# Practice of Information Processing
# Final Assignment: Japanese football league ranking program
# J_score.c

Create a program J_score.c that generates a standings table based on the score data of the 2023 Japanese football league and outputs it to a file. This program follows the specifications below.

＜Specifications＞

- Read J_result2023.csv for score data. Each line of the CSV file is listed in the order of "0: team name 1: number of wins 2: number of draws 3: number of loses 4: total goals scored (GF: goals for) 5: total goals conceded (GA: goals against)" separated by commas. Currently, the data is in ascending order by team names.
- The teams with the higher “win points” should be ranked higher. If the "win points" are the same, the team with the largest "goal difference" will be ranked higher. If there is still a tie, the team with the highest "total goals scored (GF: goals for)" will be ranked higher.
- “Win points” are calculated based on 3 points for winning, 1 point for drawing, and 0 points for losing.
- “Goal difference” is the “total goals scored (GF: goals for)” minus the “total goal conceded (GA: goals against)”.
- For the rankings to be written to the file, in addition to the contents of the CSV file, add "ranking", "win points", and "goal difference" to the table, and sort them in order of "ranking" from the top. It is desirable to format and output as carefully as possible so that it is easy to read.

＜Assignments＞

- Create the above program using the specified template. To get credit, you must submit at least the mandatory assignment.
  - Mandatory assignment
    - Use template J_score_template1.c (and bubble or selection sort)
  - Optional assignment (1)
    - Use template J_score_template2.c
  - Optional assignment (2)
    - In the program of optional assignment (1), implement the ranking function rank_score () using heap sort.

  ** Submit also the optional assignments if you want to get higher grades such as A and AA.*

- If you can improve the program further, you may modify the above template and highlight your corrections in the comment.

＜How to submit＞

Submit the following 3 files separately for mandatory assignment and optional assignment (1) and (2).

- Mandatory assignment
  - Program code: J_score1.c
  - Execution result: J_socre1.txt
  - Explanation: J_score1_report.txt (or .pdf)
- Optional assignment (1)
  - Program code: J_score2.c
  - Execution result: J_socre2.txt
  - Explanation: J_score2_report.txt (or .pdf)
- Optional assignment (2)
  - Program code: J_score3.c
  - Execution result: J_socre3.txt
  - Explanation: J_score3_report.txt

*In explanation, outlines your program and show what you have done and how it works etc. The explanation of the optional assignments may focus on the difference from others.

＜Tips＞

- The two templates provide guidelines on how to construct the program. The functions defined in the prototype declaration are the minimum guidelines, so you may add more functions if necessary.
- The key of this program is sorting structure arrays. There are many methods for sorting. For the mandatory assignment, you can use the bubble sort or selection sort that you studied already in class.
- In optional assignment (2), heap sort should be implemented. The explanation of heap sort is more easily found on the Web than in textbooks.