MIDDLE EAST TECHNICAL UNIVERSITY, NORTHERN CYPRUS CAMPUS
CNG213 Data Structures – Programming Assignment 1

Date handed out: 09 April 2021, Friday
Date submission due: 25 April 2021, Sunday 23:55

TFMS: Turkish Football Team Management System

This assignment aims to help you practice linked list data structure and basic linked list operations. Your main task in this assignment is to write a C program to create a simple application that will allow you manage information about Turkish football teams in Turkey. This application will mainly keep team's information in a simple text file but when loaded to your application; your application will keep team's information in an internal Linked List. For each team, your application will store the following details: a unique identification number which can be maximum of 2-digit integer, the name of the team (max 50 characters), the status of the team (max 1 character, which could be win (W), lost (L) and draw (D)), the points gained from the match, score of the team, the number of goals and the date-time (Format: DD/MM/YYYY HH:MM) that you added this team to your list.

When you start the application, it will read teams from an external text files (Teams.txt), create a linked list and then populate this list with the teams stored in that file. This application will then provide some operations for you to manage your teams. When you exit from the application, the application will overwrite the external file with the latest version of the list to include the latest teams in your application. Therefore, the TFMS application needs to support the following operations.

- **Reading teams from an external file and initialising teams lists**: The application will start by reading the teams from an external text file called Teams.txt. The Teams.txt file will include the details of the team that you have, including unique id, name, status, points, score, goals, and date-time separated by a semicolon. We assume that there is no semicolon in the contents of teams; for example, please assume that a team name itself does not include a semicolon. Example content file is shown below:

Teams.txt
```
1;Galatasaray;L;0;-1;2;22/01/2021 09:11
2;Fenerbahce;D;1;0;0;22/01/2021 14:30
3;Goztepe;D;1;0;1;22/01/2021 19:00
4;Trabzonspor;W;3;4;5;24/01/2021 09:11
5;Besiktas;W;3; 1;3;24/01/2021 15:30
6;Rizespor;L;0;-1;0;24/01/2021 20:30
7;Konyaspor;W;3;1;1;26/01/2021 20:30
8;Denizlispor;D;1;0;0;27/01/2021 10:30
```

The application will then internally store these teams in a linked list. Please note that you cannot make any assumptions about the number of teams you have in your list and there is no upper limit for the number of teams. In your internal representation, you will need to decide about the structure of your linked list based on the txt file given above.

- **Adding a new team:** After the initialisation of the application with the external file, you may want to add a new team to your storage. In this case, the application will ask you to enter the team details, including the name, status, points, score and also goals. The team list cannot include more than one team with the same name. If the user wants to enter an existing team, then your program should give a warning message. You can make use of external libraries in C, such as string.h library. In addition to these details, the application will take the current date-time from the system and add the new team with all the details in the list of teams maintained. You can find the date-time from the system as follows:

```c
#include <stdio.h>
#include <time.h>
int main() {
    time_t ti = time(NULL);
    struct tm t = *localtime(&ti);
    printf("Date:     %02d/%02d/%04d\n",      t.tm_mday,      t.tm_mon+1,
t.tm_year+1900);
    printf("Time: %02d:%02d\n", t.tm_hour, t.tm_min);
    return 0;
}
```

- **Deleting a team:** This application will allow you to select a specific team by using its unique id from the list and delete it.

- **Displaying teams**: This application will allow you to display the teams that you manage in your application. Deleted teams should not be displayed.

- **Searching for a team**: This application will allow you to search for a team by using the team name you have to consider both capital and small letters of the names. For example; Galatasaray = galatasaray = GALATASARAY. Your code should handle these cases in search. You can make use of external libraries in C, such as string.h library

- **Create a teamlist**: This application will also allow you to create a favourite team list. The user will give ID of the team, and the team will be added to the favourite team list which will be created and the team details will be stored in an external text file called as favouriteTeams.txt.

- **Overwriting the external file:** When the application is closed, the external file (Teams.txt) should be overwritten with the latest version of the list.

Programming Requirements
When you write this application, you need to consider the data structure(s) that will be necessary. Therefore, it is recommended that you implement your basic linked list operations first (add/delete/search/display, etc). By using these basic operations on linked lists, you can implement other required operations. You also need to define and use a structure for date-time. To achieve the steps, you need to have the following functions. Please strictly follow the requirements of the functions given below! In addition to these functions, you can write some helper/auxiliary functions.

Function	Explanation	Take	Return
initialiseTeams	To create and initialise the lists of teams that you have in Teams.txt file	-	A list of teams you manage
addTeam	To insert a new team in to your list of teams by taking the required details.	A list of teams you manage; name, status, points, score and goals	-
deleteTeam	To delete a team from the list of teams you manage by using one of its unique id.	A list of teams you manage, a unique id	-
displayTeams	To show the details of the teams you manage.	A list of teams you manage	-
searchTeams	To search for a team by using team name.	A list of teams you manage	-
createFavouriteList	To create a favourite team list with the team details provided.	A list of teams you manage, A list of favourite teams you manage	A list of favourite teams you manage
Overwrite	To overwrite the external files with the latest versions of the list.	A list of teams you manage	-

Grading

Your program will be graded as follows:

Grading Point	Mark (out of 100)
Structures to represent a list of emails and date-time	5
Main function to control and coordinate the commands	15
initialiseTeams	15
addTeam	10
deleteTeam	5
displayTeams	5
searchTeams	15
createFavouriteList	15
Overwrite	15

Important Notes
- Remember to have good programming style (Appropriate comments, variable names, formulation of selection statements and loops, reusability, extensibility etc.). Each of the items above will include10% for good programming style.
- Read rules regarding to assignments from the Syllabus carefully.
- If your code does not compile due to syntax errors, you will automatically get zero.

- If your code includes a variable declaration inside a for loop such as for(int i=0; i<5;i++), you will automatically get zero.
- If your code includes gloable varibles, you will automatically get zero.

Sample Run

```
The Teams.txt file has been loaded successfully

----- MENU-----

1. Add Team
2. Delete Team
3. Print Teams
4. Search Teams
5. Create Favourite Team List
6. Exit

Enter your option: 1

Enter name of the Team: Antalyaspor
Enter status of the Team: W
Enter points of the Team: 2
Enter score of the Team: 2
Enter number of Team goals: 2
The team has been added!!

----- MENU-----

1. Add Team
2. Delete Team
3. Print Teams
4. Search Teams
5. Create Favourite Team List
6. Exit

Enter your option: 3

Teams in your database:
----------------------
ID: 1
Team Name: Galatasaray
Team Status: L
Team Points: 0
Team Score: -1
Number of team goals: 2
Date: 22/01/2021
Time:09:11

ID: 2
Team Name: Fenerbahce
Team Status: D
Team Points: 1
Team Score: 0
Number of team goals: 0
Date: 22/01/2021
```

Time: 14:30

ID: 3
Team Name: Goztepe
Team Status: D
Team Points: 1
Team Score: 0
Number of team goals: 1
Date: 22/01/2021
Time: 19:00

ID: 4
Team Name: Trabzonspor
Team Status: W
Team Points: 3
Team Score: 4
Number of team goals: 5
Date: 24/01/2021
Time: 09:11

ID: 5
Team Name: Besiktas
Team Status: W
Team Points: 1
Team Score: 3
Number of team goals: 3
Date: 24/01/2021
Time: 15:30

ID: 6
Team Name: Rizespor
Team Status: L
Team Points: 0
Team Score: -1
Number of team goals: 0
Date: 24/01/2021
Time: 20:30

ID: 7
Team Name: Konyaspor
Team Status: W
Team Points: 3
Team Score: 1
Number of team goals: 1
Date: 26/01/2021
Time: 20:30

ID: 8
Team Name: Denizlispor
Team Status: D
Team Points: 1
Team Score: 0
Number of team goals: 0
Date: 27/01/2021
Time:10:30

```
ID: 9
Team Name: Antalyaspor
Team Status: W
Team Points: 2
Team Score: 2
Number of team goals: 2
Date: 6/04/2021
Time:1:30

----- MENU-----

1. Add Team
2. Delete Team
3. Print Teams
4. Search Teams
5. Create Favourite Team List
6. Exit

Enter your option: 2

Enter the ID of the team you want to delete: 2
Team with ID 2 has been deleted from your list!!!

----- MENU-----
1. Add Team
2. Delete Team
3. Print Teams
4. Search Teams
5. Create Favourite Team List
6. Exit

Enter your option: 4

Enter Team name: GALATASARAY

Results:
--------------------
ID: 1
Team Name: Galatasaray
Team Status: L
Team Points: 0
Team Score: -1
Number of team goals: 2
Date: 22/01/2021
Time:09:11

----- MENU-----
1. Add Team
2. Delete Team
3. Print Teams
4. Search Teams
5. Create Favourite Team List
6. Exit

Enter your option: 5
```

```
Enter team ID you want to add to your favorite list: 1
1 has been added to your list

----- MENU-----
1. Add Team
2. Delete Team
3. Print Teams
4. Search Teams
5. Create Favourite Team List
6. Exit

Enter your option: 5

Enter team ID you want to add to your favorite list: 11
Team with ID 11 doesn't exist in team list!!!!
```