

General Guidelines

1. Please take special care about the way code is structured - including consistent spacing, indentation, etc. as well as across multiple files
2. Choose meaningful names for your variables, methods and classes
3. Write short functions and follow modular code design
4. Write unit tests with sufficient test coverage, if possible.
5. When submitting, zip the source folder and send it to email addresses: ananth@batonsystems.com and amita.asthana@batonsystems.com
6. Include only the source files and remove any build output such as .exe, .class, etc.

Program #1

(25 points)

You work at a startup called The Rider Co., a ride hailing start-up entering the competitive Chennai region. The company soon realizes that there was one important feature missing in their app, the ability to match riders with drivers within a 5km range (inclusive). You have been tasked to build a solution that will help to match riders with drivers based on their location and generate a bill for the ride.

Input Commands & Format

ADD_DRIVER <DRIVER_ID> <X_COORDINATE> <Y_COORDINATE>

The ***ADD_DRIVER*** command allows a driver to join the service. The command should take in the driver's id and current location (x_coordinate and y_coordinate) as arguments.

ADD_RIDER <RIDER_ID> <X_COORDINATE> <Y_COORDINATE>

The ***ADD_RIDER*** command allows a rider to request a ride. The command should take in the rider's id, current location (x_coordinate and y_coordinate), as arguments.

MATCH <RIDER_ID>

Matches the rider with the nearest available drivers within 5 kms distance. Print nearest 5 drivers ids in ascending order of their distance from the rider in the following format. In the event of multiple drivers being equidistant, print them in lexicographical order.:

DRIVERS_MATCHED <DRIVER_ID1> <DRIVER_ID2> ... <DRIVER_ID5>

If no drivers are available then print '***NO_DRIVERS_AVAILABLE***'

START_RIDE <RIDE_ID> <N> <RIDER_ID>

Start the ride with the Nth Driver ($1 \leq N \leq 5$). If the match has fewer than N number of drivers, driver is not available, or <RIDE_ID> already exists, then print 'INVALID_RIDE' otherwise, print 'RIDE_STARTED <RIDE_ID>'.

***STOP_RIDE <RIDE_ID><DESTINATION_X_COORDINATE>
<DESTINATION_Y_COORDINATE> <TIME_TAKEN_IN_MIN>***

If the <RIDE_ID> does not exist, or the ride is already stopped, then print 'INVALID_RIDE', otherwise, Print 'RIDE_STOPPED <RIDE_ID>'

BILL <RIDE_ID>

Print the total bill of the ride in the format 'BILL <RIDE_ID> <DRIVER_ID> <AMOUNT>'. To calculate the total bill use the following formula:

A base fare of ₹50 is charged for every ride.

An additional ₹6.5 is charged for every kilometer traveled.

An additional ₹2 is charged for every minute spent in the ride.

A service tax of 20% is added to the final amount.

Assumptions

- It is guaranteed that no two drivers or riders will have the same id.
- Ride can only be started once the match is completed.
- Every start ride request will happen after the match request.
- One rider can make multiple match requests.
- Bill for the ride will be calculated based on the distance between the rider's location and the destination.
- The driver will not be available to accept another rider's request after the ride has started.

SAMPLE INPUT/OUTPUT #1

INPUT

```
ADD_DRIVER D1 1 1
ADD_DRIVER D2 4 5
ADD_DRIVER D3 2 2
ADD_RIDER R1 0 0
MATCH R1
```

```
START_RIDE  RIDE-001  2  R1
STOP_RIDE   RIDE-001  4  5  32
BILL        RIDE-001
```

OUTPUT

```
DRIVERS_MATCHED  D1 D3
RIDE_STARTED     RIDE-001
RIDE_STOPPED     RIDE-001
BILL  RIDE-001   D3  186.72
```

SAMPLE INPUT/OUTPUT #2

INPUT

```
ADD_DRIVER  D1  0  1
ADD_DRIVER  D2  2  3
ADD_RIDER   R1  3  5
ADD_DRIVER  D3  4  2
ADD_RIDER   R2  1  1
MATCH  R1
MATCH  R2
START_RIDE  RIDE-101  1  R1
START_RIDE  RIDE-102  1  R2
STOP_RIDE   RIDE-101  10  2  48
STOP_RIDE   RIDE-102  7   9  50
BILL        RIDE-101
BILL        RIDE-102
```

OUTPUT

```
DRIVERS_MATCHED  D2 D3 D1
DRIVERS_MATCHED  D1 D2 D3
RIDE_STARTED     RIDE-101
RIDE_STARTED     RIDE-102
RIDE_STOPPED     RIDE-101
RIDE_STOPPED     RIDE-102
BILL  RIDE-101   D2  234.64
BILL  RIDE-102   D1  258.00
```