In [3]:
```
import numpy as np
wines = np.genfromtxt("winequality-red.csv", delimiter=";", skip_header=1)
```

In [4]:
```
wines.shape
```

Out[4]:
```
(1599, 12)
```

In [5]:
```
wines.shape[0]
```

Out[5]:
```
1599
```

In [6]:
```
wines.shape[1]
```

Out[6]:
```
12
```

In [7]:
```
wines.ndim
```

Out[7]:
```
2
```

In [8]:
```
 type(wines)
```

Out[8]:
```
numpy.ndarray
```

In [9]:
```
wines.dtype
```

Out[9]:
```
dtype('float64')
```

In [10]:
```
 wines[2,3]
```

Out[10]:
```
2.3
```

In [11]:
```
wines[:3, 3]
```

Out[11]:
```
array([1.9, 2.6, 2.3])
```

In [12]:
```
 wines[:, 0]
```

Out[12]:
```
array([7.4, 7.8, 7.8, ..., 6.3, 5.9, 6. ])
```

In [13]:
```
wines[1, :]
```

Out[13]:
```
array([ 7.8   ,  0.88  ,  0.    ,  2.6   ,  0.098 , 25.    , 67.    ,
        0.9968,  3.2   ,  0.68  ,  9.8   ,     nan])
```

In [14]:
```
wines[1:4, 4]
```

Out[14]:
```
array([0.098, 0.092, 0.075])
```

In [15]:
```
wines[:,:]
```

Out[15]:
```
array([[ 7.4  ,  0.7  ,  0.   , ...,  0.56 ,  9.4  ,    nan],
       [ 7.8  ,  0.88 ,  0.   , ...,  0.68 ,  9.8  ,    nan],
       [ 7.8  ,  0.76 ,  0.04 , ...,  0.65 ,  9.8  ,    nan],
       ...,
       [ 6.3  ,  0.51 ,  0.13 , ...,  0.75 , 11.   ,    nan],
       [ 5.9  ,  0.645,  0.12 , ...,  0.71 , 10.2  ,    nan],
       [ 6.   ,  0.31 ,  0.47 , ...,  0.66 , 11.   ,    nan]])
```

In [16]:
```
wines[0,0]
```

Out[16]:
```
7.4
```

In [17]:
```
wines[0,0] = 100
```

In [18]:
```
wines[0,0]
```

Out[18]:
```
100.0
```

In [20]:
```
wines[0,0] = 7.4
```

In [28]:
```
third_wine = wines[3, :]
```

In [29]:
```
third_wine
```

Out[29]:
```
array([11.2  ,  0.28 ,  0.56 ,  1.9  ,  0.075, 17.   , 60.   ,  0.998,
        3.16 ,  0.58 ,  9.8  ,    nan])
```

In [30]:
```
third_wine[1]
```

Out[30]:
```
0.28
```

In [31]:
```
wines.astype(int)
```

Out[31]:
```
array([[          7,           0,           0, ...,           0,
                  9, -2147483648],
       [          7,           0,           0, ...,           0,
                  9, -2147483648],
       [          7,           0,           0, ...,           0,
                  9, -2147483648],
       ...,
       [          6,           0,           0, ...,           0,
                 11, -2147483648],
       [          5,           0,           0, ...,           0,
                 10, -2147483648],
       [          6,           0,           0, ...,           0,
                 11, -2147483648]])
```

In [32]:
```
wines[:, 11]
```

Out[32]:
```
array([nan, nan, nan, ..., nan, nan, nan])
```

In [33]:
```
wines[:, 11] += 10
```

In [34]:
```
wines[:, 11]
```

Out[34]:
```
array([nan, nan, nan, ..., nan, nan, nan])
```

In [35]:
```
 wines[:, 10] *= 3
```

In [36]:
```
wines[:, 10]
```

Out[36]:
```
array([28.2, 29.4, 29.4, ..., 33. , 30.6, 33. ])
```

In [37]:
```
wines[:, 11] + wines[:, 11]
```

Out[37]:
```
array([nan, nan, nan, ..., nan, nan, nan])
```

In [39]:
```
wines[:,10] * wines[:,11]
```

Out[39]:
```
array([nan, nan, nan, ..., nan, nan, nan])
```

In [47]:
```
 rand_array = np.random.rand(12)
```

In [48]:
```
rand_array
```

Out[48]:
```
array([0.80253175, 0.92756494, 0.80045798, 0.74620715, 0.55075698,
       0.6980907 , 0.35418985, 0.71244404, 0.12625357, 0.09026317,
       0.01108523, 0.8868359 ])
```

In [49]:
```
wines + rand_array
```

Out[49]:
```
array([[ 8.20253175,  1.62756494,  0.80045798, ...,  0.65026317,
         28.21108523,         nan],
       [ 8.60253175,  1.80756494,  0.80045798, ...,  0.77026317,
         29.41108523,         nan],
       [ 8.60253175,  1.68756494,  0.84045798, ...,  0.74026317,
         29.41108523,         nan],
       ...,
       [ 7.10253175,  1.43756494,  0.93045798, ...,  0.84026317,
         33.01108523,         nan],
       [ 6.70253175,  1.57256494,  0.92045798, ...,  0.80026317,
         30.61108523,         nan],
       [ 6.80253175,  1.23756494,  1.27045798, ...,  0.75026317,
         33.01108523,         nan]])
```

In [ ]:
```

```