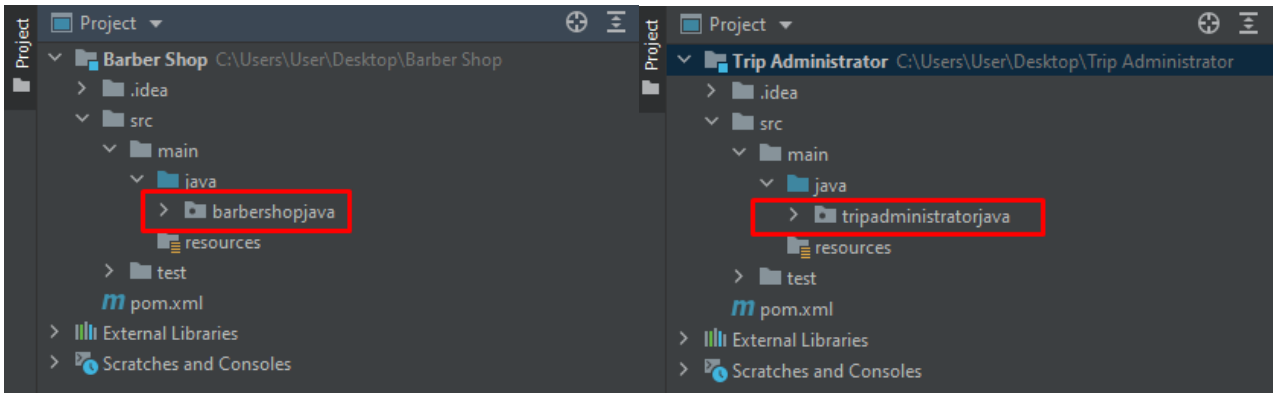
Data Structures Java Exam Retake

Do not modify the interface or the package, or anything from the given recourses. In Judge you only upload the archive of the corresponding package.



1. Barber Shop

You are given a skeleton with a class **BarberShopImpl** that implements the **BarberShop interface.**

The BarberShopImpl works with **Barber** & **Client entities**, **all barbers and clients** are identified by their **unique names**. Implements all the operations from the **interface:**

- **void addBarber(Barber b)** – **adds** a barber. If there **is a barber with the same name** added before, throw IllegalArgumentException.
- **void addClient(Client c)** – **adds a client**. If a client with the same name exists, throw IllegalArgumentException.
- **boolean exist(Barber b) –** returns whether the **Barber** has been **added** or **not.**
- **boolean exist(Client c) –** returns whether the **Client** has been **added** or **not.**
- **Collection<Barber> getBarbers() –** returns all added barbers. If there aren't any - return empty collection.
- **Collection<Client> getClients() –** returns all added clients. If there aren't any - return empty collection.
- **void assignClient(Barber b, Client c)** – **adds a client for** the provided **barber**. If the barber or the client does not exist, throw IllegalArgumentException.
- **void deleteAllClientsFrom(Barber b) – Deletes** all assigned clients for the provided **barber.** If the barber does not exist throw IllegalArgumentException.
- **Collection<Client> getClientsWithNoBarber()** – **return only** clients with no assigned barber.
- **Collection<Barber> getAllBarbersSortedWithClientsCountDesc()** – **return all added barbers** ordered by their clients count descending. If there are not any barbers return empty collection.
- **Collection<Barber> getAllBarbersSortedWithStarsDecsendingAndHaircutPriceAsc()** – returns all **barbers** sorted by their stars descending and their haircut price ascending.

- **Collection<Client> getClientsSortedByAgeDescAndBarbersStarsDesc()** – return only clients who are assigned to barber and sorted by their age descending and by their barber stars descending**.**

2. Barber Shop – Performance

For this task you will only be required to submit the **code from the previous problem**. If you are having a problem with this task you should **perform detailed algorithmic complexity analysis**, and try to **figure out weak** spots inside your implementation.

For this problem it is important that other operations are **implemented correctly** according to the specific problems: **add**, **size**, **remove**, **get** etc…

You can submit code to this problem **without full coverage** from the previous problem, **not all test cases** will be considered, only the **general behaviour** will be important, **edge cases** will mostly be ignored such as throwing exceptions etc…

3. Trip Administrator

You are given a skeleton with a class **TripAdministrationsImpl** that implements the **TripAdministrations interface.**

The TripAdministrations works with **Company** & **Trip entities**, **all companies and trips** are identified by their **names and ids.** A company is allowed to have only **tripOrganizationLimit number of Trips to manage.** Implements all the operations from the **interface:**

Note: All "get" methods return the elements in their order of addition.

- **void addCompany(Company c)** – **adds** a company. If there **is a company with the same name** added before, throw IllegalArgumentException.
- **void addTrip(Company c, Trip t)** – **adds a trip for** the provided **company**. If the company does not exist, throw IllegalArgumentException.
- **boolean exist(Company c) –** returns whether the **Company** has been **added** or **not.**
- **boolean exist(Trip t) –** returns whether the **Trip** has been **added** or **not.**
- **void removeCompany(Company c) – remove** the provided company with all its **trips**. If the company does not exist, throw IllegalArgumentException.
- **Collection<Company> getCompanies() –** return a collection of **all added companies**. If there are not any - return empty collection.
- **Collection<Trip> getTrips() – r**eturn a collection of **all added trips**. If there are not any - return empty collection.
- **void executeTrip(Company c, Trip t) – remove** the trip for the **provided company.** If the company or trip does not exist - throw IllegalArgumentException. If the trip is not for the provided company again - throw IllegalArgumentException.
- **Collection<Company> getCompaniesWithMoreThatNTrips(int n)** – return all companies with more than N trips.

- **Collection<Trip> getTripsWithTransportationType(Transportation t)** – **return all trips** filtered by the transportation type.
- **Collection<Trip> getAllTripsInPriceRange(int lo, int hi)** – return trips in between provided price range **inclusive**.

4. Trip Administrator – Performance

For this task you will only be required to submit the **code from the previous problem**. If you are having a problem with this task you should **perform detailed algorithmic complexity analysis**, and try to **figure out weak** spots inside your implementation.

For this problem it is important that other operations are **implemented correctly** according to the specific problems: **add**, **size**, **remove**, **get** etc…

You can submit code to this problem **without full coverage** from the previous problem, **not all test cases** will be considered, only the **general behaviour** will be important, **edge cases** will mostly be ignored such as throwing exceptions etc…