EXERCICE SUR LES SERIES TEMPORELLES

```python
In [2]: import pandas as pd
        import matplotlib.pyplot as plot
        import numpy as num
```

```python
In [3]: data=pd.read_csv("./jeu_de_donnée/jeu_data1.csv")
```

```python
In [4]: data.head(7)
```

Out[4]:

	Period	Revenue	Sales_quantity	Average_cost	The_average_annual_payrol
0	01.01.2015	1.601007e+07	12729.0	1257.763541	
1	01.02.2015	1.580759e+07	11636.0	1358.507000	
2	01.03.2015	2.204715e+07	15922.0	1384.697024	
3	01.04.2015	1.881458e+07	15227.0	1235.606705	
4	01.05.2015	1.402148e+07	8620.0	1626.621765	
5	01.06.2015	1.678393e+07	13160.0	1275.374508	
6	01.07.2015	1.916189e+07	17254.0	1110.576805	

valeur statisque

```python
In [5]: data["Sales_quantity"].describe()
```

```
Out[5]: count       64.000000
        mean     19197.375000
        std       6591.287257
        min       8314.000000
        25%      15065.500000
        50%      18368.000000
        75%      22856.250000
        max      38069.000000
        Name: Sales_quantity, dtype: float64
```

```python
In [6]: moyenne=num.mean(data["Sales_quantity"])
        print('moyenne', moyenne)
        variance=num.std(data["Sales_quantity"])**2
        print('variance',variance)
        ecart_type=num.std(data["Sales_quantity"])
        print('ecart-type', ecart_type)

        moyenne 19197.375
        variance 42766238.51562499
        ecart-type 6539.5900877367685
```

Representation de la serie temporelle

```python
In [8]: data.dropna(inplace=True)
        #suppression des valeurs manquantes
```
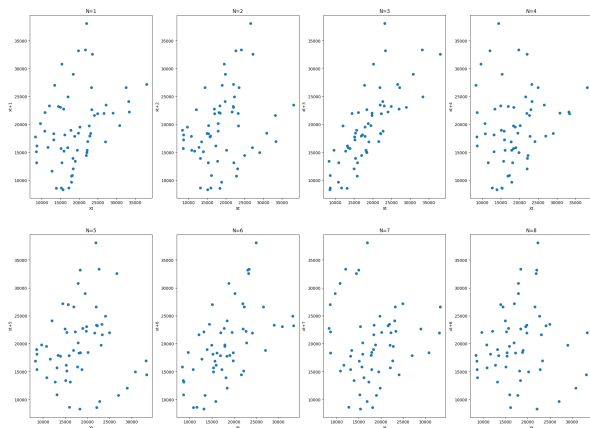

Représenter la courbe des auto-corrélations p̂n (k) avec

k = 1...50 (50 valeurs de k)

```python
In [11]: moy=num.mean(data["Sales_quantity"])
```

```python
In [12]: def auto_cov(data,k,moy):
             debut=0
             fin=len(data)
             xt=data[debut:fin-k]
             xt_k=data[debut+k:fin]
             cov=0
             for i in range(0,fin-k):
                 cov=cov+(xt[i]-moy)*(xt_k[i]-moy)
                 #calcul de L'auto-covariance empirique
             return (cov/(fin-k))
```

```python
In [13]: def auto_corr(data,k,moy):
             cov_0=auto_cov(data,0,moy)
             cov_k=auto_cov(data,k,moy)
             return (cov_k/cov_0)
```

```python
In [14]: correlation_k=[]
         d=list(data["Sales_quantity"])
         for cov in range (1,51):
             res=auto_corr(d,cov,moy)
             correlation_k.append(res)
```

```python
In [9]: plot.figure(figsize=[18,7])
        plot.plot(data["Period"],data["Sales_quantity"])
        plot.xlim(0,64)
        plot.xlabel("periodes")
        plot.ylabel("quantité")
```

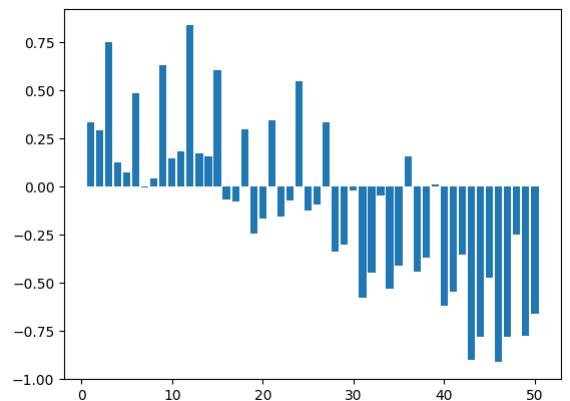```
Out[9]: Text(0, 0.5, 'quantité')
```
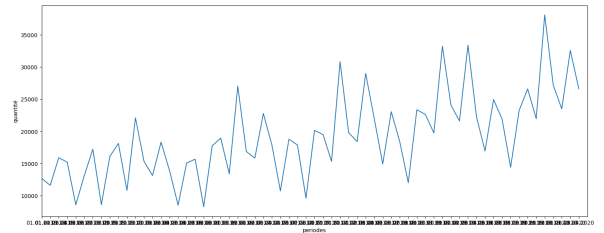


## Différents nuages de point

```python
In [22]: #N=1: (0-62)(1,63)
         #sur les revenues
```

```python
In [10]: plot.figure(figsize=[25,18])
         for N in range(1,9):
             plot.subplot(2,4,N)
             debut=0
             fin=64
             plot.title(f"N={N}")
             plot.xlabel("Xt")
             plot.ylabel(f"xt+{N}")
             plot.scatter(data["Sales_quantity"][debut:fin-N],data["Sales_quantity"
```

```python
In [15]: views=[i for i in range(1,51)]
         plot.bar(views,correlation_k)
```

```
Out[15]: <BarContainer object of 50 artists>
```



```
In [ ]:
```