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Introduction

The objective of this report is to reflect on the workings of the programming project undertaken as part of the Python and R programming course in Dalarna University. The course was comprised of various programming concepts ranging from basic and elementary ones like basic units of programming, objects, functions, methods and classes to more advanced and technical ones, for instance repetition structures, nesting, inheritance summarizing everything into object oriented programming. The execution of the project involved designing an interface that would register and make changes to teams in a hockey youth cup tournament.

To code the interface, three classes were used:-

- 1) class Player
- 2) class Team
- 3) class Menu

An instance of the class Player held information about a player of a team. An instance of the class Team held information about a team. An instance of the class Menu was the actual user interface itself, allowing users to register teams, make changes to teams, display information of a team, save whole tournament's data to a file etc.

Description

Dependencies of the class Menu:-

- class Player
- class Team

An object of the class Menu instantiates objects of the class Team that represent different teams participating in the tournament. The objects of class Team can instantiate objects of class Player that represent different players of a team. Each of these players and teams can be encoded with unique information and attributes using the methods these objects inherit from parent classes (class Player and class Team). Finally the class Menu can instantiate multiple objects which represent multiple teams.

class Player

This class represents a player. An object of this class can hold a player's name and information. An object of this class has the following attributes:-

- player_name
- info

An object of this class has following methods:-

- get_player_name()
- get_player_info()
- change_player_name()
- change_player_info()

Objects of this class are used to represent all the 11 players of a team. So the class Team utilizes methods of this class to create new players/objects of class Player to modify these objects and also to set attributes of these objects.

class Team

This class represents a team. An object of this class can hold a team's information. An object of this class has the following attributes:

- name

An object of this class has following methods:-

- get_team_name()
- add_new_player()
- list_team_players()
- list_team_player_names()
- remove_player()
- change_player_name()
- change_player_info()
- get_player_info()
- update_fee_status()
- define_team_type()
- set_id()
- show_fee_status()
- show_team_type()
- show_team_id()
- set_team_description()
- show_team_info()
- cancell_participation()
- show_participation_status()
- show_fee_paid_amount()
- change_fee_paid_amount()
- teams_loaded_data()

Objects of this class are used to represent the teams participating in the tournament. So the class Menu utilizes methods of this class to create new teams/objects of class Team to modify these objects and also to set attributes of these objects.

class Menu

This class represents a user interface. An object of this class can hold information of all teams participating in the tournament. An object of this class has no attributes. An object of this class has the following methods:-

- create_team()
- edit_team()
- show_teams_ids()
- show_team_info()
- delete_team()
- list_all_teams()
- list_all_boys_teams()
- list_all_girls_teams()
- get_percent_of_teams_that_paid_fee()
- get_all_teams_data()

User Guide

The Menu.py builds upon the Team.py file and provides an interface to it. So, on executing the Menu.py script, the user is prompted to make choices. In this user guide, we have described both the menu with options and sub-menu with sub-options for better understanding. The interface looks like as shown below in **Fig.1:-**

```
Welcome
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6]Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: |
```

Fig.1

Now we will demonstrate step by step, the menu interface.

In **Fig.2**, we see that for the **creation of a new team**, we select **option [1]** from the main menu as shown below, which directly prompts the user to **'Enter team name: '** and right after that gives the option to **'Enter player name: '** and **'Enter player information: '**. For simplicity at the moment, the number of players to be added have been decreased to just one.

```
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6]Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: 1
Enter team name: Sweden
Add players to the team!

Enter player name: John
Enter player information: Defense
```

Fig.2

For the sake of keeping simplicity at the moment, the number of players have been set to only 1, which can easily be tweaked back to 11 from the following code in **Fig.3**:-

```
for _ in range(1): #Adding 1 new players to the team created
    new_team.add_new_player()
self.teams.append(new_team) #Appending newly created team to list that contains all teams
self.team_ids_mappings[id] = new_team #Mapping newly created team object to the team id
self.team_ids_names_mappings[id] = new_team.get_team_name() #Mapping newly created team id to the team name
new_team.set_id(id) #Setting up team id of newly created team
```

Fig.3

Moving on, we can go for **View team ids** using the **option [2]** in the main menu. We can also see the teams' ids, which are automatically generated as soon as the user enters team name and player name and player information and without manipulation by the user, as shown below:-

```
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6]Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: 2
id : 69 | name : Sweden
id : 24 | name : Norway
```

Fig.4

In **option [3]**, we can edit different attributes of the team under **[3] Edit team**, which opens up a **sub-menu** from the main menu:-

```
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6]Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: 3
Enter team id :69
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: |
```

Fig.5

After entering the respective team id under **option [3]** in **Fig.5**, we explore a sub menu, starting with **sub-option [1]**, where we have listed all the team members in that particular team as shown in **Fig.6** below:-

```
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 1
John
Ramsey
James
```

Fig.6

In **sub-option [2]**, a player named James can be removed as shown in **Fig.7** below:-

```
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 2
Enter player name: James
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 1
John
Ramsey
```

Fig.7

In **sub-option [3]**, a player named John can be renamed to Felix as shown in **Fig.8** below:-

```
John
Ramsey

Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 3
Enter old name: John
Enter new name: Felix
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 1
Felix
Ramsey
```

Fig.8

In **sub-option [4]**, player information of a player named Felix can be changed as shown in **Fig.9** below:-

```
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 4
Enter player name: Felix
Enter information: Goal keeper
```

Fig.9

In **sub-option [5]**, the fee status of the team can be changed independently as shown in **Fig.10** and verified in **Fig.11** below:-

```
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 5
Enter fee status(True or False): True
```

Fig.10

```
Your Choice: 4
Enter team id: 69
team name : Sweden
created : 2022-04-24
fee status : True
team type : not defined yet
fee amount paid : 4000
participation status : Participating
team description : not defined yet
Player Name: Felix | Player Information: Goal keeper

Player Name: Ramsey | Player Information: Defender
```

Fig.11

In **sub-option [6]**, team type can be defined (boys and girls) as shown in **Fig.12** and verified in **Fig.13** below:-

```
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 6
Enter team type(boys or girls): boys
```

Fig.12

```
Your Choice: 4
Enter team id: 69
team name : Sweden
created : 2022-04-24
fee status : True
team type : boys
fee amount paid : 4000
participation status : Participating
team description : not defined yet
Player Name: Felix | Player Information: Goal keeper

Player Name: Ramsey | Player Information: Defender
```

Fig.13

In **sub-option [7]**, team description can be added as shown in **Fig.14** and verified in **Fig.15** below:-

```
Enter team id :69
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 7
Enter description: Hockey team
```

Fig.14

```
Enter team id: 69
team name : Sweden
created : 2022-04-24
fee status : True
team type : boys
fee amount paid : 4000
participation status : Participating
team description : Hockey team
Player Name: Felix | Player Information: Goal keeper

Player Name: Ramsey | Player Information: Defender
```

Fig.15

In **sub-option [8]**, players can be added in the team as shown in **Fig.16** and verified in **Fig.17** below:-

```
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 8
Enter player name: Ramsey
Enter player information: Defender
```

Fig.16

```
Your Choice: 4
Enter team id: 69
team name : Sweden
created : 2022-04-24
fee status : True
team type : boys
fee amount paid : 4000
participation status : Participating
team description : not defined yet
Player Name: Felix | Player Information: Goal keeper

Player Name: Ramsey | Player Information: Defender
```

Fig.17

In **sub-option [9]**, team's participation can be cancelled as shown in **Fig.18** and verified in **Fig.19** below:-

```
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 9
Enter participation cancellation date in YYYY-MM-DD format: 2021-03-15
```

Fig.18

```
Enter team id: 69
team name : Sweden
created : 2022-04-24
fee status : True
team type : boys
fee amount paid : 4000
participation status : Participation cancelled on 2021-03-15
team description : Hockey team
Player Name: Felix | Player Information: Goal keeper

Player Name: Ramsey | Player Information: Defender
```

Fig.19

In **sub-option [10]**, team's name can be changed as shown in **Fig.20** and verified in **Fig.21** below:-

```
Enter team id :69
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 10
Enter new name: Denmark
```

Fig.20

```
Enter team id: 69
team name : Denmark
created : 2022-04-24
fee status : True
team type : boys
fee amount paid : 4000
participation status : Participation cancelled on 2021-03-15
team description : Hockey team
Player Name: Felix | Player Information: Goal keeper

Player Name: Ramsey | Player Information: Defender
```

Fig.21

In **sub-option [11]**, team's fees amount can be updated as shown in **Fig.22** and verified in **Fig.23** below:-

```
Enter team id :69
Choose an option
[1]List team players
[2]Remove a player
[3]Change player name
[4]Change player information
[5]Update fee status
[6]Define team type
[7]Set team description
[8]Add player
[9]Cancell team participation
[10]Change team name
[11]Update fee paid amount
[12]Back
Your Choice: 11
Enter paid amount: 6000
```

Fig.22

```
Enter team id: 69
team name : Denmark
created : 2022-04-24
fee status : True
team type : boys
fee amount paid : 6000
participation status : Participation cancelled on 2021-03-15
team description : Hockey team
Player Name: Felix | Player Information: Goal keeper

Player Name: Ramsey | Player Information: Defender
```

Fig.23

Resuming **option [4]** of the main menu, a team's information can be shown as shown in **Fig.24** below:-

```
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6>Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: 4
Enter team id: 69
team name : Denmark
created : 2022-04-24
fee status : True
team type : boys
fee amount paid : 6000
participation status : Participation cancelled on 2021-03-15
team description : Hockey team
Player Name: Felix | Player Information: Goal keeper

Player Name: Ramsey | Player Information: Defender
```

Fig.24

In **option [6]**, a team's information can be deleted as shown in **Fig.25** and verified in **Fig.26** (Norway removed and only Denmark remains) below:-

```
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6>Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: 6
Enter team id: 24
```

Fig.25

```
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6>Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: 2
id : 69 | name : Denmark
```

Fig.26

In **option [7]**, all teams' names can be displayed as shown in **Fig.27** below:-

```
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6]Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: 7
Denmark
Germany
```

Fig.27

In **option [8]**, only teams of particular type (gender) can be displayed as shown in **Fig.28** below:-

```
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6]Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: 8
Enter type of team (boys or girls): girls
Germany
```

Fig.28

In **option [9]**, percentage of teams that have paid fees can be shown in **Fig.29** below:-

```
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6]Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: 9
Total number of teams: 2
Percentage of teams that have paid fee: 50.0
```

Fig.29

In **option [10]**, all teams' information can be displayed as shown in **Fig.30** below:-

```
Your Choice: 10
team id : 51
team name : Denmark
created : 2022-04-25
fee status : True
team type : boys
fee amount paid : 6000
participation status : Participation cancelled on 2022-04-25
team description : Hockey team
Player Name: Felix | Player Information: Goal Keeper

Player Name: Ramsey | Player Information: Defender

team id : 81
team name : Germany
created : 2022-04-25
fee status : False
team type : girls
fee amount paid : 0
participation status : Participating
team description : Hockey team
Player Name: Sarah | Player Information: Goal Keeper
```

Fig.30

In **option [11]**, all the information can be saved in a text file in the same directory as shown in **Fig.31** below:-

```
Choose an option
[1]Create new team
[2]View teams ids
[3]Edit team
[4]Show team information
[5]Update fields for a team
[6]Delete team
[7]List all teams names
[8]List boys/girls teams names
[9]Show percentage of teams that paid fee
[10]Show all teams information
[11]Save data
[12]Load saved data
[13]Exit
Your Choice: 11
```

Fig.31

The information on the teams is saved in a txt file in the same directory as shown in **Fig.32** below:-

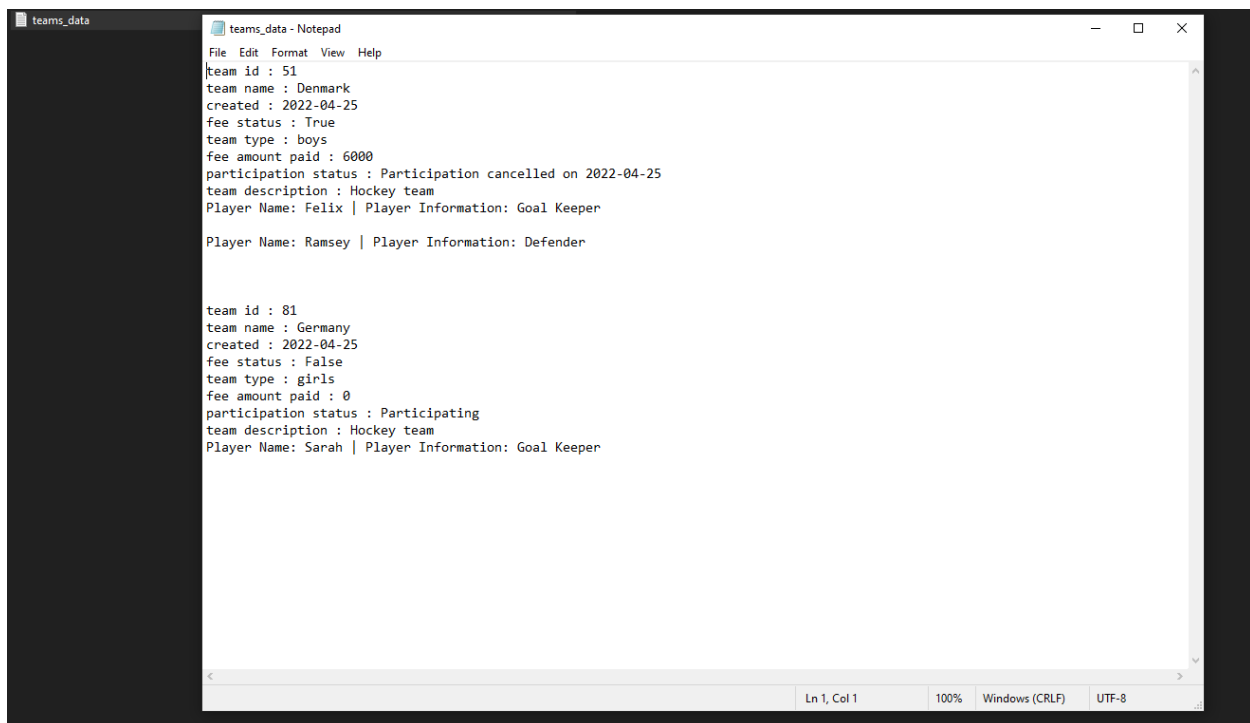


Fig.32

In **option [12]**, the saved information can be retrieved from the txt file as shown in **Fig.33** below:-

```
Loaded Information of Teams
team id : 51

team name : Denmark

created : 2022-04-25

fee status : True

team type : boys

fee amount paid : 6000

participation status : Participation cancelled on 2022-04-25

team description : Hockey team

Player Name: Felix | Player Information: Goal Keeper


Player Name: Ramsey | Player Information: Defender


team id : 81

team name : Germany

created : 2022-04-25

fee status : False

team type : girls

fee amount paid : 0

participation status : Participating

team description : Hockey team

Player Name: Sarah | Player Information: Goal Keeper
```

Fig.33

Action Item	Description
Welcome	
Choose an option	
[1]Create new team	Creates a new team, expects a string as team name and prompts the user to add players to the team
[2]View teams ids	Displays ids of all existing teams, expects no arguments
[3]Edit team	Edits a team, expects an integer which is the team's unique id
[4]Show team information	Shows information of a team, expects an integer which is team's unique id
[5]Update fields for a team	Updates fields/encoded information for a team, expects an integer which is team's unique id
[6]Delete team	Deletes a team from the tournament, expects an integer which is team's unique id
[7]List all teams	Lists names of all existing teams in the tournament, expects no arguments
[8]List boys/girls teams	Lists names of all existing boys or girls teams , prompts the user to choose either to display all boys teams names or all girls teams names , expects no arguments
[9]Show percentage of teams that paid fee	Shows number of teams participating in the tournament and also shows percentage of teams that have paid fee, expects no arguments
[10]Show all teams information	Shows all information from the menu
[11]Save data	Saves information of all registered teams to a txt file
[12]Load saved data	Loads saved data from the txt file
[13]Exit	Terminates the user interface

References

References

T. Gaddis, Starting Out with Python, Hoboken, NJ: Pearson Education, Inc., Hoboken, 2018.
