Universitatea Tehnica din Cluj-Napoca
Departament Calculatoare

Programming Techniques, Undergraduate 2018/19
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TP Lab – Homework 5

Objective

Lambda Expressions and Stream Processing

Description

Consider the task of analyzing the behavior of a person recorded by a set of sensors.
The historical log of the person's activity is stored as tuples (*start_time, end_time, activity_label),* where *start_time* and *end_time* represent the date and time when each activity has started and ended while the activity label represents the type of activity performed by the person: Leaving, Toileting, Showering, Sleeping, Breakfast, Lunch, Dinner, Snack, Spare_Time/TV, Grooming.
The data is spread over several days as many entries in the log *Activities.txt*, taken from [1,2] and downloadable from the file Activities.txt located in this folder.
Write a Java 1.8 program using lambda expressions and stream processing to do the tasks defined below.

Task	Grading
Define a class *MonitoredData* with 3 fields: start time, end time and activity as string. Read the data from the file *Activity.txt* using streams and split each line in 3 parts: *start_time*, *end_time* and *activity label* and create a list of objects of type *MonitoredData.*	2 points
Count how many days of monitored data appears in the log.	1 point
Count how many times has appeared each activity over the entire monitoring period. Return a map of type <String, Int> representing the mapping of activities to their count.	2 points
Count how many times has appeared each activity for each day over the monitoring period	1 point
For each line from the file map for the activity label the duration recorded on that line (*end_time-start_time*)	1 point
For each activity compute the entire duration over the monitoring period	1 point
Filter the activities that have 90% of the monitoring records with duration less than 5 minutes	1 point
Documentation	1 point

REFERENCES

[1] Ordóñez, F.J.; de Toledo, P.; Sanchis, A. Activity Recognition Using Hybrid Generative/Discriminative Models on Home Environments Using Binary Sensors. Sensors 2013, 13, 5460-5477.

[2] Available online at https://archive.ics.uci.edu/ml/datasets/Activities+of+Daily+Living+(ADLs)+Recognition+Using+Binary+Sensors