Home Work 4 Group Project
CSCI 1121 Fall 2016
Due Date: Sunday, December 4

Submit 2 files to blackboard: (1) the the c program assigned below and (2) one file containing the slides for your group's presentations (either pdf or powerpoint format).

Programming Instructions
Programs that don't compile will receive a grade of zero.   If parts of your program don't work, comment them out. Add additional comments describing your approach. This assignment will likely take several programming sessions; don't wait until the last few days. If you have questions, ask them early, don't wait until the day before the due date. Back up your work often.

Students are encouraged to discuss all aspects of the program and share information often. The intent of this assignment is to gain experience working with arrays of structs and functions. Once the first couple of functions are written, the work will progress more quickly since the later functions can be created by copying and editing previous functions.

Use the program ***Group_HW4.c*** as a starting point. This program will look familiar. It is very similar to the bike trip program used in class on Nov. 16. It reads data in from a file called ***bikeData5000.txt*** and writes to a file called ***output.txt***. The programs will be emailed in a zipped file and are also located in the usual directory on *shell01* called *GroupProject*.

There are 4 functions given in this program
- Print one struct
- Print the array of structs
- Print the max value of a member of the struct
- Return a count of trips for a given value of a struct member

Copy and then edit these functions as instructed below. Write the output to a file. Displaying output to the screen is optional.   Grades will be based on the content of the output file. Compile often. Making only small incremental programming changes between compiling will make the overall process go faster.

Take care to preserve the syntax of the functions that print to a file using fprintf( ). Note that when functions print to the output file, the output file stream is included in the parameter list and passed in as an argument. You will need to preserve this syntax and pass the output file streams into these types of functions. We will review this in class on Nov. 21.

Add the following functions to the c program:

1. (1 point) Using the function TripsInHr( ) that is already in the program, write a for loop that prints the number of trips that begin in each hour

```
int TripsInHr(BikeTrip arrayIn[], int arraySize, int hour);
```

2. (1 point) Write a function that returns the number of trips that began and ended at the same station, print this number to the output file with a descriptive message

```
int FindCircularTrips(BikeTrip arrayIn[], int arraySize);
```

3. (1 point) Write a function that returns the percentage of the trips with casual memberships, print this percentage to the output file with a descriptive message

```
float PercentCasual(BikeTrip arrayIn[], int arraySize);
```

4. (1 point) Write a function that returns the number of trips for a selected bikeId

```
int FindTripsBikeId(BikeTrip arrayIn[], int arraySize, int bike);
```

   Print the bikeId with the highest number of trips, along with the number of trips, to the output file with a descriptive message

5. (2 points) Write a function that returns the average duration of all the trips, then prints the average in both milliseconds and minutes to the output file with a descriptive message

6. (3 points) Write a function that returns the number of trips in a time interval

```
int TripsInTimeInterval(BikeTrip arrayIn[], int arraySize,
                        int lowDuration, int highDuration);
```

   Using the function above, write a for loop that prints the number of trips in each of the following intervals:

   [0 – 10 minutes], [11 – 20 minutes], [21 – 30 minutes], [30+ minutes]

7. (3 points) Write a function that returns the number of trips that started at a selected start station, print how many trips started at station 31263 to the output file

```
int FindTripsStartStationId(BikeTrip arrayIn[], int arraySize,
                            int station);
```

Write a function that returns the number of trips that ended at a selected end station, print how many trips ended at station 31101 to the output file

```
int FindTripsEndStationId(BikeTrip arrayIn[], int arraySize,
                          int station);
```

Write a function that returns the number of trips between two stations, print the number of trips between stations 31200 and 31201 to the output file

```
int TripsInStationPair(BikeTrip arrayIn[], int arraySize,
                       int startStation, int endStation);
```

Presentation Instructions
Each student will take a turn speaking and make a 3 – 4 minute presentation with 2 slides.

Slide 1:
- How you contributed to the project
- What were the advantages of programming in a group
- What were the challenges of programming in a group

Slide 2:
Cut and paste a short excerpt of code that you wrote on to a slide. State the objective of the code and then give a brief overview of how the code works. The excerpt can be an overview of an entire function, or a smaller piece of code that solved a particular problem.