

## CSC 110 – Programming Project

### Major League Baseball Statistics

#### ***Objective:***

The objective of this project is to write a program in Python that will read in a data file with batting statistics for 319 MLB players and display information requested by the user.

#### ***The Statistics:***

The data file can be found here:

[http://www.cs.uri.edu/~cingiser/csc110/assignments/mlb\\_stats.txt](http://www.cs.uri.edu/~cingiser/csc110/assignments/mlb_stats.txt)

This text file contains the following information for 319 MLB players who had at least 200 at bats in the 2012 regular season.

#### Player Name

The last name of the player. In order to ensure that the name was unique, if there were players with the same last name, the first one or two letters of the first name were appended to the end of the last name. So because there were two players with the last name Cabrera (Miguel and Melky), their names are listed as:

```
CabreraMe  
CabreraMi
```

The data file is sorted alphabetically by the player's name.

#### Team

The team that the player was on at the end of the 2012 regular season. The team name is a 2 or 3 letter abbreviation of the city in which the team plays. For cities where there is more than one team (New York, Chicago, Los Angeles, etc.), the abbreviation includes an indication of the team name. For instance, the Chicago Cubs is abbreviated as CHC and the Chicago White Sox is abbreviated as CWS. These abbreviations are established by Major League Baseball and the list can be found here:

[http://www.cs.uri.edu/~cingiser/csc110/assignments/team\\_names.txt](http://www.cs.uri.edu/~cingiser/csc110/assignments/team_names.txt)

#### Position

The position on the field that the player plays most often. Since we are working with batting statistics, we do not include any pitchers in the list. The abbreviations for the various positions are:

1B - First Base  
2B - Second Base

3B - Third Base  
C - Catcher

CF - Center Field  
DH - Designated Hitter

LF - Left Field  
OF - Outfield

RF - Right Field  
SS - Shortstop

### Runs

The number of times the player scored a run.

### Hits

The number of times the player reached base by hitting the ball.

### Home Runs

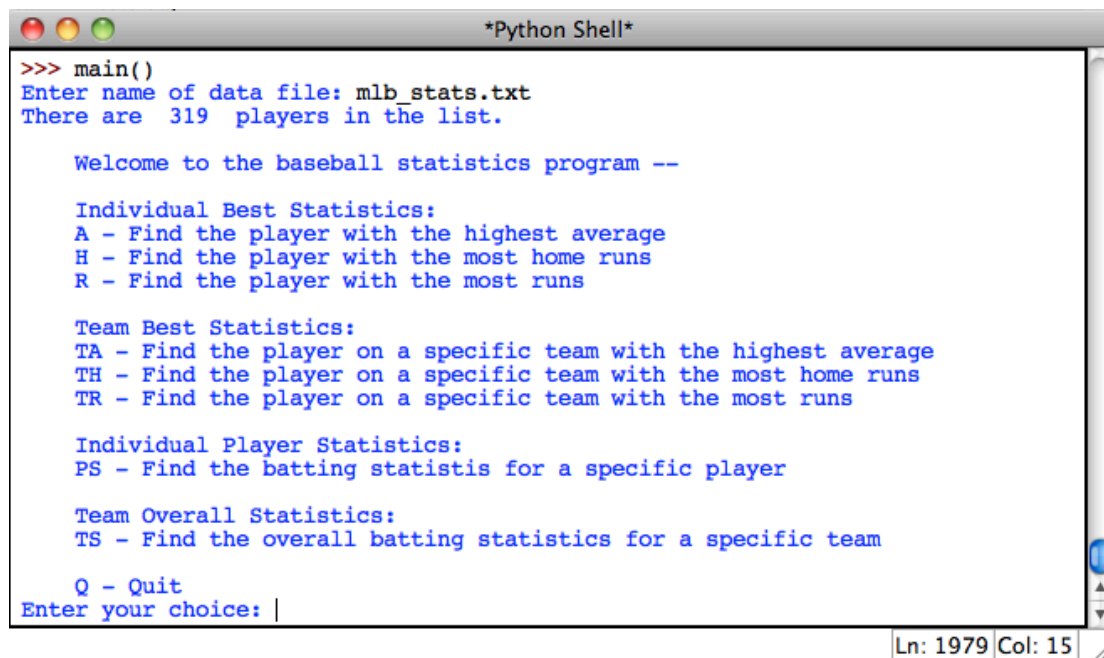
The number of home runs the player hit.

### Batting Average

The number of hits divided by the number of official at bats.

### ***The Program:***

For this assignment, you will present the user with a list of options and you will present the results chosen by the user. The program should continue to run until the user chooses to quit. The menu that you present to the user should look something like this:



```
>>> main()
Enter name of data file: mlb_stats.txt
There are 319 players in the list.

Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistis for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: |
```

Ln: 1979 Col: 15

As you can see from the image, there are eight different options offered to the user. Here is a brief description of each.

### Highest Average

This option will go through the entire list of batting averages and find the highest. It will then print the player with the highest batting average along with the batting

average. The algorithm that you will use here is one that we have looked at several times in class.

#### Most Home Runs

This option will print the player with the most home runs, along with the number of home runs hit by that player. The algorithm for this option is almost identical to the one you will use for the Highest Average. Keep this in mind when designing your functions.

#### Most Runs

This option will print the player with the most runs, along with the number of runs by that player. Again, this is the same algorithm as the previous two.

#### Team Highest Average

This option will ask the user to choose a team and will print the player on that team with the highest batting average, along with the player's batting average.

#### Team Most Home Runs

This option will ask the user to choose a team and will print the player on that team with the most home runs, along with the number of home runs hit by that player. Note that the algorithm for this task is very similar to the algorithm for Team Highest Average. Keep this in mind when designing your functions.

#### Team Most Runs

This option will ask the user to choose a team and will print the player on that team with the most runs, along with the number of runs by that team. Again, this algorithm is the same as the one used to find the most home runs on a given team.

#### Individual Player Statistics

This option will ask the user to enter a player's name, and will print all of the statistics for that player. Note that the `mlb_stats.txt` data file is sorted by player name, so be sure to choose your search algorithm accordingly.

#### Team Overall Statistics

This option will ask the user to enter the name of a team and provide overall statistics for that team. That is, it will compute an average number of runs, hits, home runs and the average batting average for the players on the team.

#### ***Program Requirements:***

Your program should meet the following requirements:

- 1) Your program should *work correctly*. Your program should do at least the following correctly:
  - a. Display the menu of options to the user.
  - b. Ask the user to make a choice.

- c. Execute the choice made by the user and display the results.
  - d. Continue until the user chooses to quit.
  - e. Display an error message if the user chooses an invalid option and allow the user to try again.
- 2) Your program should use good *modular design*. It should use functions for each of the main tasks of the program. Note that some of the tasks in this program are very similar, and if you design your code carefully, you can use the same function to perform several of the options the user may choose.
  - 3) Your program should be *well-documented*. This should include your name and an overall description of the program at the top of the file. It should also include a description of any algorithms that are used in the code.
  - 4) Your program should use *well-named* functions and variables. The code should be simple to read and understand what is going on given the names of the functions, and variables along with the comments in the code.

***Extra Credit:***

If you complete all of the required elements of the program, you can attempt this extra credit.

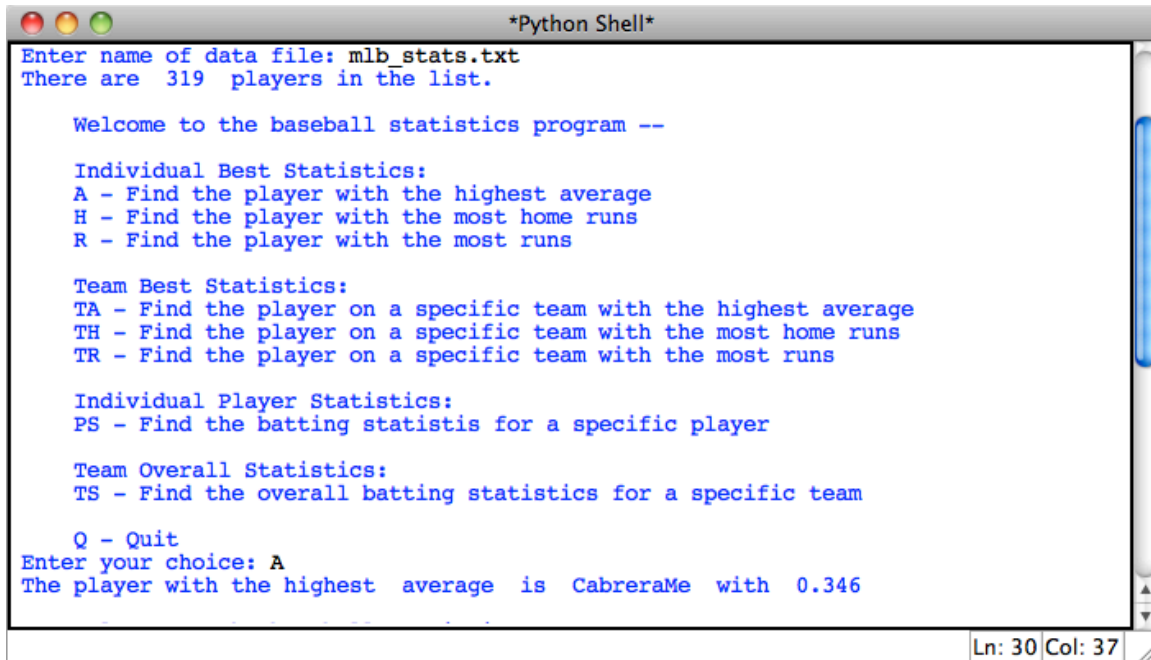
Add the following options to the menu and implement functions to execute them:

- Find all players on particular team and sort the results by any of the statistics. You will ask the user to enter the team and then choose from among the available statistics to sort by. You will display a table with the data (all of the stats) sorted accordingly.
- Find the player at each position that is best for a given statistic. You will ask the user to choose from among the available statistics, and then you will find the catcher with the highest value, the first baseman with the highest value, etc.

### Examples:

The following screen shots give you an idea of what you should display for each of the options offered by the program.

#### Highest Average



```
*Python Shell*
Enter name of data file: mlb_stats.txt
There are 319 players in the list.

Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

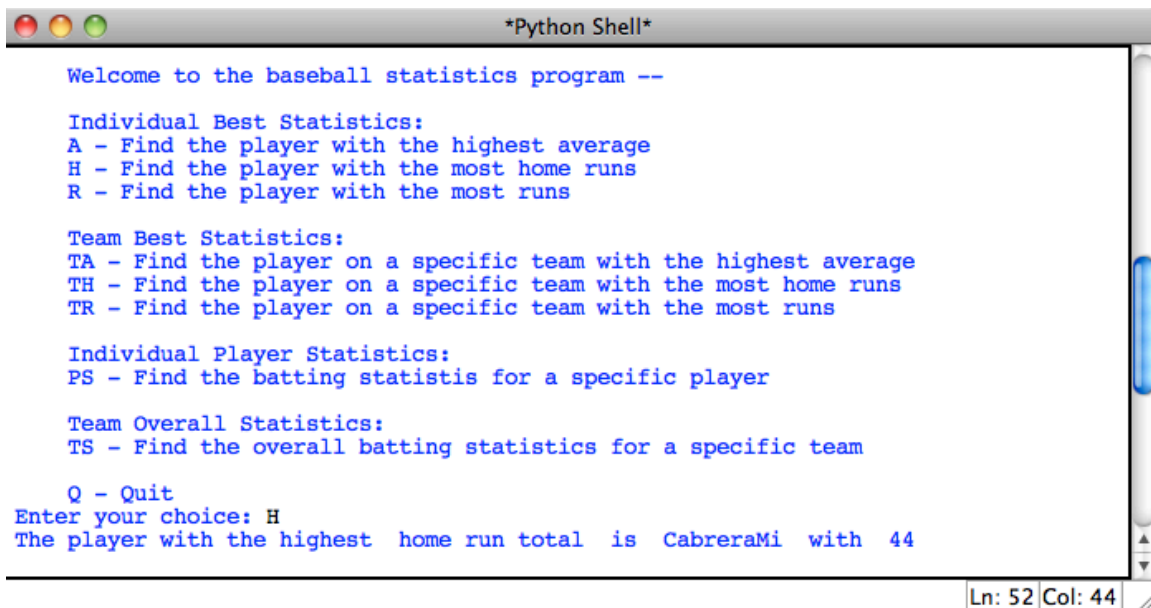
Individual Player Statistics:
PS - Find the batting statistics for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: A
The player with the highest average is CabreraMe with 0.346

Ln: 30 Col: 37
```

#### Most Home Runs



```
*Python Shell*

Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistics for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: H
The player with the highest home run total is CabreraMi with 44

Ln: 52 Col: 44
```

## Most Runs

```
*Python Shell*

Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistis for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: R
The player with the highest run total is Trout with 129

Ln: 74 Col: 49
```

## Team Highest Average

```
*Python Shell*

Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistis for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: TA
Choose a team to search: BOS
The player on BOS with the highest average is Ortiz with 0.318

Ln: 216 Col: 19
```

## Team Most Home Runs

```
*Python Shell*

Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistis for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: TH
Choose a team to search: NYM
The player on NYM with the highest home run total is DavisI with 32

Ln: 239 Col: 18
```

## Team Most Runs

```
*Python Shell*

Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistis for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: TR
Choose a team to search: CIN
The player on CIN with the highest run total is Bruce with 89

Ln: 262 Col: 19
```

## Invalid Input – Team Name

```
*Python Shell*

Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistis for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: TH
Choose a team to search: BOX
Team name not found - please try again
Choose a team to search: |
```

Ln: 310 Col: 25

## Individual Player Statistics

```
*Python Shell*

Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistis for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: PS
Enter the last name of the player: Ortiz

Statistics for Ortiz Runs: 65 Hits: 103 Home Runs: 23 Average: 0.318
```

Ln: 286 Col: 16

## Invalid Input - Player Name

```
*Python Shell*
Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistis for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: PS
Enter the last name of the player: DiPippo

Player not found
```

Ln: 337 Col: 50

## Team Overall Statistics

```
*Python Shell*
Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistis for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: TS
Enter the team name: CLE

There are 10 players listed for CLE
The average number for runs for CLE is 52.5
The average number of hits for CLE is 107.7
The average number of home runs for CLE is 107.7
The average batting average for CLE is 0.248
```

Ln: 359 Col: 14

## Invalid Input – Menu Choice

```
*Python Shell*

Welcome to the baseball statistics program --

Individual Best Statistics:
A - Find the player with the highest average
H - Find the player with the most home runs
R - Find the player with the most runs

Team Best Statistics:
TA - Find the player on a specific team with the highest average
TH - Find the player on a specific team with the most home runs
TR - Find the player on a specific team with the most runs

Individual Player Statistics:
PS - Find the batting statistis for a specific player

Team Overall Statistics:
TS - Find the overall batting statistics for a specific team

Q - Quit
Enter your choice: N
Invalid input - please try again
```

Ln: 387 Col: 0