a

May 6, 2024

1 Exercícios 3 e 4 - Seção 6.5

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3. A Lahman Baseball Database é uma das fontes de dados mais abrangentes e respeitadas para estatísticas e informações sobre beisebol nos Estados Unidos e no Canadá. Foi criada por Sean Lahman e contém uma ampla variedade de dados históricos e estatísticas relacionadas ao beisebol, incluindo informações sobre jogadores, equipes, estatísticas de temporada regular e pós-temporada, registros de jogos, salários, prêmios e muito mais. O link da base de dados é http://seanlahman.com/. Acesse os dados da última versão e faça os exercícios propostos na Seção 22.4 em [63].

4. Faça o exercício 13 da Seção 23.5 em [63]. Técnicas de raspagem de dados da rede em R e Python são, respectivamente, apresentadas no Capítulo 23 em [63] e em [23].

1. Install and load the Lahman library. This database includes data related to baseball teams. It includes summary statistics about how the players performed on offense and defense for several years. It also includes personal information about the players. The Batting data frame contains the offensive statistics for all players for many years.

```
[ ]: import numpy as np
     import pandas as pd
     from plotnine import *
```

```
[ ]: batting = pd.read_csv("lahman_1871-2023_csv/Batting.csv")
     batting.head()
```

```
[ ]:     playerID  yearID  stint teamID lgID   G  G_batting  AB  R  H  …   SB  \
     0  aardsda01    2004      1    SFN   NL  11        NaN   0  0  0  …  0.0
     1  aardsda01    2006      1    CHN   NL  45        NaN   2  0  0  …  0.0
     2  aardsda01    2007      1    CHA   AL  25        NaN   0  0  0  …  0.0
     3  aardsda01    2008      1    BOS   AL  47        NaN   1  0  0  …  0.0
     4  aardsda01    2009      1    SEA   AL  73        NaN   0  0  0  …  0.0

         CS  BB   SO  IBB  HBP   SH   SF  GIDP  G_old
     0  0.0   0  0.0  0.0  0.0  0.0  0.0   0.0    NaN
     1  0.0   0  0.0  0.0  0.0  1.0  0.0   0.0    NaN
     2  0.0   0  0.0  0.0  0.0  0.0  0.0   0.0    NaN
     3  0.0   0  1.0  0.0  0.0  0.0  0.0   0.0    NaN
```

```
4  0.0   0  0.0  0.0  0.0  0.0  0.0   0.0    NaN

[5 rows x 24 columns]
```

```
[ ]: top = batting[batting["yearID"] == 2016].sort_values("HR", ascending=False)[:10]
     top
```

```
[ ]:        playerID  yearID  stint teamID lgID    G  G_batting   AB    R    H  \
103772  trumbma01    2016      1    BAL   AL  159        NaN  613   94  157
22463    cruzne02    2016      1    SEA   AL  155        NaN  589   96  169
29385   encared01    2016      1    TOR   AL  160        NaN  601   99  158
24045   daviskh01    2016      1    OAK   AL  150        NaN  555   85  137
27201   doziebr01    2016      1    MIN   AL  155        NaN  615  104  165
16151   cartech02    2016      1    MIL   NL  160        NaN  549   84  122
2819    arenano01    2016      1    COL   NL  160        NaN  618  116  182
33647   frazito01    2016      1    CHA   AL  158        NaN  590   89  133
15320    canoro01    2016      1    SEA   AL  161        NaN  655  107  195
12752   bryankr01    2016      1    CHN   NL  155        NaN  603  121  176

        …    SB   CS  BB     SO   IBB   HBP   SH    SF  GIDP  G_old
103772  …   2.0  0.0  51  170.0   1.0   3.0  0.0   0.0  14.0    NaN
22463   …   2.0  0.0  62  159.0   5.0   9.0  0.0   7.0  15.0    NaN
29385   …   2.0  0.0  87  138.0   3.0   5.0  0.0   8.0  22.0    NaN
24045   …   1.0  2.0  42  166.0   0.0   8.0  0.0   5.0  19.0    NaN
27201   …  18.0  2.0  61  138.0   6.0   8.0  2.0   5.0  12.0    NaN
16151   …   3.0  1.0  76  206.0   1.0   9.0  0.0  10.0  18.0    NaN
2819    …   2.0  3.0  68  103.0  10.0   2.0  0.0   8.0  17.0    NaN
33647   …  15.0  5.0  64  163.0   1.0   4.0  1.0   7.0  11.0    NaN
15320   …   0.0  1.0  47  100.0   8.0   8.0  0.0   5.0  18.0    NaN
12752   …   8.0  5.0  75  154.0   5.0  18.0  0.0   3.0   3.0    NaN

[10 rows x 24 columns]
```

We can see column names nameFirst and nameLast. Use the left_join function to create a table of the top home run hitters. The table should have **playerID, first name, last name, and number of home runs (HR)**. Rewrite the object top with this new table.

```
[ ]: people = pd.read_csv("lahman_1871-2023_csv/People.csv", encoding="ISO-8859-1")
     people.columns
```

```
[ ]: Index(['ID', 'playerID', 'birthYear', 'birthMonth', 'birthDay', 'birthCity',
       'birthCountry', 'birthState', 'deathYear', 'deathMonth', 'deathDay',
       'deathCountry', 'deathState', 'deathCity', 'nameFirst', 'nameLast',
       'nameGiven', 'weight', 'height', 'bats', 'throws', 'debut', 'bbrefID',
       'finalGame', 'retroID'],
      dtype='object')
```

```
[ ]: top = top[["playerID", "HR"]]
     top = pd.merge(top,people[["playerID", "nameFirst", "nameLast"]],␣
      ↪on="playerID", how='left')
     top = top[["playerID", "nameFirst", "nameLast", "HR"]]
     top
```

```
[ ]:     playerID nameFirst     nameLast  HR
     0  trumbma01      Mark       Trumbo  47
     1   cruzne02    Nelson         Cruz  43
     2  encared01     Edwin  Encarnacion  42
     3  daviskh01     Khris        Davis  42
     4  doziebr01     Brian       Dozier  42
     5  cartech02     Chris       Carter  41
     6  arenano01     Nolan      Arenado  41
     7  frazito01      Todd      Frazier  40
     8   canoro01  Robinson         Cano  39
     9  bryankr01      Kris       Bryant  39
```

2. Now use the Salaries data frame to add each player's salary to the table you created in exercise 1. Note that salaries are different every year so make sure to filter for the year 2016, then use right_join. This time show first name, last name, team, HR, and salary.

```
[ ]: salaries = pd.read_csv("lahman_1871-2023_csv/Salaries.csv")
     salaries, salaries.columns
```

```
[ ]: (       yearID teamID lgID   playerID    salary
      0        1985    ATL   NL  barkele01    870000
      1        1985    ATL   NL  bedrost01    550000
      2        1985    ATL   NL  benedbr01    545000
      3        1985    ATL   NL   campri01    633333
      4        1985    ATL   NL  ceronri01    625000
      …         …     …    …         …         …
      26423    2016    WAS   NL  strasst01  10400000
      26424    2016    WAS   NL  taylomi02    524000
      26425    2016    WAS   NL  treinbl01    524900
      26426    2016    WAS   NL  werthja01  21733615
      26427    2016    WAS   NL  zimmery01  14000000

      [26428 rows x 5 columns],
      Index(['yearID', 'teamID', 'lgID', 'playerID', 'salary'], dtype='object'))
```

```
[ ]: salaries = salaries[salaries["yearID"] == 2016]
     salaries
```

```
[ ]:        yearID teamID lgID   playerID    salary
     25575    2016    ARI   NL  ahmedni01    521600
```

```
25576    2016    ARI   NL  barreja01    507500
25577    2016    ARI   NL  brachsi01    509300
25578    2016    ARI   NL  britoso01    508500
25579    2016    ARI   NL  castiwe01   3700000
…       …    …   …         …        …
26423    2016    WAS   NL  strasst01  10400000
26424    2016    WAS   NL  taylomi02    524000
26425    2016    WAS   NL  treinbl01    524900
26426    2016    WAS   NL  werthja01  21733615
26427    2016    WAS   NL  zimmery01  14000000

[853 rows x 5 columns]
```

```
[ ]: teams = pd.read_csv("lahman_1871-2023_csv/Teams.csv")
     teams= teams[teams["yearID"] == 2016]
     teams.columns
```

```
[ ]: Index(['yearID', 'lgID', 'teamID', 'franchID', 'divID', 'Rank', 'G', 'Ghome',
            'W', 'L', 'DivWin', 'WCWin', 'LgWin', 'WSWin', 'R', 'AB', 'H', '2B',
            '3B', 'HR', 'BB', 'SO', 'SB', 'CS', 'HBP', 'SF', 'RA', 'ER', 'ERA',
            'CG', 'SHO', 'SV', 'IPouts', 'HA', 'HRA', 'BBA', 'SOA', 'E', 'DP', 'FP',
            'name', 'park', 'attendance', 'BPF', 'PPF', 'teamIDBR',
            'teamIDlahman45', 'teamIDretro'],
           dtype='object')
```

```
[ ]: salary_and_team = pd.
      ↪merge(salaries[["teamID","playerID","salary"]],teams[["teamID","name"]],␣
      ↪on="teamID", how="left")
     salary_and_team
```

```
[ ]:     teamID   playerID    salary                    name
     0      ARI  ahmedni01    521600  Arizona Diamondbacks
     1      ARI  barreja01    507500  Arizona Diamondbacks
     2      ARI  brachsi01    509300  Arizona Diamondbacks
     3      ARI  britoso01    508500  Arizona Diamondbacks
     4      ARI  castiwe01   3700000  Arizona Diamondbacks
     ..     …          …        …                   …
     848    WAS  strasst01  10400000  Washington Nationals
     849    WAS  taylomi02    524000  Washington Nationals
     850    WAS  treinbl01    524900  Washington Nationals
     851    WAS  werthja01  21733615  Washington Nationals
     852    WAS  zimmery01  14000000  Washington Nationals

     [853 rows x 4 columns]
```

```
[ ]: top = pd.merge(salary_and_team, top, on="playerID", how="right")
     top = top[["nameFirst","nameLast","name","HR","salary"]]
```

```
top
```

```
[ ]:   nameFirst     nameLast                name  HR    salary
     0      Mark       Trumbo   Baltimore Orioles  47   9150000
     1    Nelson         Cruz    Seattle Mariners  43  14250000
     2     Edwin  Encarnacion   Toronto Blue Jays  42  10000000
     3     Khris        Davis   Oakland Athletics  42    524500
     4     Brian       Dozier     Minnesota Twins  42   3000000
     5     Chris       Carter   Milwaukee Brewers  41   2500000
     6     Nolan      Arenado    Colorado Rockies  41   5000000
     7      Todd      Frazier   Chicago White Sox  40   8250000
     8  Robinson         Cano    Seattle Mariners  39  24000000
     9      Kris       Bryant        Chicago Cubs  39    652000
```

3. In a previous exercise, we created a tidy version of the co2 dataset. We want to see if the monthly trend is changing so we are going to remove the year effects and then plot the results. We will first compute the year averages. Use the group_by and summarize to compute the average co2 for each year. Save in an object called yearly_avg.

```
[ ]: co2 = pd.read_csv("co2.csv")
     co2["time"] = co2["time"].astype(int)
     co2
```

```
[ ]:      rownames  time   value
     0           1  1959  315.42
     1           2  1959  316.31
     2           3  1959  316.50
     3           4  1959  317.56
     4           5  1959  318.13
     ..        …     …       …
     463       464  1997  362.57
     464       465  1997  360.24
     465       466  1997  360.83
     466       467  1997  362.49
     467       468  1997  364.34

     [468 rows x 3 columns]
```

```
[ ]: yearly_avg = co2.groupby('time')['value'].mean()
     yearly_avg = pd.DataFrame(yearly_avg)
     yearly_avg
```

```
[ ]:            value
     time
     1959  315.825833
     1960  316.747500
```

```
1961   317.485000
1962   318.297500
1963   318.832500
1964   319.462500
1965   319.872500
1966   321.210000
1967   322.020000
1968   322.890000
1969   324.459167
1970   325.517500
1971   326.155000
1972   327.293333
1973   329.511667
1974   330.079167
1975   330.985833
1976   331.985833
1977   333.730000
1978   335.335833
1979   336.680833
1980   338.515000
1981   339.760833
1982   340.959167
1983   342.608333
1984   344.246667
1985   345.725833
1986   346.975000
1987   348.750833
1988   351.313333
1989   352.754167
1990   354.036667
1991   355.478333
1992   356.291667
1993   356.995833
1994   358.880000
1995   360.914167
1996   362.686667
1997   363.817500
```

4. Now use the left__join function to add the yearly average to the co2__wide dataset. Then compute the residuals: observed co2 measure - yearly average.

[ ]:

```
co2_wide = pd.merge(co2,yearly_avg, on="time", how= "left")

co2_wide = co2_wide.rename(columns={
    "value_x":"co2_emission",
    "value_y":"yearly_avg_co2_emission",
    "time":"year"
    })

co2_wide
```

[ ]:

```
     rownames  year  co2_emission  yearly_avg_co2_emission
0           1  1959        315.42               315.825833
1           2  1959        316.31               315.825833
2           3  1959        316.50               315.825833
3           4  1959        317.56               315.825833
4           5  1959        318.13               315.825833
..        …   …           …                    …
463       464  1997        362.57               363.817500
464       465  1997        360.24               363.817500
465       466  1997        360.83               363.817500
466       467  1997        362.49               363.817500
467       468  1997        364.34               363.817500

[468 rows x 4 columns]
```

[ ]:

```
co2_wide["residuals"] = co2_wide["co2_emission"] -␣
 ↪co2_wide["yearly_avg_co2_emission"]
co2_wide
```

[ ]:

```
     rownames  year  co2_emission  yearly_avg_co2_emission  residuals
0           1  1959        315.42               315.825833  -0.405833
1           2  1959        316.31               315.825833   0.484167
2           3  1959        316.50               315.825833   0.674167
3           4  1959        317.56               315.825833   1.734167
4           5  1959        318.13               315.825833   2.304167
..        …   …           …                    …         …
463       464  1997        362.57               363.817500  -1.247500
464       465  1997        360.24               363.817500  -3.577500
465       466  1997        360.83               363.817500  -2.987500
466       467  1997        362.49               363.817500  -1.327500
467       468  1997        364.34               363.817500   0.522500

[468 rows x 5 columns]
```

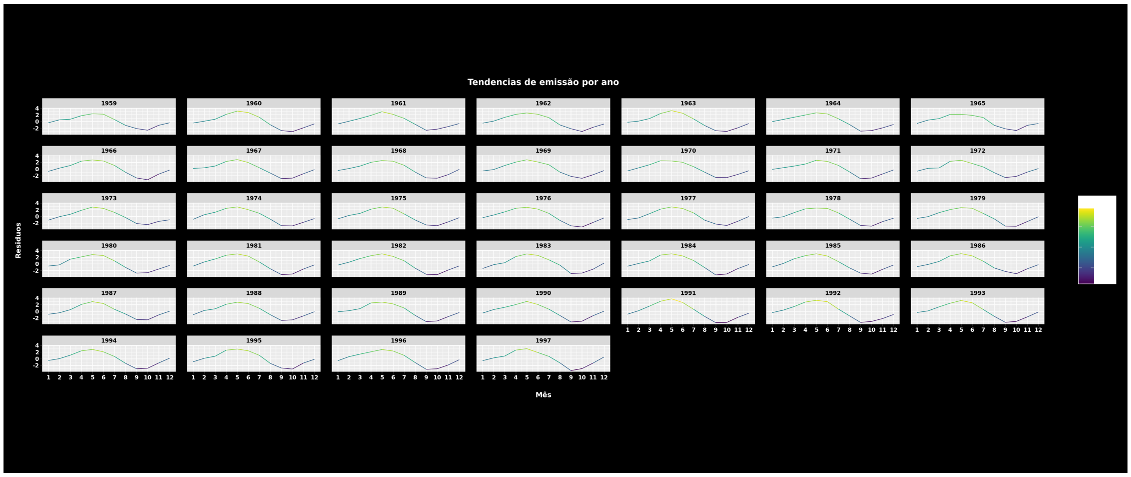
[ ]:

```
# colocando meses para calcular a média de emissão de co2 por
# mês e poder calcular o residual mensal que representaria como
# deveriam ser as tendencias naturais de emissão ao longo do ano
# sem a intervenção de eventos pontuais de alguns anos que poderiam afetar
months = []
for i in range(len(co2_wide['year'])):
    months.append(i%12 + 1)

co2_wide['month'] = months
```

```
co2_wide
```

```
[ ]:      rownames  year  co2_emission  yearly_avg_co2_emission  residuals  month
     0           1  1959        315.42               315.825833  -0.405833      1
     1           2  1959        316.31               315.825833   0.484167      2
     2           3  1959        316.50               315.825833   0.674167      3
     3           4  1959        317.56               315.825833   1.734167      4
     4           5  1959        318.13               315.825833   2.304167      5
     ..        …    …             …                      …         …       …
     463       464  1997        362.57               363.817500  -1.247500      8
     464       465  1997        360.24               363.817500  -3.577500      9
     465       466  1997        360.83               363.817500  -2.987500     10
     466       467  1997        362.49               363.817500  -1.327500     11
     467       468  1997        364.34               363.817500   0.522500     12

     [468 rows x 6 columns]
```

```
[ ]: ggplot(co2_wide) \
       + aes(x="month", y="residuals", color="residuals") \
       + geom_line() \
       + facet_wrap('~ year') \
       + scale_x_continuous(breaks=range(1, 13)) \
       + labs(title='Tendencias de emissão por ano', y='Residuos', x='Mês') \
       + theme(aspect_ratio=0.2, figure_size=(24,10)
               , text= element_text(colour = "white", face = "bold")
               , strip_text = element_text(colour = "black", face = "bold")
               )
```



13. Advanced: extract the titles of the movies that won Best Picture from this website: https://m.imdb.com/chart/bestpicture/

[ ]:

```python
import requests

from bs4 import BeautifulSoup
import pandas as pd
import time
```

[ ]:

```python
url = "https://m.imdb.com/chart/bestpicture/"
response = requests.get(url)
response.status_code
```

[ ]:

```
403
```

https://www.youtube.com/watch?v=JesHXRoJbzw

[ ]:

```python
import random


userAgents=["Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like␣
 ↪Gecko) Chrome/123.0.0.0 Safari/537.36",
            "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like␣
 ↪Gecko) Chrome/124.0.0.0 Safari/537.36",
            "Mozilla/5.0 (X11; Linux x86_64; rv:125.0) Gecko/20100101 Firefox/
 ↪125.0",
            "Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:125.0) Gecko/20100101␣
 ↪Firefox/125.0"
            ]
response = requests.get(url, headers={'User-Agent': random.choice(userAgents)})
response.status_code
```

[ ]:

```
200
```

[ ]:

```python
soup = BeautifulSoup(response.content,'html.parser')
titulos = soup.select('h3[class="ipc-title__text"]')
titulos
```

[ ]:

```
[<h3 class="ipc-title__text">1. Oppenheimer</h3>,
 <h3 class="ipc-title__text">2. Tudo em Todo o Lugar ao Mesmo Tempo</h3>,
 <h3 class="ipc-title__text">3. No Ritmo do Coração</h3>,
 <h3 class="ipc-title__text">4. Nomadland</h3>,
 <h3 class="ipc-title__text">5. Parasita</h3>,
 <h3 class="ipc-title__text">6. Green Book: O Guia</h3>,
 <h3 class="ipc-title__text">7. A Forma da Água</h3>,
 <h3 class="ipc-title__text">8. Moonlight: Sob a Luz do Luar</h3>,
 <h3 class="ipc-title__text">9. Spotlight: Segredos Revelados</h3>,
 <h3 class="ipc-title__text">10. Birdman ou (A Inesperada Virtude da
Ignorância)</h3>,
 <h3 class="ipc-title__text">11. 12 Anos de Escravidão</h3>,
 <h3 class="ipc-title__text">12. Argo</h3>,
 <h3 class="ipc-title__text">13. O Artista</h3>,
 <h3 class="ipc-title__text">14. O Discurso do Rei</h3>,
 <h3 class="ipc-title__text">15. Quem Quer Ser um Milionário?</h3>,
 <h3 class="ipc-title__text">16. Guerra ao Terror</h3>,
 <h3 class="ipc-title__text">17. Onde os Fracos Não Têm Vez</h3>,
 <h3 class="ipc-title__text">18. Os Infiltrados</h3>,
 <h3 class="ipc-title__text">19. Crash: No Limite</h3>,
 <h3 class="ipc-title__text">20. Menina de Ouro</h3>,
 <h3 class="ipc-title__text">21. O Senhor dos Anéis: O Retorno do Rei</h3>,
 <h3 class="ipc-title__text">22. Chicago</h3>,
 <h3 class="ipc-title__text">23. Uma Mente Brilhante</h3>,
 <h3 class="ipc-title__text">24. Gladiador</h3>,
 <h3 class="ipc-title__text">25. Beleza Americana</h3>,
 <h3 class="ipc-title__text">26. Shakespeare Apaixonado</h3>,
 <h3 class="ipc-title__text">27. Titanic</h3>,
 <h3 class="ipc-title__text">28. O Paciente Inglês</h3>,
 <h3 class="ipc-title__text">29. Coração Valente</h3>,
 <h3 class="ipc-title__text">30. Forrest Gump: O Contador de Histórias</h3>,
 <h3 class="ipc-title__text">31. A Lista de Schindler</h3>,
 <h3 class="ipc-title__text">32. Os Imperdoáveis</h3>,
 <h3 class="ipc-title__text">33. O Silêncio dos Inocentes</h3>,
 <h3 class="ipc-title__text">34. Dança com Lobos</h3>,
 <h3 class="ipc-title__text">35. Conduzindo Miss Daisy</h3>,
 <h3 class="ipc-title__text">36. Rain Man</h3>,
 <h3 class="ipc-title__text">37. O Último Imperador</h3>,
 <h3 class="ipc-title__text">38. Platoon</h3>,
 <h3 class="ipc-title__text">39. Entre Dois Amores</h3>,
 <h3 class="ipc-title__text">40. Amadeus</h3>,
 <h3 class="ipc-title__text">41. Laços de Ternura</h3>,
 <h3 class="ipc-title__text">42. Gandhi</h3>,
 <h3 class="ipc-title__text">43. Carruagens de Fogo</h3>,
 <h3 class="ipc-title__text">44. Gente como a Gente</h3>,
 <h3 class="ipc-title__text">45. Kramer vs. Kramer</h3>,
 <h3 class="ipc-title__text">46. O Franco Atirador</h3>,
 <h3 class="ipc-title__text">47. Noivo Neurótico, Noiva Nervosa</h3>,
 <h3 class="ipc-title__text">48. Rocky, um Lutador</h3>,
 <h3 class="ipc-title__text">49. Um Estranho no Ninho</h3>,
 <h3 class="ipc-title__text">50. O Poderoso Chefão II</h3>,
 <h3 class="ipc-title__text">Recently viewed</h3>]
```

[ ]:

```python
movies = []
for titulo in titulos:
    print(titulo.text.strip())
```

```
1. Oppenheimer
2. Tudo em Todo o Lugar ao Mesmo Tempo
```

3. No Ritmo do Coração
4. Nomadland
5. Parasita
6. Green Book: O Guia
7. A Forma da Água
8. Moonlight: Sob a Luz do Luar
9. Spotlight: Segredos Revelados
10. Birdman ou (A Inesperada Virtude da Ignorância)
11. 12 Anos de Escravidão
12. Argo
13. O Artista
14. O Discurso do Rei
15. Quem Quer Ser um Milionário?
16. Guerra ao Terror
17. Onde os Fracos Não Têm Vez
18. Os Infiltrados
19. Crash: No Limite
20. Menina de Ouro
21. O Senhor dos Anéis: O Retorno do Rei
22. Chicago
23. Uma Mente Brilhante
24. Gladiador
25. Beleza Americana
26. Shakespeare Apaixonado
27. Titanic
28. O Paciente Inglês
29. Coração Valente
30. Forrest Gump: O Contador de Histórias
31. A Lista de Schindler
32. Os Imperdoáveis
33. O Silêncio dos Inocentes
34. Dança com Lobos
35. Conduzindo Miss Daisy
36. Rain Man
37. O Último Imperador
38. Platoon
39. Entre Dois Amores
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42. Gandhi
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44. Gente como a Gente
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46. O Franco Atirador
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48. Rocky, um Lutador
49. Um Estranho no Ninho
50. O Poderoso Chefão II

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