

CIS*1500 – Assignment 5

Due: Friday Apr 8 - 3pm

****This assignment MUST be submitted via the dropbox before the deadline. ****

Write a complete C program for the following problem and submit to the dropbox for Assignment 5. **Make sure you submit the .c file, not the executable.** Your programs must compile successfully with the command: `gcc -Wall -std=c99 your_file.c`.

[40 marks] Your parents have been swept up in the Fantasy Sports craze. Their favourite sport is basketball, and they think they have a strategy for picking the best fantasy players. Statistics for basketball players are usual sorted by Points Per Game (PPG). As an example, the list below contains the top 15 players in the NBA sorted by this statistic:

Player	PPG	REB	AST	STL	BLK
Stephen Curry	30.1	5.4	6.5	2.1	0.2
James Harden	28.5	6.3	7.4	1.8	0.6
Kevin Durant	27.8	8.3	5.0	0.9	1.3
DeMarc Cousins	27.1	11.6	3.3	1.5	1.4
Damian Lillard	25.7	4.2	6.9	0.9	0.4
LeBron James	25.0	7.4	6.6	1.4	0.6
Anthony Davis	24.3	10.3	1.9	1.3	2.0
DeMar DeRozan	23.7	4.4	3.9	1.0	0.3
Russ Westbrook	23.6	7.7	10.4	2.1	0.3
Paul George	23.4	7.0	4.2	1.9	0.3
Klay Thompson	22.2	3.9	2.1	0.8	0.6
Isaiah Thomas	22.2	3.0	6.4	1.1	0.1
Kyle Lowry	21.9	5.0	6.4	2.2	0.4
Carmelo Anthony	21.9	7.9	4.2	0.8	0.5
Jimmy Butler	21.4	5.2	4.5	1.7	0.6

where: **PPG**= Points, **REB**= Rebounds, **AST** = Assists, **STL** = Steals, and **BLK**=Blocks, on a per game basis.

Your parents believe the best fantasy player will maximize the value **FAN** given by the following formula:

$$FAN = PPG + (1.5 \cdot REB) + (1.5 \cdot AST) + (3 \cdot STL) + (2 \cdot BLK).$$

Help your parents out by reordering such a list of players by this new statistic.

Your task is to write a program that takes an input file **nba.txt** (formatted as above) containing a list of players and to output the data **sorted** by the new statistic FAN. You may assume:

- ▷ the file **nba.txt** is formatted as above and contains between 1 and 999 players,
- ▷ each player's first name and last name contains at most 10 characters, and
- ▷ each statistic (including the new one) will total less than 100.
- ▷ the FAN statistic will be greater than 10 for each player in the file.

The output for your program should look exactly as follows for the sample data given.

Player	FAN	PTS	REB	AST	STL	BLK
=====						
1 Westbrook, Russ	57.6	23.6	7.7	10.4	2.1	0.3
2 Cousins, DeMarc	56.8	27.1	11.6	3.3	1.5	1.4
3 Harden, James	55.7	28.5	6.3	7.4	1.8	0.6
4 Curry, Stephen	54.7	30.1	5.4	6.5	2.1	0.2
5 Durant, Kevin	53.0	27.8	8.3	5.0	0.9	1.3
6 James, LeBron	51.4	25.0	7.4	6.6	1.4	0.6
7 Davis, Anthony	50.5	24.3	10.3	1.9	1.3	2.0
8 George, Paul	46.5	23.4	7.0	4.2	1.9	0.3
9 Lowry, Kyle	46.4	21.9	5.0	6.4	2.2	0.4
10 Lillard, Damian	45.9	25.7	4.2	6.9	0.9	0.4
11 Anthony, Carmelo	43.4	21.9	7.9	4.2	0.8	0.5
12 Butler, Jimmy	42.2	21.4	5.2	4.5	1.7	0.6
13 DeRozan, DeMar	39.8	23.7	4.4	3.9	1.0	0.3
13 Thomas, Isaiah	39.8	22.2	3.0	6.4	1.1	0.1
15 Thompson, Klay	34.8	22.2	3.9	2.1	0.8	0.6

Note:

- ▷ the players names given last name first,
- ▷ the rank of the player relative to FAN (observe the tie for 13th), and

Recall that determining whether 2 floating point numbers are equal is very difficult for a computer. Since we are rounding to one decimal place, we can convert the 4 characters in the FAN statistic (eg. 57.6) to a string using the function **sprintf** and then compare the strings for equality. For this assignment you **must** perform this conversion and use a function that sorts strings.

HINT: While you are sorting the FAN list, at the same time sort a separate array representing the **index** of sorted items in the original player list. Eg. If Russ Westbrook is indexed by 9 in your original data, then you want 9 to be in the first position of this new array of indexes.