# P4_fr

December 24, 2018

In [1]:
```
from urllib import request
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
sns.set()
```

In [2]:
```
request.urlretrieve ("https://raw.githubusercontent.com/jakevdp/data-CDCbirths/master/
births = pd.read_csv("births.csv")
```

In [3]:
```
births.describe()
```

Out[3]:

| | year | month | day | births |
|---|---|---|---|---|
| count | 15547.000000 | 15547.000000 | 15067.000000 | 15547.000000 |
| mean | 1979.037435 | 6.515919 | 17.769894 | 9762.293561 |
| std | 6.728340 | 3.449632 | 15.284034 | 28552.465810 |
| min | 1969.000000 | 1.000000 | 1.000000 | 1.000000 |
| 25% | 1974.000000 | 4.000000 | 8.000000 | 4358.000000 |
| 50% | 1979.000000 | 7.000000 | 16.000000 | 4814.000000 |
| 75% | 1984.000000 | 10.000000 | 24.000000 | 5289.500000 |
| max | 2008.000000 | 12.000000 | 99.000000 | 199622.000000 |

In [4]:
```
births.head()
```

Out[4]:

| | year | month | day | gender | births |
|---|---|---|---|---|---|
| 0 | 1969 | 1 | 1.0 | F | 4046 |
| 1 | 1969 | 1 | 1.0 | M | 4440 |
| 2 | 1969 | 1 | 2.0 | F | 4454 |
| 3 | 1969 | 1 | 2.0 | M | 4548 |
| 4 | 1969 | 1 | 3.0 | F | 4548 |

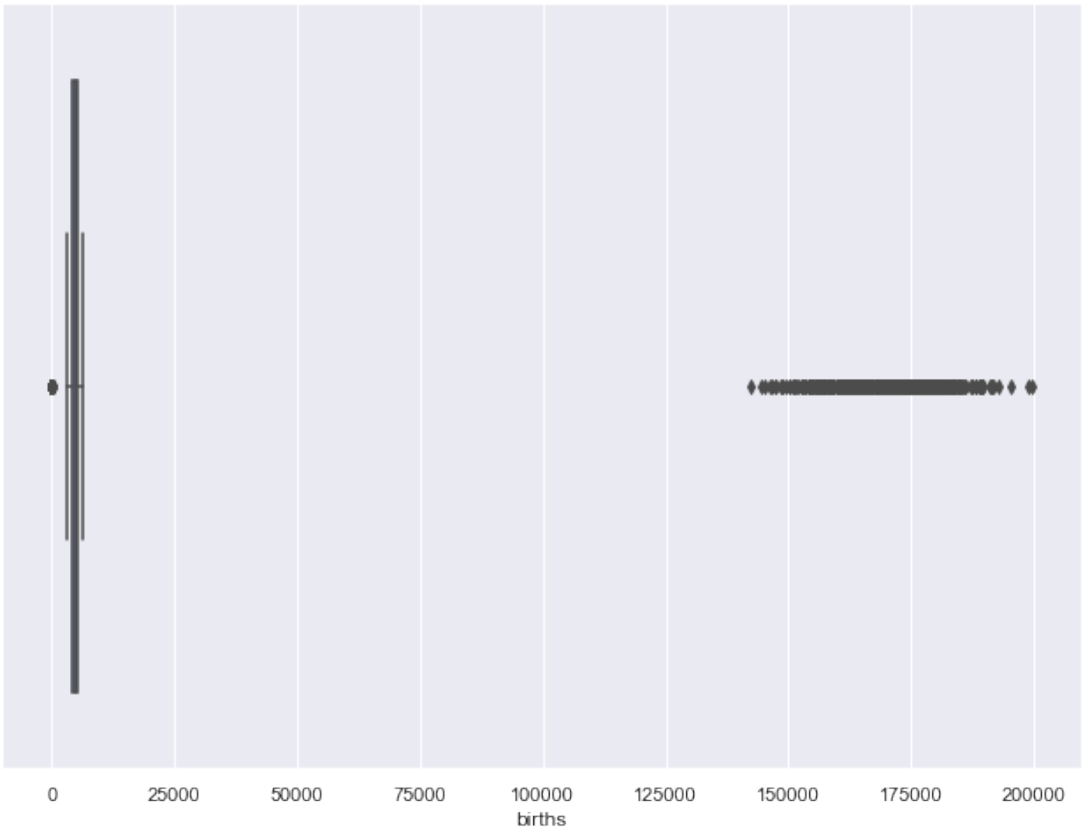
In [5]:
```
births['decade'] = 10 * (births['year'] // 10)
```

In [6]:
```
births.head()
```

Out[6]:

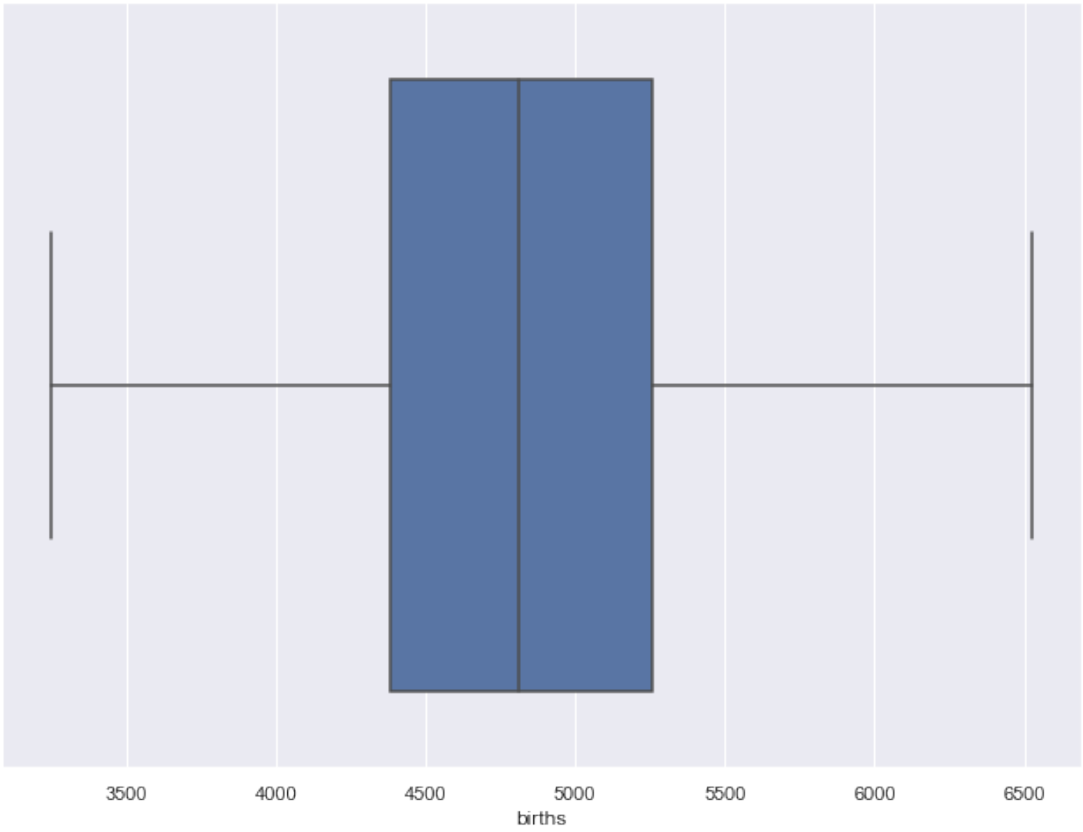
| | year | month | day | gender | births | decade |
|---|---|---|---|---|---|---|
| 0 | 1969 | 1 | 1.0 | F | 4046 | 1960 |
| 1 | 1969 | 1 | 1.0 | M | 4440 | 1960 |
| 2 | 1969 | 1 | 2.0 | F | 4454 | 1960 |
| 3 | 1969 | 1 | 2.0 | M | 4548 | 1960 |
| 4 | 1969 | 1 | 3.0 | F | 4548 | 1960 |

```
In [7]: fig = plt.figure(figsize=(11,8))
        fig = sns.boxplot(births.births)
```




Let's take care of outliers.

```
In [8]: births = births.query('(births > 1000) & (births < 100000)')
        fig = plt.figure(figsize=(11,8))
        fig = sns.boxplot(births.births)
```




```
In [9]: births.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 14610 entries, 0 to 15066
Data columns (total 6 columns):
year      14610 non-null int64
month     14610 non-null int64
day       14610 non-null float64
gender    14610 non-null object
births    14610 non-null int64
decade    14610 non-null int64
dtypes: float64(1), int64(4), object(1)
memory usage: 799.0+ KB
```

Days, months and years must be integers.

```
In [10]: for field in ["day", "month", "year"]:
             births[field] = births[field].astype(int)
```

Extracting day of the week. Always use built-in librairies to work with dates.

```
In [11]: # create a datetime index from the year, month, day
         births.index = pd.to_datetime(10000 * births.year +
                                       100 * births.month +
                                       births.day, format='%Y%m%d')

         births['dayofweek'] = births.index.dayofweek
```

```
In [12]: births.head()
```

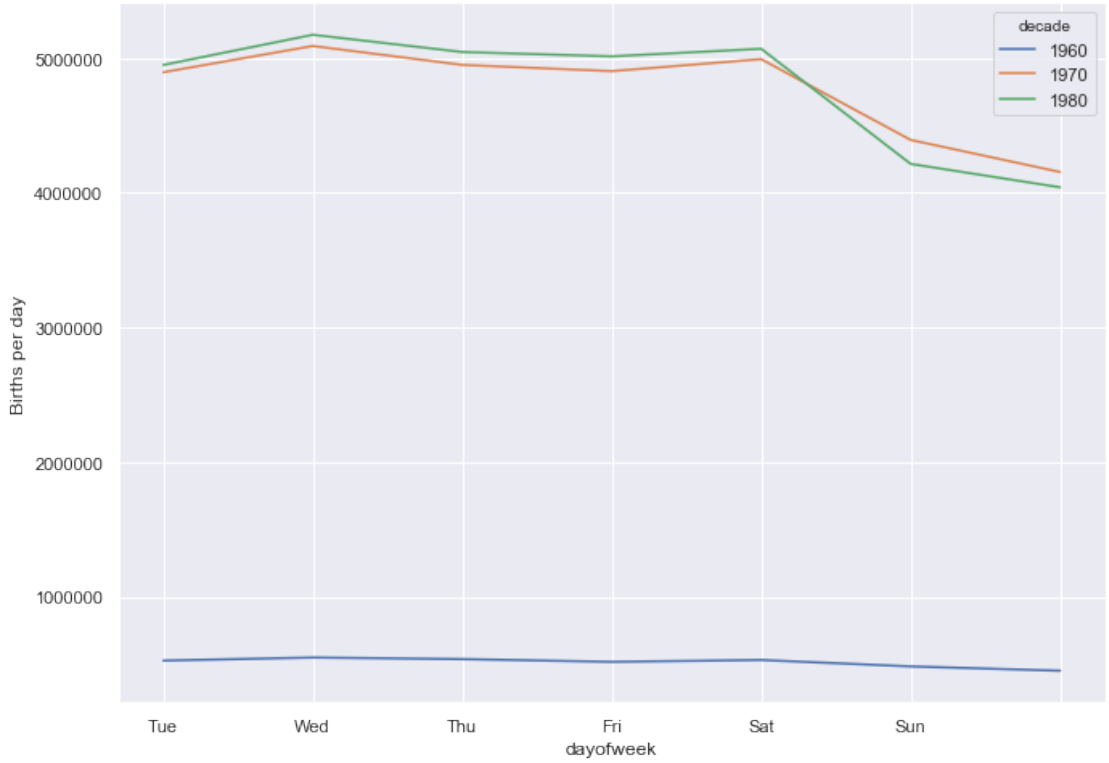
Out[12]:

| | year | month | day | gender | births | decade | dayofweek |
|---|---|---|---|---|---|---|---|
| 1969-01-01 | 1969 | 1 | 1 | F | 4046 | 1960 | 2 |
| 1969-01-01 | 1969 | 1 | 1 | M | 4440 | 1960 | 2 |
| 1969-01-02 | 1969 | 1 | 2 | F | 4454 | 1960 | 3 |
| 1969-01-02 | 1969 | 1 | 2 | M | 4548 | 1960 | 3 |
| 1969-01-03 | 1969 | 1 | 3 | F | 4548 | 1960 | 4 |

And finally, number of births per day.

```
In [13]: fig = plt.figure(figsize=(11,8))
         births_per_day = births.pivot_table('births', index='dayofweek',
                             columns='decade', aggfunc='sum')
         births_per_day.plot(figsize=(11,8))
         plt.gca().set_xticklabels(['Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat', 'Sun'])
         plt.ylabel('Births per day');
```

```
<Figure size 792x576 with 0 Axes>
```



This part is optional. The low number of births in the 1960s is most likely due to missing data in your dataset. You cannot do anything about this, but it probably makes more sense to have a look at the average number of births:

```
In [14]: fig = plt.figure(figsize=(11,8))
         births_per_day = births.pivot_table('births', index='dayofweek',
                                             columns='decade', aggfunc='mean')
         births_per_day.plot(figsize=(11,8))
         plt.gca().set_xticklabels(['Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat', 'Sun'])
         plt.ylabel('Births per day');
```

```
<Figure size 792x576 with 0 Axes>
```