Q1. Pearson correlation coefficient is a measure of the linear relationship between two variables. Suppose you have collected data on the amount of time students spend studying for an exam and their final exam scores. Calculate the Pearson correlation coefficient between these two variables and interpret the result.

In [7]:

```python
data = {'time_spend':[8,4,5,2,7,4,6,2,8,6],
        'exam_score':[95,56,60,36,84,55,79,40,92,73]}
import pandas as pd
df = pd.DataFrame(data)
print(df)
df.corr(method='pearson')
```

```
   time_spend  exam_score
0           8          95
1           4          56
2           5          60
3           2          36
4           7          84
5           4          55
6           6          79
7           2          40
8           8          92
9           6          73
```

Out[7]:

	time_spend	exam_score
time_spend	1.00000	0.99172
exam_score	0.99172	1.00000

Q2. Spearman's rank correlation is a measure of the monotonic relationship between two variables. Suppose you have collected data on the amount of sleep individuals get each night and their overall job satisfaction level on a scale of 1 to 10. Calculate the Spearman's rank correlation between these two variables and interpret the result.

In [10]:

```
data1 = {'sleep':[8,4,5,7,4,6,9],
         'job_satisfaction':[9,4,6,7,6,8,8]}
import pandas as pd
df1 = pd.DataFrame(data1)
print(df1)
df1.corr(method='spearman')
```

```
   sleep  job_satisfaction
0      8                 9
1      4                 4
2      5                 6
3      7                 7
4      4                 6
5      6                 8
6      9                 8
```

Out[10]:

	sleep	job_satisfaction
sleep	1.000000	0.853247
job_satisfaction	0.853247	1.000000

Q3. Suppose you are conducting a study to examine the relationship between the number of hours of exercise per week and body mass index (BMI) in a sample of adults. You collected data on both variables for 50 participants. Calculate the Pearson correlation coefficient and the Spearman's rank correlation between these two variables and compare the results.

In [11]:

```
df2= pd.DataFrame({"number_of_hours_exercise":[10,11,14,15,16,12,13,12,15,18,10,11,14,15
                              10,11,14,15,16,12,13,12,15,18,10,11,14,15,1
                "BMI": [50,60,67,69,72,80,76,66,59,64,50,60,67,69,72,80,76,66,59,64,50
                       50,60,67,69,72,80,76,66,59,64,50,60,67,69,72,80,76,66,59,64]
                })

df2.corr(method = 'spearman')
```

Out[11]:

	number_of_hours_exercise	BMI
number_of_hours_exercise	1.000000	0.213419
BMI	0.213419	1.000000

Q4. A researcher is interested in examining the relationship between the number of hours individuals spend watching television per day and their level of physical activity. The researcher collected data on both variables from a sample of 50 participants. Calculate the Pearson correlation coefficient between these two variables.

In [15]:

```python
df3= pd.DataFrame({"number_of_hours_exercise":[10,11,14,15,16,12,13,12,15,18,10,11,14,15
                                   10,11,14,15,16,12,13,12,15,18,10,11,14,15,1
               "BMI": [50,60,67,69,72,80,76,66,59,64,50,60,67,69,72,80,76,66,59,64,50
                      50,60,67,69,72,80,76,66,59,64,50,60,67,69,72,80,76,66,59,64]
               })
df3.corr(method = 'pearson')
```

Out[15]:

	number_of_hours_exercise	BMI
number_of_hours_exercise	1.000000	0.233962
BMI	0.233962	1.000000

Q5. A survey was conducted to examine the relationship between age and preference for a particular brand of soft drink. The survey results are shown below:

In [16]:

```python
df4=pd.DataFrame({"Age(Years)" :[25,42,37,19,31,28],
         "Soft drink Preference" :["Coke","Pepsi","Mountain dew","Coke","Pepsi","Cok
         })
df4.cov()
```

Out[16]:

	Age(Years)
Age(Years)	68.666667

Q6. A company is interested in examining the relationship between the number of sales calls made per day and the number of sales made per week. The company collected data on both variables from a sample of 30 sales representatives. Calculate the Pearson correlation coefficient between these two variables.

In [18]:

```python
df5= pd.DataFrame({"number_of_ sale_calls_per_day":[1,2,4,5,6,2,3,2,5,8,1,1,4,5,6,2,3,2,
                   8,0,1,4,5,3,4,5,6,7,8],
             "number_of_sales_per_week": [5,6,6,6,2,8,7,6,5,6,5,6,7,9,2,4,6,6,9,4,5
             })
df5.corr(method = 'pearson')
```

Out[18]:

	number_of_ sale_calls_per_day	number_of_sales_per_week
number_of_ sale_calls_per_day	1.000000	-0.019629
number_of_sales_per_week	-0.019629	1.000000