by program written in any language? Why?
- In which format is data transferred across internet?
- What are the different video formats supported by Youtube video?
- How does Youtube convert data packets into streaming video?
    - Using a Decoder
- What is the process of encoding / decoding called as?
    - Serialization and Deserialization

(De) Serialization



Data File Format

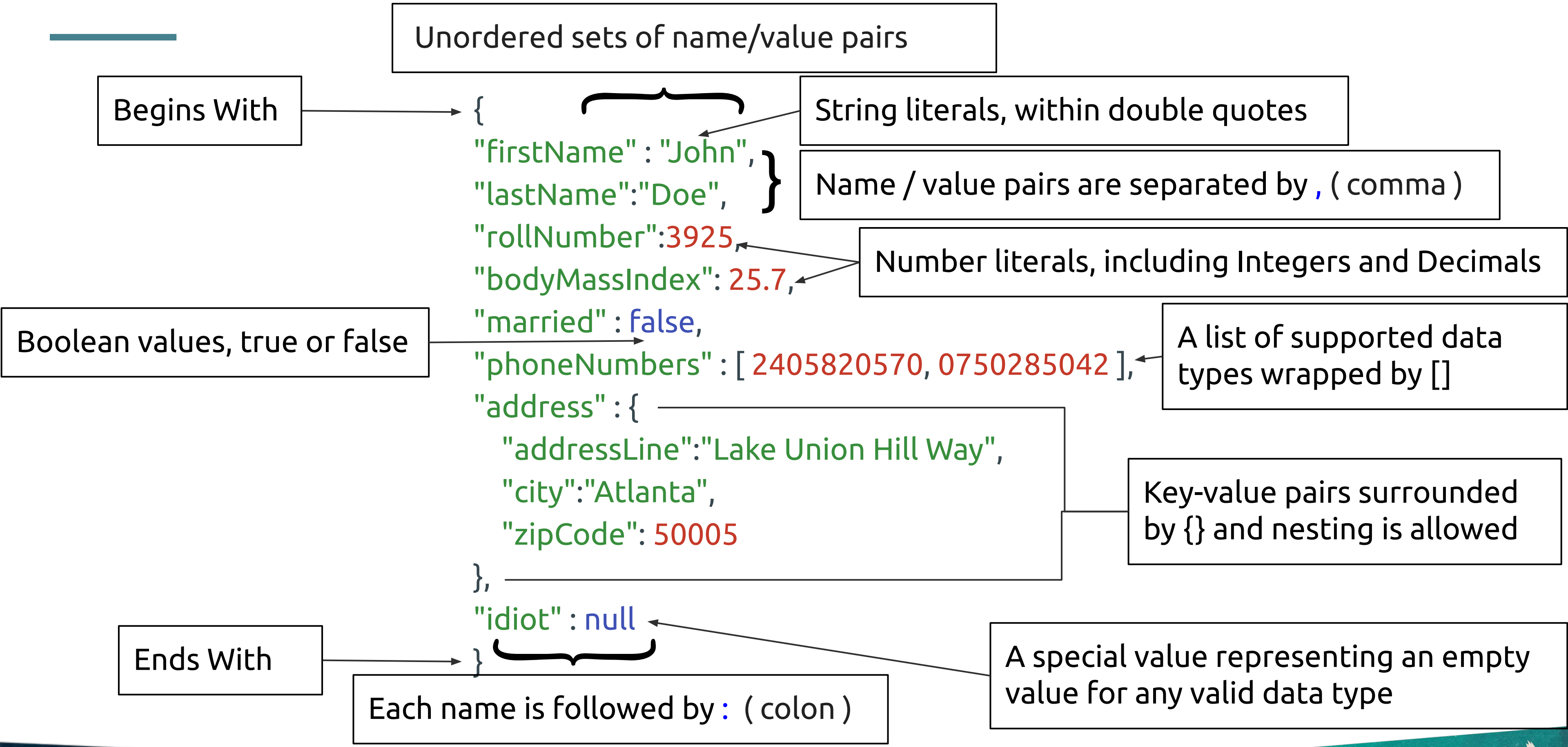
- Can you list down famous data formats used to store / exchange data?



- Less common - many more like Avro, Parquet, ORC ,etc.

- Most common format to transfer data on the internet. Human readable.
- Microservices - mostly use JSON to exchange information.

JSON



```
{
"firstName" : "John",
"lastName":"Doe",
"rollNumber":3925,
"bodyMassIndex": 25.7,
"married" : false,
"phoneNumbers" : [ 2405820570, 0750285042 ],
"address" : {
   "addressLine":"Lake Union Hill Way",
   "city":"Atlanta",
   "zipCode": 50005
},
"idiot" : null
}
```

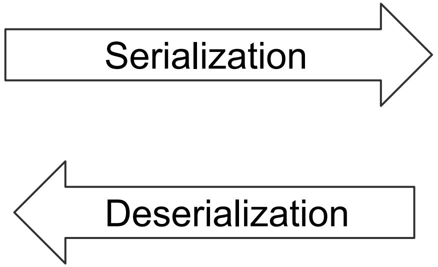
Unordered sets of name/value pairs
Begins With
String literals, within double quotes
Name / value pairs are separated by , (comma)
Number literals, including Integers and Decimals
Boolean values, true or false
A list of supported data types wrapped by []
Key-value pairs surrounded by {} and nesting is allowed
Ends With
A special value representing an empty value for any valid data type
Each name is followed by : (colon)

JSON (De)Serialization

Java stores information as Objects. How to (De) Serialize Java POJO to JSON vice-versa?

```
ObjectMapper om = new ObjectMapper();
Member m = new Member("J Jonah Jameson",29,"Omni Man");
String s = om.writeValue(outputFile,m);
```

```
public class Member {
   public String name;
   public Integer age;
   public String secretIdentity;
   ...
}
```

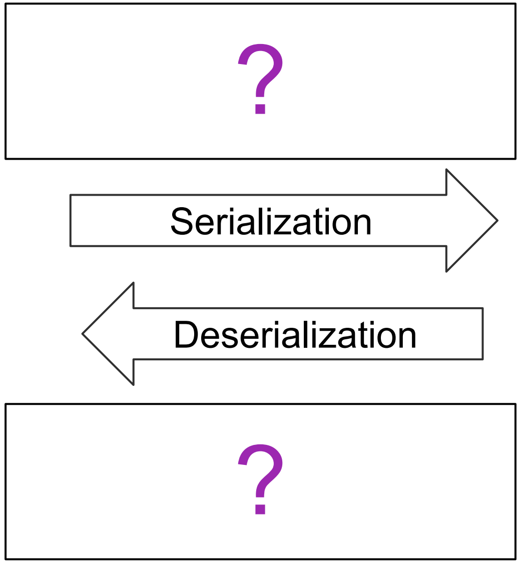


```
{
   "name": "J Jonah Jameson",
   "age": 60,
   "secretIdentity": "Omni Man"
}
```

```
String inputFile = "{\"name\": \"J Jonah Jameson\",\"age\": 60,\"secretIdentity\": \"Omni Man\"}";
ObjectMapper om = new ObjectMapper();
Member m = om.readValue(inputFile, Member.class);
```

Activity #1 - Parse Stock Data

```java
public class Trade {
  public String symbol;
  public int quantity;
  public String purchaseDate;
}
```

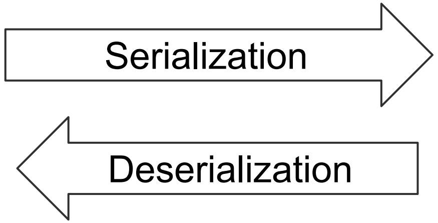


```json
[
  {
    "symbol": "AAPL",
    "purchaseDate": "2019-01-02"
    "quantity": 100
  },
  {
   "quantity": 10,
   "purchaseDate": "2019-01-02",
    "symbol": "MSFT"
  }
]
```

- Complete the (De)Serialization Logic in parseJSONJacksomattically method.
- How does Jackson know which variable to map a JSON key to?
- What happens if change the name of symbol to symbl in POJO? Edit and Run the Program.
- What happens if change data type of quantity to String in POJO? Edit and Run the program.
- What will Jackson if there are duplicate keys in JSON? Try it out!

Activity #2 - Annotations to the Rescue

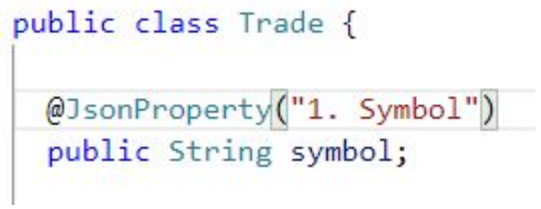
```java
public class Trade {
  public String symbol;
  public int quantity;
  public String purchaseDate;
}
```



Keys don't match?

```json
[
  {
    "1. symbol": "AAPL",
    "2. quantity": 100,
    "3. purchaseDate": "2019-01-02",
  },
  {
    "1. symbol": "MSFT",
    "2. quantity": 10,
    "3. purchaseDate": "2019-01-02",
  }
]
```

- Copy (De)Serialization logic from activity 1 to this activity.
- Run the program. What do you see?
- Suddenly keys have changed. What would you do? Do we have better solution?
  - Use @JsonProperty Annotation
- Annotate other required fields as well. Execute the program.

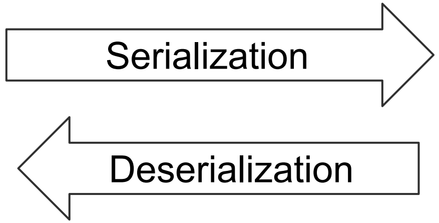


```java
public class Trade {

  @JsonProperty("1. Symbol")
  public String symbol;
```

Activity #2.1 - Annotations to the Rescue

```
public class Trade {
  public String symbol;
  public int quantity;
  public String purchaseDate;
}
```



```
[
  {
    "1. symbol": "AAPL",
    "2. quantity": 100,
    "3. purchaseDate": "2019-01-02",
    "4. weather": "Rainy"
  },
  {
    "1. symbol": "MSFT",
    "2. quantity": 10,
    "3. purchaseDate": "2019-01-02",
    "4. weather": "Sunny"

  }
]
```

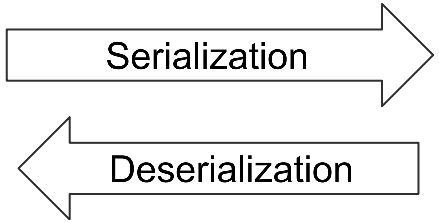
Unwanted fields ?

- Copy (De)Serialization logic from activity 1 to this activity.
- Copy changes made in Trade.java from activity 2 to this activity.
- Run the program. What do you see?
- Unwanted field was added in JSON. What would you do? Do we have better solution?
  - Use @JsonIgnoreProperties Annotation
  - Annotate the Trade POJO

Activity #3 - Private Data

```java
public class Trade {
  private String symbol;
  private int quantity;
  private String purchaseDate;
}
```

Fields are private ?

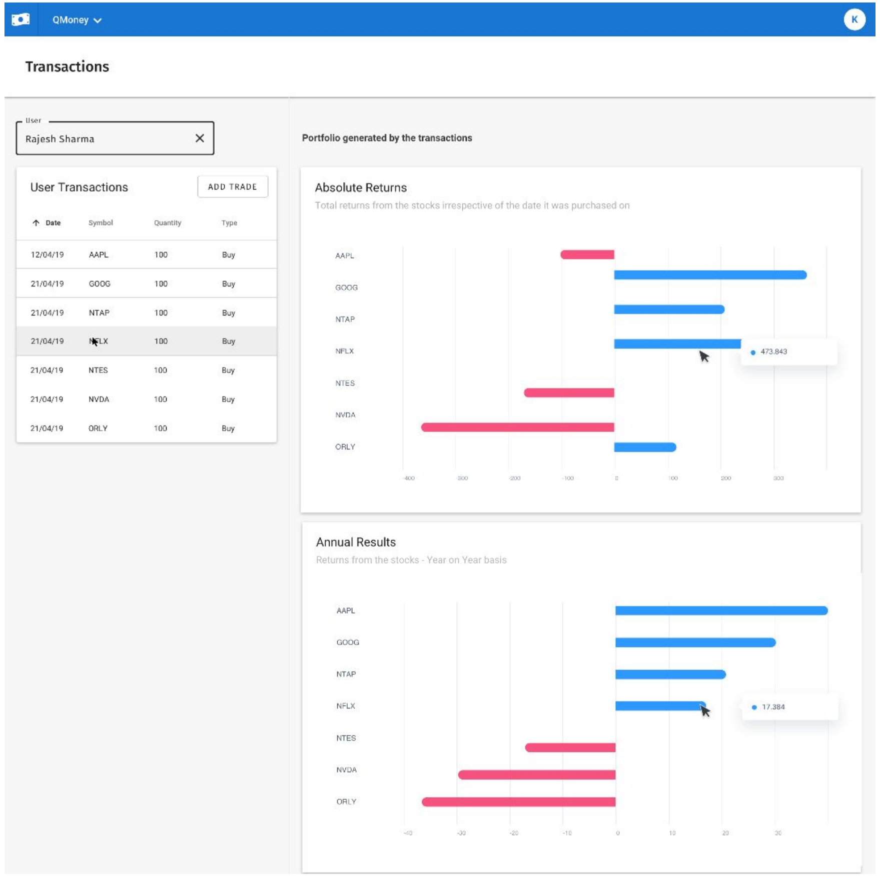


```json
[
  {
    "symbol": "AAPL",
    "purchaseDate": "2019-01-02"
    "quantity": 100
  },
  {
   "quantity": 10,
   "purchaseDate": "2019-01-02",
    "symbol": "MSFT"
  }
]
```

- Copy (De)Serialization logic from activity 1 to this activity.
- Run the program. What do you see? Any solution?
  - Add Getters
- What happens if change getSymbol to getSYmbol?
- Is there any annotation to make non-public field serializable without Getters? Google it.

Introduction to QMoney

- Stock Analyzer Tool for Portfolio Managers
- Annualized Returns and Absolute Returns



Transactions

User
Rajesh Sharma

User Transactions

ADD TRADE

Date	Symbol	Quantity	Type
12/04/19	AAPL	100	Buy
21/04/19	GOOG	100	Buy
21/04/19	NTAP	100	Buy
21/04/19	NFLX	100	Buy
21/04/19	NTES	100	Buy
21/04/19	NVDA	100	Buy
21/04/19	ORLY	100	Buy

Portfolio generated by the transactions

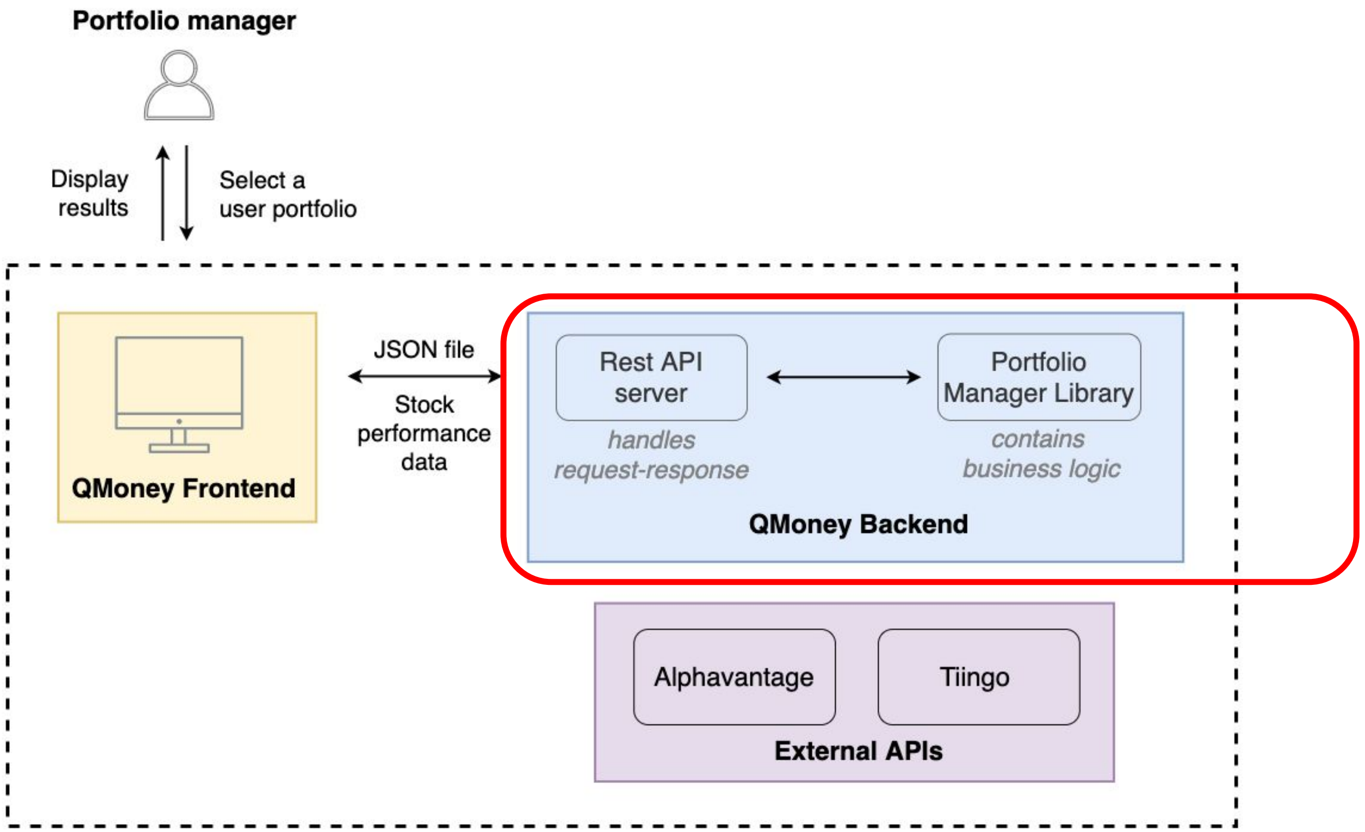
Absolute Returns

Total returns from the stocks irrespective of the date it was purchased on

Annual Results

Returns from the stocks - Year on Year basis

QMoney Architecture



Concepts Covered in QMoney

- JSON
- Jackson
- Consuming REST API
- Gradle
- Factory Pattern
- Exception Handling
- Concurrency

QMoney Product Features to be implemented

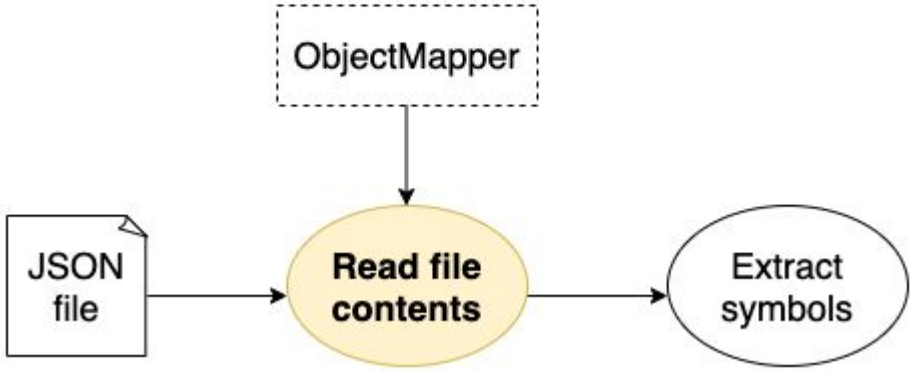
1. Read user portfolio file
2. Get stock quotes from a third-party provider
3. Implement logic to perform calculations
4. Create a portfolio management library
5. Publish the library
6. Add another service provider
7. Handle user issues
8. Enhance performance of the app

} Optional

Module 1 Overview - JSON Parsing

- User Stock Portfolio is in the form of JSON Data format.
- In the longer term, this JSON Data will be retrieved through REST API but for this module, data will be retrieved from a temporary JSON file.
- Learn how to parse this data and perform operations on it.
- This will be required to calculate Annualized Returns of Portfolio in Upcoming Modules.

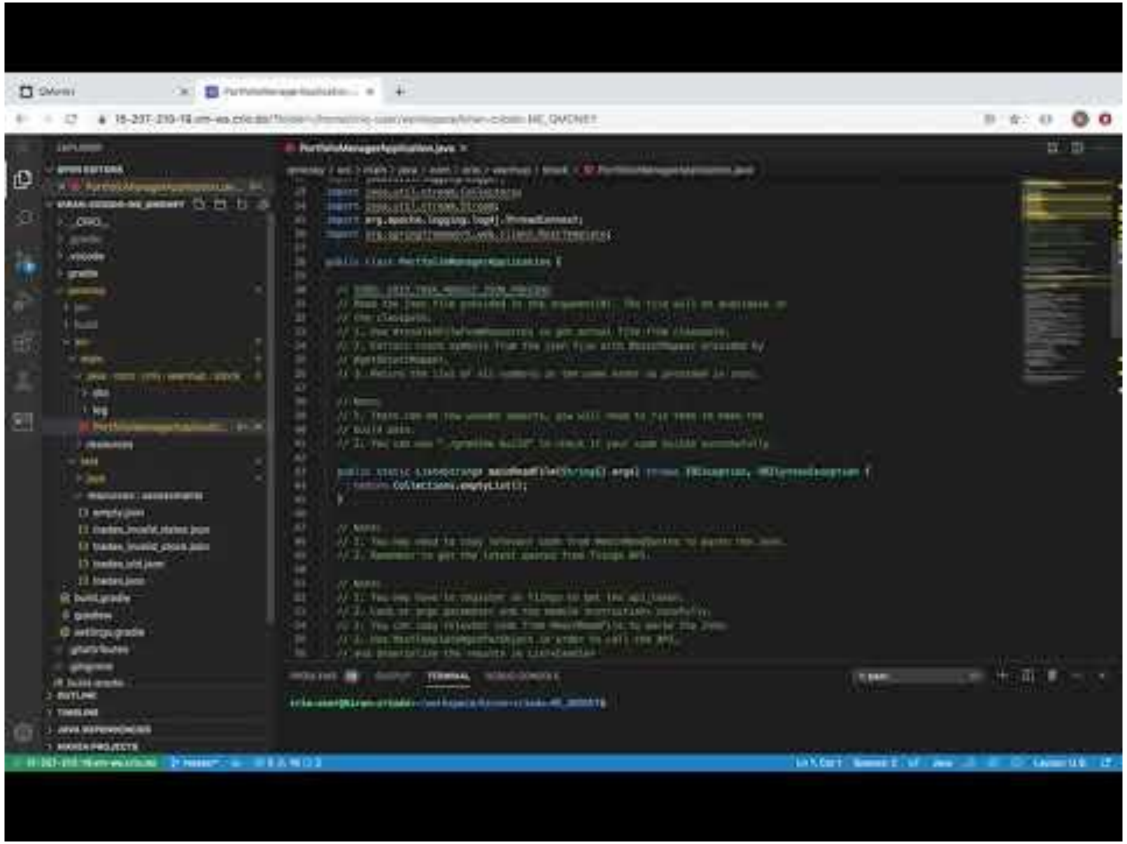
Module 1 Intro - JSON Parsing



Files to be modified

PortfolioManager.java

QMoney Module Intro Video (Available on Crio.Do)



Take home exercises for the session

- Byte: Jackson (Crio.Do)
- Byte: Jackson Advanced (Crio.Do)
- ME: QMoney - Module 1

Feedback

Thank you for joining in today.

We’d love to hear your thoughts and feedback - Feedback for CORE-JAVA-1 Session

Further Reading

- Do+JSON+with+Jackson+by+Baeldung.pdf

References

- Byte: Jackson (Crio.Do)

Thank you