

Data analysis for penguins

In this task it is important that you analyze a data set that has already been read in using streams. The data set is a scientific and freely accessible data set.

The template comprises the classes CSVReading with the method processInputFile which returns a stream <PenguinData>, PenguinData which corresponds exactly to the data record, Penguin to which you should later transform PenguinData and Geo for the measured position.

We differentiate the penguins based on the trackID of the data set. That a penguin always has the same and unique trackID.

methods

toString for penguins with streams No results

In the Penguin class, write the public String toStringUsingStreams () method that returns the attributes of a single penguin in the following format:

```
Penguin{locations=[Geo{latitude=1.0, longitude=2.0}, Geo{latitude=-3.5, longitude=-12.0}, ], trackID='Pingu'}
```

Locations per penguin No results

Write the public static stream <Penguin> getDataByTrackId (Stream <PenguinData> stream) method that returns a stream of penguins. All locations that have the same TrackID should be summarized in a penguin. This penguin has a list <Geo> that contains exactly these locations.

Edition of the penguins No results

Write the public static void outputPenguinStream () method, which first outputs the number of penguins in the data set and then calls its toString () method for each penguin. The output should look something like this (only the beginning of the output is shown in the example):

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```
Penguin{locations=[Geo{latitude=-43.270279, longitude=147.349091}, Geo{latitude=-43.270573, longitude=147.349579}, Geo{latitude=-43.271561, longitude=147.350983}, Geo{latitude=-43.272297, longitude=147.352371}, Geo{latitude=-43.274204, longitude=147.354446}, Geo{latitude=-43.275059, longitude=147.355392}, Geo{latitude=-43.275707, longitude=147.356216}, Geo{latitude=-43.276581, longitude=147.357224}, Geo{latitude=-43.277428, longitude=147.358139}, Geo{latitude=-43.278721, longitude=147.358948}, Geo{latitude=-43.279358, longitude=147.360184}, Geo{latitude=-43.280125,
```

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longitude=147.349197}, ], trackID='bru_4'}
```

(Many more penguins follow in the edition.)

Min / Max / Avg Location per Penguin No results

Write out the method `public static void outputLocationRangePerTrackid (Stream <PenguinData> stream)` on the console, the minimum, maximum and average of longitude and latitude per trackid in the following format on the console:

bru_4

Min Longitude: 147.349091 Max Longitude: 147.467499 Avg Longitude:
147.400995172956 Min Latitude: -43.412323 Max Latitude: -43.270184 Avg
Latitude: -43.34747790880503

Note on the output formats: Artemis adds line breaks to improve readability, there is only one line break for both editions (see public tests).

Test

There are explicitly very few public tests that actually only test their expenditure format. It is part of your task to test your implementation, you are welcome to exchange tests in the dedicated channel in RocketChat.

Allowed methods

You can freely use the `java.util.stream`. In particular, you may also use methods that have not been dealt with in the lecture or tutorial (even if this is of course not necessary).

You should solve the problem with the help of streams, the use of loops (`for`, `while`) is not fundamentally prohibited, but can lead to points deduction if you handle the use of streams.