DATA-51100: Statistical Programming
Programming Assignment 5 – Data Preparations and Statistics

Introduction

The file `cps.csv` (attached) contains school profile information for Chicago Public Schools. Your program will derive some data from it and then generate some statistical information.

Requirements

You are to create a program in Python that performs the following:

1. Loads the cps.csv file (assume it's in the current directory) and create a DataFrame object from it.

2. Based on the data contained in the cps.csv file, generates a dataframe with the following information:
    a. School_ID
    b. Short_Name
    c. Is_High_School
    d. Zip
    e. Student_Count_Total
    f. College_Enrollment_Rate_School
    g. Lowest Grade Offered (derived from Grades_Offered_All column)
    h. Highest Grade Offered (derived from Grades_Offered_All column)
    i. Starting Hour (derived from School_Hours column)

    The values for a-f are based on existing columns in the data. For g-i, you will need to generate new columns which derives information from existing ones.

    Replace the missing numeric values with the mean for that column.
    Display the first 10 rows of this dataframe.

3. Displays the following information:
    a. Mean and standard deviation of College Enrollment Rate for High Schools
    b. Mean and standard deviation of Student_Count_Total for non-High Schools
    c. Distribution of starting hours for all schools
    d. Number of schools outside of the Loop Neighborhood (i.e., outside of zip codes 60601, 60602, 60603, 60604, 60605, 60606, 60607, and 60616)

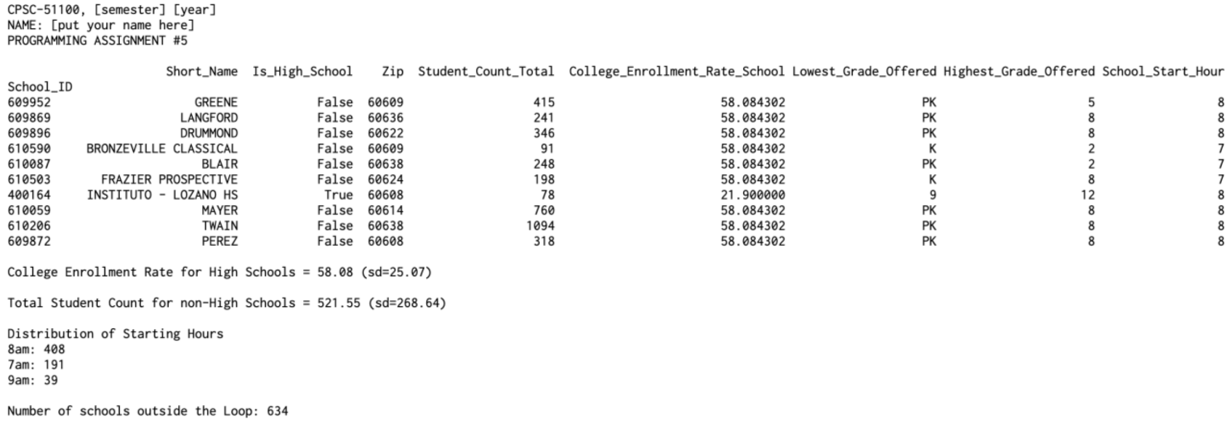
Additional Requirements

1. The name of your source code file should be `DataStats.py`. All your code should be within a single file.
2. You need to use the pandas DataFrame object for storing data.
3. Your code should follow good coding practices, including good use of whitespace and use of both inline and block comments.
4. You need to use meaningful identifier names that conform to standard naming conventions.
5. At the top of each file, you need to put in a block comment with the following information: your name, date, course name, semester, and assignment name.

What to Turn In

You will turn in the **single DataStats.py file** as well as **a screenshot of your output(s)** using BlackBoard.

Sample Program Output



```
CPSC-51100, [semester] [year]
NAME: [put your name here]
PROGRAMMING ASSIGNMENT #5

                      Short_Name  Is_High_School    Zip  Student_Count_Total  College_Enrollment_Rate_School Lowest_Grade_Offered Highest_Grade_Offered School_Start_Hour
School_ID
609952                    GREENE           False  60609                  415                       58.084302                   PK                     5                 8
609869                  LANGFORD           False  60636                  241                       58.084302                   PK                     8                 8
609896                  DRUMMOND           False  60622                  346                       58.084302                   PK                     8                 8
610590     BRONZEVILLE CLASSICAL           False  60609                   91                       58.084302                    K                     2                 7
610087                     BLAIR           False  60638                  248                       58.084302                   PK                     2                 7
610503       FRAZIER PROSPECTIVE           False  60624                  198                       58.084302                    K                     8                 7
400164     INSTITUTO - LOZANO HS            True  60608                   78                       21.900000                    9                    12                 8
610059                     MAYER           False  60614                  760                       58.084302                   PK                     8                 8
610206                     TWAIN           False  60638                 1094                       58.084302                   PK                     8                 8
609872                     PEREZ           False  60608                  318                       58.084302                   PK                     8                 8

College Enrollment Rate for High Schools = 58.08 (sd=25.07)

Total Student Count for non-High Schools = 521.55 (sd=268.64)

Distribution of Starting Hours
8am: 408
7am: 191
9am: 39

Number of schools outside the Loop: 634
```

CORRECTION:

Distribution of Starting Hours should be:

8am: 415

7am: 193

9am: 40