Electrical and Computer Engineering / Software Engineering

CPrE/SE 419: SOFTWARE TOOLS FOR LARGE-SCALE DATA ANALYSIS, SPRING 2024

LAB 6: SPARK #2

Purpose

The main objective of this lab is to solidify the experience with Spark – and you are required to write programs that will have to pipeline the activities/jobs. Specifically, you will write a code for jobs that will:

- Analyze GitHub data
- Analyze Graph data

Submission

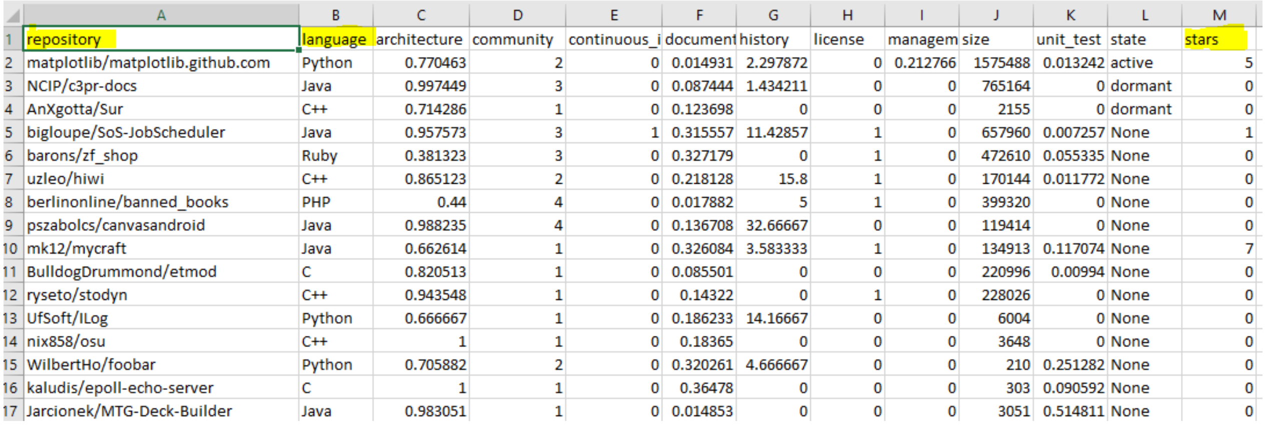
Create a single zip archive with the following and hand it in through canvas:

- Write-up report with commented code and result screenshots of each experiment.
- **ONLY** give the java files **AND** jar files. Please do not resubmit the data set or the output files.

As mentioned, you can work in teams of two students on this project. Please make sure that the names of both team-members are listed in the lab report.

Experiment 1 (40 points)

Our data is "github.csv" is available at https://iastate.app.box.com/s/pots65nagg9qjbsnnsmqjws58ap8j3ng



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	repository	language	architecture	community	continuous_i	document	history	license	managem	size	unit_test	state	stars
2	matplotlib/matplotlib.github.com	Python	0.770463	2	0	0.014931	2.297872	0	0.212766	1575488	0.013242	active	5
3	NCIP/c3pr-docs	Java	0.997449	3	0	0.087444	1.434211	0	0	765164	0	dormant	0
4	AnXgotta/Sur	C++	0.714286	1	0	0.123698	0	0	0	2155	0	dormant	0
5	bigloupe/SoS-JobScheduler	Java	0.957573	3	1	0.315557	11.42857	1	0	657960	0.007257	None	1
6	barons/zf_shop	Ruby	0.381323	3	0	0.327179	0	1	0	472610	0.055335	None	0
7	uzleo/hiwi	C++	0.865123	2	0	0.218128	15.8	1	0	170144	0.011772	None	0
8	berlinonline/banned_books	PHP	0.44	4	0	0.017882	5	1	0	399320	0	None	0
9	pszabolcs/canvasandroid	Java	0.988235	4	0	0.136708	32.66667	0	0	119414	0	None	0
10	mk12/mycraft	Java	0.662614	1	0	0.326084	3.583333	1	0	134913	0.117074	None	7
11	BulldogDrummond/etmod	C	0.820513	1	0	0.085501	0	0	0	220996	0.00994	None	0
12	ryseto/stodyn	C++	0.943548	1	0	0.14322	0	1	0	228026	0	None	0
13	UfSoft/ILog	Python	0.666667	1	0	0.186233	14.16667	0	0	6004	0	None	0
14	nix858/osu	C++	1	1	0	0.18365	0	0	0	3648	0	None	0
15	WilbertHo/foobar	Python	0.705882	2	0	0.320261	4.666667	0	0	210	0.251282	None	0
16	kaludis/epoll-echo-server	C	1	1	0	0.36478	0	0	0	303	0.090592	None	0
17	Jarcionek/MTG-Deck-Builder	Java	0.983051	1	0	0.014853	0	0	0	3051	0.514811	None	0

For each language, (1). **Find out how many repositories using it;** and (2). **One repository that has the highest stars number using it.**

In this experiment, the job is to generate a list/output with the following format:

<language> <num_of_repo> <name_of_repo_highest_star> <num_stars>

num_of_repo total number of projects in GitHub using a specific <language>

name_of_repo_highest_star name of the repository that has highest stars number using a specific <language>

num_starts number of stars of the repository that has highest starts number

This list should be sorted by the num_of_repo in descending order.

Experiment 2 (60 points)

A graph G= (V,E) consists of a set of vertices V, and a set of edges E such that each element e in E is an pair (u,v), denoting an edge between u and v. In a undirected graph, a cycle of length three is a triple of vertices (x,y,z) such that (x,y) (y,z) and (z,x) exist in E.

Write a program that calculate total number of all undirected cycles of length 3 in a graph.

We use the dataset “patents_small.txt” available at
https://iastate.app.box.com/s/pots65nagg9qjbsnnsmqjws58ap8j3ng

The graph is in the form of an edge list. Every line of the file has information about a single edge. A line contains information in the format <vertex id 1> <vertex id 2>, which means that it’s an edge between those 2 vertices.