# DSCI 551 – Spring 2022

HW5 (Hadoop MapReduce & Spark), 100 points

Due: April 22, Friday (end of day, 11:59pm)

In this homework, we will consider the churn data set again (as in hw1). You are given two versions of the file: churn4hadoop.csv and churn.csv. The former has not header, to be used for Hadoop question below; the latter has header used in Spark.

1. [Hadoop MapReduce, 40 points] Complete the provided Churn.java by supplying the missing code as indicated in the source file, so that it answers the following SQL query.

Select InternetService, max(tenure), count(\*)

From Churn

Where churn = "Yes"

Group by InternetService

Having count(\*) > 200;

Execution format: hadoop jar churn.jar Churn input output

Where the input directory contains a single file: churn4hadoop.csv.

1. [40 points] For each of the following SQL queries, write a Spark script that finds the answer to the query. Note to read a csv file with header into Spark as a dataframe, proceed as follows:

churn = spark.read.csv('churn.csv', header=True)

You will also need to import this:

import pyspark.sql.functions as fc

1. select count(\*)

from churn

where gender = ‘Male’ and churn = ‘Yes’;

1. select gender, max(TotalCharges)

from churn

where churn = "Yes"

group by gender;

Note: you will need to change the data type of TotalCharges from string to double. For example,

churn = churn.withColumn('TotalCharges', fc.col('TotalCharges').cast('double'))

1. select gender, count(\*)

from churn

where churn = ‘Yes’

group by gender;

1. select churn, contract, count(\*) cnt

from churn

group by churn, contract

order by churn, cnt desc;

1. select gender, churn, count(\*)

from churn

group by gender, churn

having count(\*) > 1000;

1. [20 points] Write a Spark RDD script for each of the following SQL queries.
   1. Same as q2.a.
   2. Same as q2.b.

**Submission**:

* Q1: Churn.java and churn.jar and part-r-00000 under the output directory.
* Q2: submit a text file q2-solution.txt with your scripts and outputs from each script.
* Q3: submit a text file q3-solution.txt with your scripts and outputs from each script.