

Programming Assignment - Coupon Management System

Objective:

To develop a coupon management system using Python/Java/NodeJS. You're free to choose your preferred persistent data source, technologies, and frameworks. The application should offer RESTful APIs to load, provide new, and record used coupons for stats management.

Feel free to make any assumptions or product decisions during development, provided that the system requirements listed below are met. This system will interface with other services, referred to as "users" in this document.

System Requirements:

Coupon Operations:

- **Upload:** Users should be able to upload coupons in bulk (at most 50K coupons in each request). Each coupon will have the following attributes:
 - Coupon code (unique)
 - Coupon type (optional, can be FREE, STANDARD, MEGADEAL)
 - Discount amount (either flat or percentage)
 - Expiry date
 - Max number of usages
- **Request New Coupon:** API should be able to allocate new coupon codes to users. The operation should receive at least the following attributes.
 - Coupon type (optional)
 - User Id
- **Record:** Used coupons need to be logged. The operation should capture:
 - Coupon code
 - Coupon type
 - User Id

Coupon Redemption & Coupon Management Rules:

- Users should be able to redeem coupons.
- Ensure that the coupon is valid.
- Once redeemed, the count of used coupons should be tracked/updated.
- The **MEGADEAL** coupon type has special restrictions:
 - New coupons can be requested at most 5 times, at the same time.
 - Coupons can be requested a maximum of 10 times within a second.
 - Users can wait up to 10 seconds to receive this coupon, otherwise, the user will receive an error.
- Unused expired coupons should be purged periodically
- The system should keep counters to count how many coupons are created and used by coupon type.
- All operations should be logged.

Data Layer:

- All coupon data should be persisted in a persistent layer of your choice.

API Endpoints:

- API should support at least 100 requests at the same time.
- Implement RESTful API endpoints for all operations on coupons.

- Ensure that API requests and responses are in JSON format.

Testing:

- Write at least one unit test case for core functionality using a test framework.

Documentation:

- Document the system architecture briefly, and note any general assumptions or design considerations.
- Write short setup and deployment instructions.

Output:

Provide source code as a zip file or a Dockerfile for the application, allowing for easy setup and deployment with source code.