

# Politechnika Śląska Wydział Automatyki, Elektroniki i Informatyki

## Programowanie Komputerów 4

### TEMAT PROJEKTU: **FOOTBALL MANAGER**

Autor: Kamil Niedziela

Prowadzący: dr hab. inż., prof. PŚ Roman Starosolski

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# 1. Temat

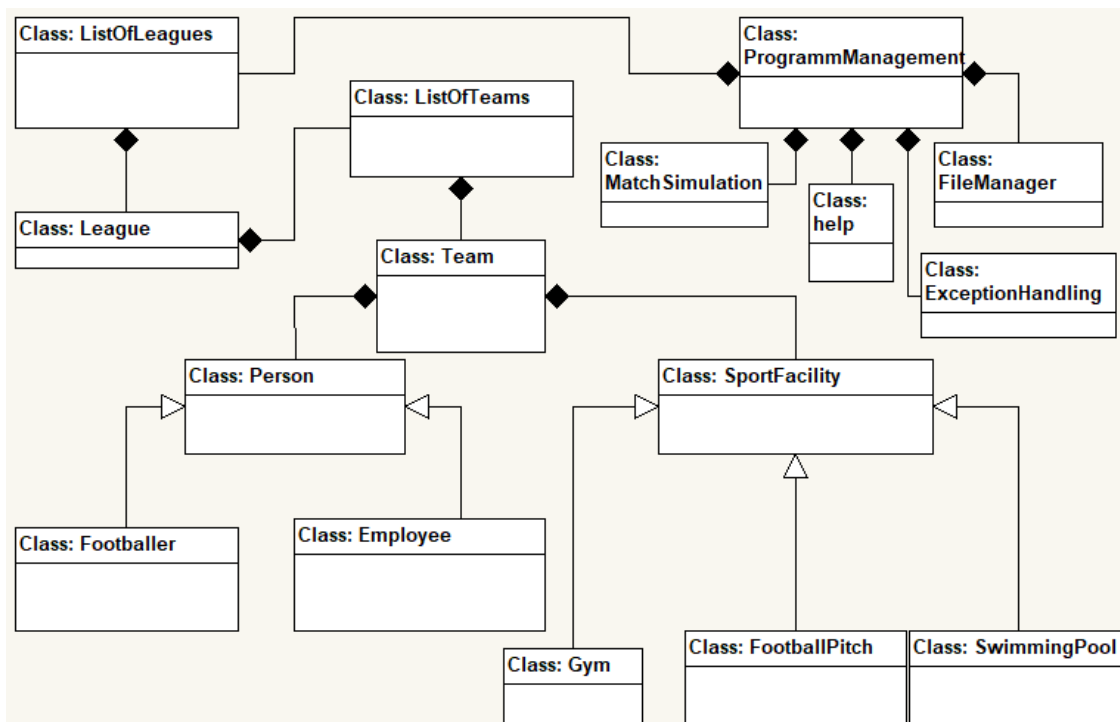
Stworzony przeze mnie program nosi nazwę „Football manager” Projekt stanowi piłkarską bazę danych, którą można zarządzać.

## 2. Analiza tematu

### 2.1. Pełna treść tematu

Program umożliwia dodanie, wyświetlanie lub usunięcie lig piłkarskich. Każda liga składa się z klubów sportowych, które również można dodawać, wyświetlać lub degradować. Nie można wyobrazić sobie drużyny która nie składa się z odpowiedniego personelu. W związku z tym do klubów można kupować, sprzedawać oraz wyświetlać na ekran wszystkich piłkarzy oraz pozostałych członków personelu takich jak drużynowi lekarze, sprzątaczkę czy dyrektorzy sportowi. Każdy z klubów zaczyna z budżetem ustawionym przez użytkownika natomiast każdy z pracowników kosztuje w zależności od swojej oceny ogólnej. Im wyższa ocena ogólna pracownika, tym większa cena. Ciężko wyobrazić sobie drużynę która nie ma gdzie trenować, warto więc pamiętać o odpowiednich obiektach sportowych. Każdy klub może nabyć siłownię, boiska czy baseny które również będą kosztować. Program umożliwia symulację meczów piłkarskich w każdej lidze, w których kluby za pomocą odpowiedniego algorytmu co mecz otrzymywać będą 0 punktów w przypadku porażki, 1 punkt w przypadku remisu oraz 3 punkty w przypadku zwycięstwa. Program będzie składał się z kilku powiązanych ze sobą list, w których każdy obiekt (reprezentanci poszczególnych list) będą ściśle powiązane ze sobą.

### 2.1. Klasy



Klasy dobrane są w taki sposób, aby zawierać się w sobie kaskadowo.

## 2.2. Algorytmy

W programie dostępny jest jeden główny algorytm odpowiedzialny za symulację kolejek piłkarskich.

## 2.3. Biblioteki zewnętrzne

Program nie posiada żadnej biblioteki zewnętrznej. Jest to program bazodanowy, więc interfejs graficzny jest w nim zbędny.

## 3. Specyfikacja zewnętrzna

Program napisany jest w konsoli.

Menu z opcjami programu:

A screenshot of a Windows command prompt window. The title bar at the top shows the file path: C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe. The window has standard Windows window controls (minimize, maximize, close) on the right. The command prompt itself has a black background with white text. The text displayed is as follows:  
What's your name: Jan  
What's your surname: Kowalski  
  
Welcome to Football Manager!  
Manager: Jan Kowalski  
  
Choose one option:  
1.Add football league  
2.Show all football leagues  
3.Remove football league  
4.Add club to the league  
5.Show all league's clubs  
6.Remove club from the league  
7.Buy footballer or employee to the club  
8.Show workers of the team  
9.Sell footballer or employee from the club  
10.Buy sport facility to the club  
11.Show sport facilities of the club  
12.Sell sport facility from the club  
13.Simulate a queue  
14.Quit  
  
Choice: \_

## Wyświetlenie lig piłkarskich:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe

Choice: 2
Available leagues:
1. La Liga
2. Bundesliga
3. Ekstraklasa
4. Serie A
5. Premier League

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: _
```

## Dodanie kolejnej ligi:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe

Choice: 1
League name: Ligue 1
Successfully added league!

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice:
```

## Usunięcie ligi piłkarskiej:

### a) Przed usunięciem

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe

Choice: 2
Available leagues:
1. La Liga
2. Bundesliga
3. Ekstraklasa
4. Serie A
5. Premier League
6. Ligue 1

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice:
```

### b) Po usunięciu

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe

Choice: 3
Give the number of the league that you want to remove: 6
Successfully removed league!

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 2
Available leagues:
1. La Liga
2. Bundesliga
3. Ekstraklasa
4. Serie A
5. Premier League

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
```

Wyświetlenie wszystkich klubów piłkarskich danej ligi:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe

Choice: 5
What league clubs would you like to see?(Give a number): 1
Club number: 1
Club name: Real Madrid
Stadium name: Estadio Santiago Bernabeu
Budget of the club: 10000
Points in the league: 0
Rating of the team: 100

Club number: 2
Club name: FC Barcelona
Stadium name: Camp Nou
Budget of the club: 300
Points in the league: 0
Rating of the team: 96

Club number: 3
Club name: Athletic Bilbao
Stadium name: San Mames
Budget of the club: 450
Points in the league: 0
Rating of the team: 90

Club number: 4
Club name: Sevilla FC
Stadium name: Estadio Ramon Sanchez Pizjuan
Budget of the club: 15241
Points in the league: 0
Rating of the team: 60
```

Dodanie klubu piłkarskiego do ligi:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe

14.Quit

Choice: 4
Where would you like to put the team?(Give the number of the league): 1
Club name: Valencia CF
Stadium name: San Mames
Budget of the club: 8000
Rating of the club(1-100): 80
Successfully added team!

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: _
```

## Degradacja drużyny z ligi:

### a) Przed degradacją

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
Club number: 2
Club name: FC Barcelona
Stadium name: Camp Nou
Budget of the club: 300
Points in the league: 0
Rating of the team: 96

Club number: 3
Club name: Athletic Bilbao
Stadium name: San Mames
Budget of the club: 450
Points in the league: 0
Rating of the team: 90

Club number: 4
Club name: Sevilla FC
Stadium name: Estadio Ramon Sanchez Pizjuan
Budget of the club: 15241
Points in the league: 0
Rating of the team: 60

Club number: 5
Club name: Valencia CF
Stadium name: San Mames
Budget of the club: 8000
Points in the league: 0
Rating of the team: 80

Welcome to Football Manager!
Manager: Jan Kowalski
```

### b) Po degradacji

```
Choice: 6
Which league would you like to reduce?(Give the number of the league): 1
What club would you like to remove? (give the number): 5
Successfully removed team!
Welcome to Football Manager!
Manager: Jan Kowalski
```

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe

Club number: 2
Club name: FC Barcelona
Stadium name: Camp Nou
Budget of the club: 300
Points in the league: 0
Rating of the team: 96

Club number: 3
Club name: Athletic Bilbao
Stadium name: San Mames
Budget of the club: 450
Points in the league: 0
Rating of the team: 90

Club number: 4
Club name: Sevilla FC
Stadium name: Estadio Ramon Sanchez Pizjuan
Budget of the club: 15241
Points in the league: 0
Rating of the team: 60

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
```

## Wyświetlanie personelu drużyny:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
Choice: 8
Which league would you like to see workers?(Give the number of the league): 1
Which club would you like to see workers? (give the number): 1
Who would you like to see?(1.Players 2.Employees): 1
Number of the player: 1
Price: 12423
Name: Cristiano
Surname: Ronaldo
Height: 188
Rating: 9
Position: Forward

Number of the player: 2
Price: 4429
Name: Luka
Surname: Mordic
Height: 170
Rating: 9
Position: Midfielder

Number of the player: 3
Price: 120345
Name: Xabi
Surname: Alonso
Height: 190
Rating: 7
Position: Midfielder

Number of the player: 4
```

## Zakup pracownika do drużyny:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 7
Which league would you like to buy worker?(Give the number of the league): 1
Which club would you like to buy worker? (give the number): 1
Who would you like to add?(1.Player 2.Employee): 1
What's the rating of the person?(1-10): 8
The price of person is: 753
What's the name?: Iker
What's the surname?: Casillas
Height?: 190
What's the position of the player?(1.Goalkeeper 2.Defender 3.Midfielder 4.Forward):
1
Successfully bought worker to the team!

Welcome to Football Manager!
Manager: Jan Kowalski
```



Sprzedaż pracownika z drużyny:

a) Stan drużyny przed sprzedażą

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
Surname: Alonso
Height: 190
Rating: 7
Position: Midfielder

Number of the player: 4
Price: 200
Name: Robert
Surname: Lewandowski
Height: 185
Rating: 9
Position: Forward

Number of the player: 5
Price: 300
Name: Leo
Surname: Messi
Height: 170
Rating: 10
Position: Midfielder

Number of the player: 6
Price: 753
Name: Iker
Surname: Casillas
Height: 190
Rating: 8
Position: Goalkeeper
```

b) Stan drużyny po sprzedaży

```
Choice: 9
Which league would you like to sell worker(Give the number of the league): 1
Which club would you like to put worker? (give the number): 1
What worker would you like to sell?(1.Player 2.Employee): 1
What player would you like to sell?(Give a number): 6
Successfully sold!

Succesfully sold worker from the team!

Welcome to Football Manager!
Manager: Jan Kowalski
```

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
Name: Luka
Surname: Mordic
Height: 170
Rating: 9
Position: Midfielder

Number of the player: 3
Price: 120345
Name: Xabi
Surname: Alonso
Height: 190
Rating: 7
Position: Midfielder

Number of the player: 4
Price: 200
Name: Robert
Surname: Lewandowski
Height: 185
Rating: 9
Position: Forward

Number of the player: 5
Price: 300
Name: Leo
Surname: Messi
Height: 170
Rating: 10
Position: Midfielder
```

## Wyświetlenie obiektów sportowych drużyny:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 11
Which league would you like to see sport facilities?(Give the number of the league): 1
Which club would you like to see sport facilities?(give the number): 1
Number of the sport facility: 1
Type of the sport facility: Football Pitch
Price of the facility 22333
Surface of the facility: 1232 m^2
Is football pitch illuminated?: no

Number of the sport facility: 2
Type of the sport facility: Swimming Pool
Price of the facility 123
Surface of the facility: 333 m^2
What's the depth of the swimming pool?: 100

Number of the sport facility: 3
Type of the sport facility: Gym
Price of the facility 156
Surface of the facility: 223 m^2
Air conditioner: yes

Welcome to Football Manager!
Manager: Jan Kowalski
```

## Zakup obiektu sportowego przez drużynę:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe

Choice: 10
Which league would you like to buy sport facility?(Give the number of the league): 1
Which club would you like to buy sport facility? (give the number): 1
What kind of object would you like to buy(1.Gym 2.Football pitch 3.Swimming pool)?: 2
What's the price of the facility?: 1200
What's the surface of the facility?(in square meters): 250
Does the football pitch is illuminated?(yes or no): yes
Successfully bought sport facility to the team!

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice:
```

Sprzedaż obiektu sportowego z drużyny:

a) Stan obiektów drużyny przed sprzedażą

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe

Choice: 11
Which league would you like to see sport facilities?(Give the number of the league): 1
Which club would you like to see sport facilities?(give the number): 1
Number of the sport facility: 1
Type of the sport facility: Football Pitch
Price of the facility 22333
Surface of the facility: 1232 m^2
Is football pitch illuminated?: no

Number of the sport facility: 2
Type of the sport facility: Swimming Pool
Price of the facility 123
Surface of the facility: 333 m^2
What's the depth of the swimming pool?: 100

Number of the sport facility: 3
Type of the sport facility: Gym
Price of the facility 156
Surface of the facility: 223 m^2
Air conditioner: yes

Number of the sport facility: 4
Type of the sport facility: Price of the facility 1200
Surface of the facility: 250 m^2
Is football pitch illuminated?: yes

Welcome to Football Manager!
Manager: Jan Kowalski
```

b) Stan obiektów drużyny po sprzedaży

```
Choice: 12
Which league would you like to sell sport facility(Give the number of the league): 1
Which club would you like to sell sport facility? (give the number): 1
What facility would you like to sell?(Give the number): 4
Successfully sold facility!

Welcome to Football Manager!
Manager: Jan Kowalski
```

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe

Choice: 11
Which league would you like to see sport facilities?(Give the number of the league): 1
Which club would you like to see sport facilities?(give the number): 1
Number of the sport facility: 1
Type of the sport facility: Football Pitch
Price of the facility 22333
Surface of the facility: 1232 m^2
Is football pitch illuminated?: no

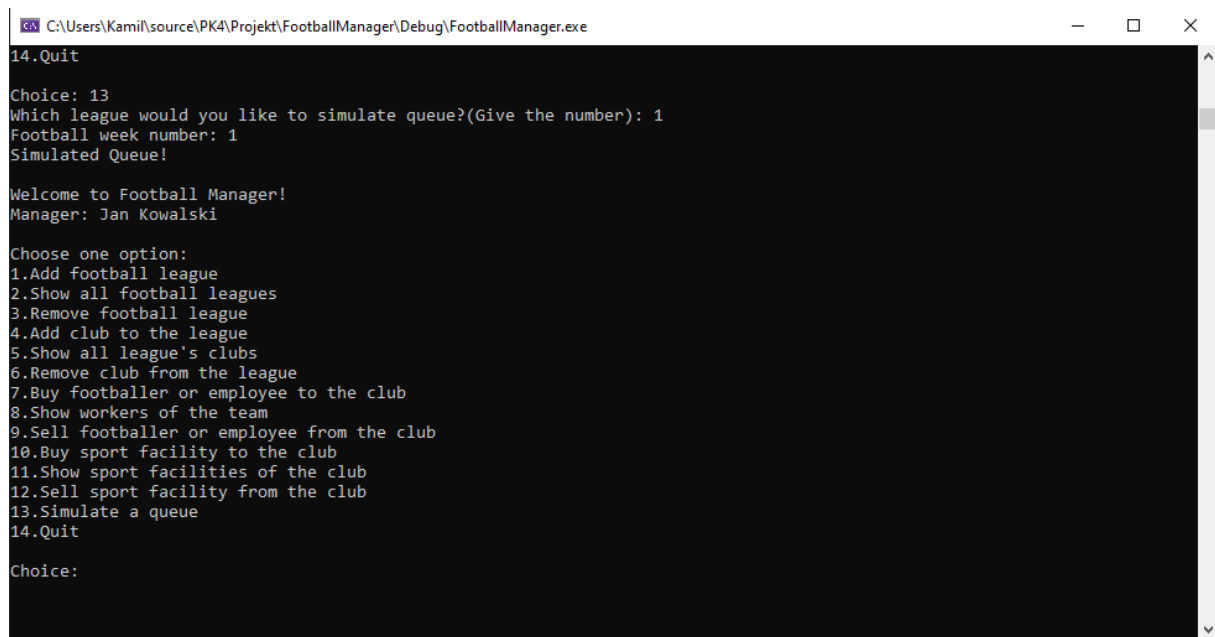
Number of the sport facility: 2
Type of the sport facility: Swimming Pool
Price of the facility 123
Surface of the facility: 333 m^2
What's the depth of the swimming pool?: 100

Number of the sport facility: 3
Type of the sport facility: Gym
Price of the facility 156
Surface of the facility: 223 m^2
Air conditioner: yes

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
```

Symulacja kolejek piłkarskich:



```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
14.Quit

Choice: 13
Which league would you like to simulate queue?(Give the number): 1
Football week number: 1
Simulated Queue!

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice:
```

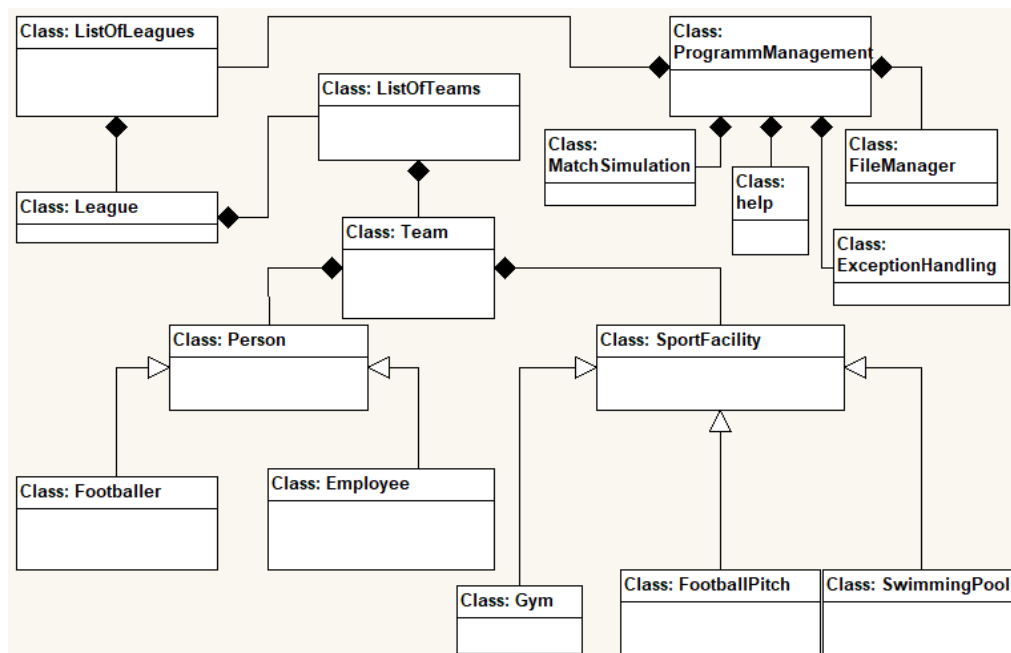
Po pięciu kolejkach w danej lidze wyłaniany jest mistrz rozgrywek.

### 3. Specyfikacja wewnętrzna

#### 3.1. Klasy

Obiektami w programie są ligi piłkarskie, drużyny, piłkarze, pracownicy oraz obiekty sportowe. Każdy z obiektów jest tworzony z odpowiednich klas posiadających atrybuty charakterystyczne dla danego obiektu. Powiązania pomiędzy klasami można dostrzec na diagramie klas. Istotnym polem klasy **ListOfLeagues** jest wektor na ligi piłkarskie. Ważnym polem klasy **League** jest wektor na drużyny piłkarskie. Istotnymi polami klasy **Team** są wektory na obiekty klasy **Player**, **Employee** oraz wektor na wskaźniki obiektów klasy **SportFacility**. Ważnymi metodami klasy **ListOfLeagues** są metody dodające, odejmujące i wyświetlające informacje o ligach, klubach, personelu czy obiektach sportowych. Klasa **League** posiada takie metody w stosunku do lig piłkarskich. Podobnie klasa **Team**, metody w tej klasie umożliwiają sprzedaż, zakup czy wyświetlenie zasobów drużyny. Klasa **MatchSimulation** posiada metodę odpowiedzialną za symulację rozgrywek. Metody klasy **ExceptionHandler** dbają o obsługę wyjątków. Metody klasy **FileManager** są odpowiedzialne za operację na plikach, czyli zapis i odczyt rozgrywki po wznowieniu programu. Klasa **help** posiada metodę wyświetlającą menu programu.

### 3.2. Diagram hierarchii klas



### 3.3. Struktury danych

Program oparty jest na zagnieżdżonych w sobie listach (wektorach) które służą jako pojemniki na obiekty odpowiedniego typu.

### 3.4. Algorytmy

W programie dostępny jest jeden główny algorytm odpowiedzialny za symulację kolejek piłkarskich. Każda z drużyn w każdej lidze ma określone szansę na zwycięstwo, remis lub porażkę w zależności od oceny ogólnej. Ocena ogólna drużyny waha się od 1 do 300, składają się na nią suma ocen piłkarzy i pracowników drużyny. Po zasymulowaniu pięciu kolejek program wyłania mistrza rozgrywek, czyli drużynę o największej liczbie punktów.

Rozkład możliwego rezultatu kolejek piłkarskich w zależności od oceny ogólnej drużyny:

Ocena ogólna drużyny	Zwycięstwo	Remis	Porażka
0-30	10%	40%	50%
30-60	10%	70%	20%
60-90	20%	40%	40%
90-120	20%	60%	20%
120-150	30%	20%	50%
150-180	30%	50%	20%
180-210	40%	30%	30%
210-240	50%	30%	20%
240-270	60%	20%	20%
270-300	70%	20%	10%

### 3.4. Wykorzystane techniki obiektowe

W aplikacji skorzystano z następujących technik obiektowych:

- hermetyzacja
- dziedziczenie
- polimorfizm
- zaprzyjaźnianie klas
- kontenery STL
- iteratory
- mechanizm wyjątków
- szablon
- inteligentne wskaźniki

### 3.4. Ogólny schemat działania programu

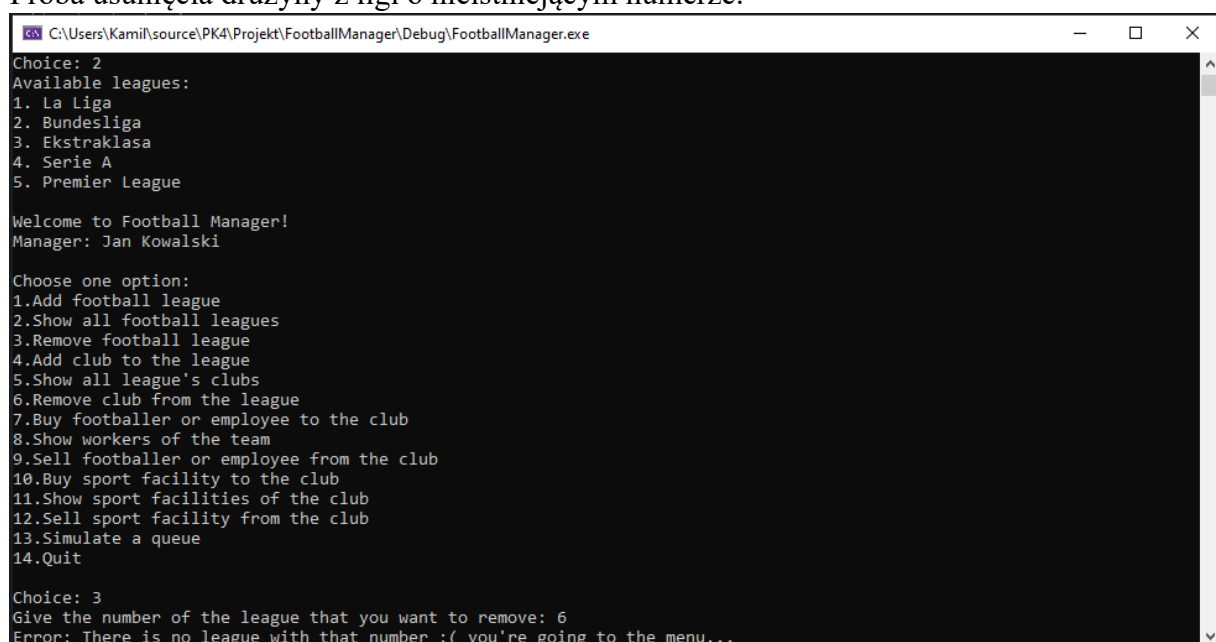
Działanie programu oraz operacje w nim są bardzo intuicyjne. Dokładne działanie opisano w punkcie „Pełna treść programu”.

## 4. Testowanie i uruchamianie

Program po uruchomieniu prosi użytkownika o imię i nazwisko, następnie za pomocą menu aplikacja wyświetla dostępne użytkownikowi opcje wyboru.

Aplikacja została przetestowana na różne sposoby. Poniżej umieszczono przykłady działania programu dla różnego rodzaju błędnych danych.

Próba usunięcia drużyny z ligi o nieistniejącym numerze:



```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
Choice: 2
Available leagues:
1. La Liga
2. Bundesliga
3. Ekstraklasa
4. Serie A
5. Premier League

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 3
Give the number of the league that you want to remove: 6
Error: There is no league with that number :( you're going to the menu...
```

Usunięcie drużyny o nieistniejącym numerze:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
Club number: 4
Club name: Sevilla FC
Stadium name: Estadio Ramon Sanchez Pizjuan
Budget of the club: 15241
Points in the league: 1
Rating of the team: 60

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 6
Which league would you like to reduce?(Give the number of the league): 1
What club would you like to remove? (give the number): 5
Error: There is no club with that number :( You're going to the menu...
```

Zakup pracownika do drużyny o nieistniejącym numerze:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
Which league would you like to reduce?(Give the number of the league): 1
What club would you like to remove? (give the number): 5
Error: There is no club with that number :( You're going to the menu...

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 7
Which league would you like to buy worker?(Give the number of the league): 1
Which club would you like to buy worker? (give the number): 5
Error: There is no club with that number :( You're going to the menu...

Welcome to Football Manager!
Manager: Jan Kowalski
```

Pokazanie zawodników nieistniejącej drużyny:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
14.Quit

Choice: 7
Which league would you like to buy worker?(Give the number of the league): 1
Which club would you like to buy worker? (give the number): 5
Error: There is no club with that number :( You're going to the menu...

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 8
Which league would you like to see workers?(Give the number of the league): 1
Which club would you like to see workers? (give the number): 5
Error: There is no club with that number :( You're going to the menu...
```

Sprzedaż pracownika z drużyny o nieistniejącym numerze:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 9
Which league would you like to sell worker(Give the number of the league): 1
Which club would you like to put worker? (give the number): 5
Error: There is no club with that number :( You're going to the menu...

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice:
```



Zakup obiektu sportowego do drużyny o nieistniejącym numerze:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 10
Which league would you like to buy sport facility?(Give the number of the league): 1
Which club would you like to buy sport facility? (give the number): 5
Error: There is no club with that number :( You're going to the menu...

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice:
```

Wyświetlenie obiektów sportowych nieistniejącej drużyny:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 11
Which league would you like to see sport facilities?(Give the number of the league): 1
Which club would you like to see sport facilities?(give the number): 5
Error: There is no club with that number :( You're going to the menu...

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice:
```

Sprzedż obiektów sportowych nieistniejącej drużyny:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 12
Which league would you like to sell sport facility(Give the number of the league): 1
Which club would you like to sell sport facility? (give the number): 5
Error: There is no club with that number :( You're going to the menu...

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice:
```

Wszystkie z wymienionych przypadków wyjścia poza zasięg wektora zostały obsłużone za pomocą odpowiednich wyjątków

Podanie numeru spoza zasięgu w menu:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 15
Bad choice. Try again...

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice:
```

Podanie numeru spoza zasięgu w przypadku zakupu pracownika:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
What's your name: Jan
What's your surname: Kowalski

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 7
Which league would you like to buy worker?(Give the number of the league): 1
Which club would you like to buy worker? (give the number): 1
Who would you like to add?(1.Player 2.Employee): 3
Bad choice. Try again....
```

Podanie numeru spoza zasięgu w przypadku sprzedaży pracownika:

```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
What's your name: Jan
What's your surname: Kowalski

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 9
Which league would you like to sell worker(Give the number of the league): 1
Which club would you like to put worker? (give the number): 1
What worker would you like to sell?(1.Player 2.Employee): 3
There is no option. Try again...
What worker would you like to sell?(1.Player 2.Employee):
```

Podanie numeru spoza zasięgu w przypadku zakupu obiektu sportowego:



```
C:\Users\Kamil\source\PK4\Projekt\FootballManager\Debug\FootballManager.exe
What's your name: Jan
What's your surname: Kowalski

Welcome to Football Manager!
Manager: Jan Kowalski

Choose one option:
1.Add football league
2.Show all football leagues
3.Remove football league
4.Add club to the league
5.Show all league's clubs
6.Remove club from the league
7.Buy footballer or employee to the club
8.Show workers of the team
9.Sell footballer or employee from the club
10.Buy sport facility to the club
11.Show sport facilities of the club
12.Sell sport facility from the club
13.Simulate a queue
14.Quit

Choice: 10
Which league would you like to buy sport facility?(Give the number of the league): 1
Which club would you like to buy sport facility? (give the number): 1
What kind of object would you like to buy(1.Gym 2.Football pitch 3.Swimming pool)? 4
There is no option. Try again...
```

Pominięto liczne zabezpieczenia wpisania typu string zamiast int. Założono, że użytkownik programu nie jest aż tak złośliwy.

## 5. Wnioski

Program który stworzyłem wymagał dobrego powiązania klas, wektorów oraz wymyślenia algorytmu odpowiedzialnego za symulację kolejek piłkarskich. Nie trzeba było uważać na wycieki pamięci, gdyż korzystano tylko i wyłącznie z gotowych kontenerów biblioteki STL i inteligentnych wskaźników. Paradoksalnie największą trudnością okazało się dla mnie stworzenie metody zapisującej oraz odczytującej dane z pliku. Mimo wszystko poradziłem sobie z problemem czego wynikiem jest gotowy program.

## Literatura i źródła:

<https://en.cppreference.com/w/>

<https://cpp0x.pl/>

<https://forum.pasja-informatyki.pl/>

<https://stackoverflow.com/>

Język C++. Szkoła programowania. Wydanie VI. Autor: Stephen Prata