In [2]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

In [3]:
```
data1=pd.read_csv('/home/placement/Desktop/basket_details.csv')
data=pd.read_csv('/home/placement/Desktop/customer_details.csv')
```

In [4]:
```
data1
```

Out[4]:

| | customer_id | product_id | basket_date | basket_count |
|---|---|---|---|---|
| **0** | 42366585 | 41475073 | 2019-06-19 | 2 |
| **1** | 35956841 | 43279538 | 2019-06-19 | 2 |
| **2** | 26139578 | 31715598 | 2019-06-19 | 3 |
| **3** | 3262253 | 47880260 | 2019-06-19 | 2 |
| **4** | 20056678 | 44747002 | 2019-06-19 | 2 |
| **...** | ... | ... | ... | ... |
| **14995** | 8336862 | 50977318 | 2019-05-26 | 2 |
| **14996** | 9500785 | 43862061 | 2019-05-26 | 2 |
| **14997** | 22787344 | 6041664 | 2019-05-26 | 2 |
| **14998** | 8221263 | 3597369 | 2019-05-26 | 2 |
| **14999** | 4912577 | 46646893 | 2019-05-26 | 2 |

15000 rows × 4 columns

In [5]:
```
data
```

Out[5]:

| | customer_id | sex | customer_age | tenure |
|---|---|---|---|---|
| **0** | 9798859 | Male | 44.0 | 93 |
| **1** | 11413563 | Male | 36.0 | 65 |
| **2** | 818195 | Male | 35.0 | 129 |
| **3** | 12049009 | Male | 33.0 | 58 |
| **4** | 10083045 | Male | 42.0 | 88 |
| **...** | ... | ... | ... | ... |
| **19995** | 12557307 | Male | 41.0 | 52 |
| **19996** | 12595961 | Male | 29.0 | 52 |
| **19997** | 12520991 | Male | 35.0 | 52 |
| **19998** | 12612719 | Male | 39.0 | 52 |
| **19999** | 12572063 | Male | 28.0 | 52 |

20000 rows × 4 columns

In [6]:
```
data1.describe()
```

Out[6]:

| | customer_id | product_id | basket_count |
|---|---|---|---|
| **count** | 1.500000e+04 | 1.500000e+04 | 15000.000000 |
| **mean** | 1.808567e+07 | 3.269771e+07 | 2.153733 |
| **std** | 1.233000e+07 | 1.629455e+07 | 0.517929 |
| **min** | 4.784000e+03 | 4.939000e+04 | 2.000000 |
| **25%** | 8.659327e+06 | 3.137412e+07 | 2.000000 |
| **50%** | 1.520775e+07 | 3.694759e+07 | 2.000000 |
| **75%** | 2.663904e+07 | 4.502408e+07 | 2.000000 |
| **max** | 4.460824e+07 | 5.579097e+07 | 10.000000 |

In [7]:
```
data.describe()
```

Out[7]:

| | customer_id | customer_age | tenure |
|---|---|---|---|
| **count** | 2.000000e+04 | 20000.000000 | 20000.000000 |
| **mean** | 1.760040e+07 | 262.222550 | 44.396800 |
| **std** | 8.679505e+06 | 604.321589 | 31.998376 |
| **min** | 2.093000e+03 | -34.000000 | 4.000000 |
| **25%** | 1.188115e+07 | 29.000000 | 21.000000 |
| **50%** | 1.560912e+07 | 38.000000 | 35.000000 |
| **75%** | 2.228484e+07 | 123.000000 | 60.000000 |
| **max** | 4.462566e+07 | 2022.000000 | 133.000000 |

## grouping the data of customer_id and counts the data

```
In [8]: data.groupby(['customer_id']).count()
```

```
Out[8]:
```

| customer_id | sex | customer_age | tenure |
|---|---|---|---|
| 2093 | 1 | 1 | 1 |
| 12817 | 1 | 1 | 1 |
| 14309 | 1 | 1 | 1 |
| 15155 | 1 | 1 | 1 |
| 23205 | 1 | 1 | 1 |
| ... | ... | ... | ... |
| 44392831 | 1 | 1 | 1 |
| 44401175 | 1 | 1 | 1 |
| 44431821 | 1 | 1 | 1 |
| 44621778 | 1 | 1 | 1 |
| 44625658 | 1 | 1 | 1 |

20000 rows × 3 columns

In [9]:
```
data1.groupby(['customer_id']).count()
```

Out[9]:

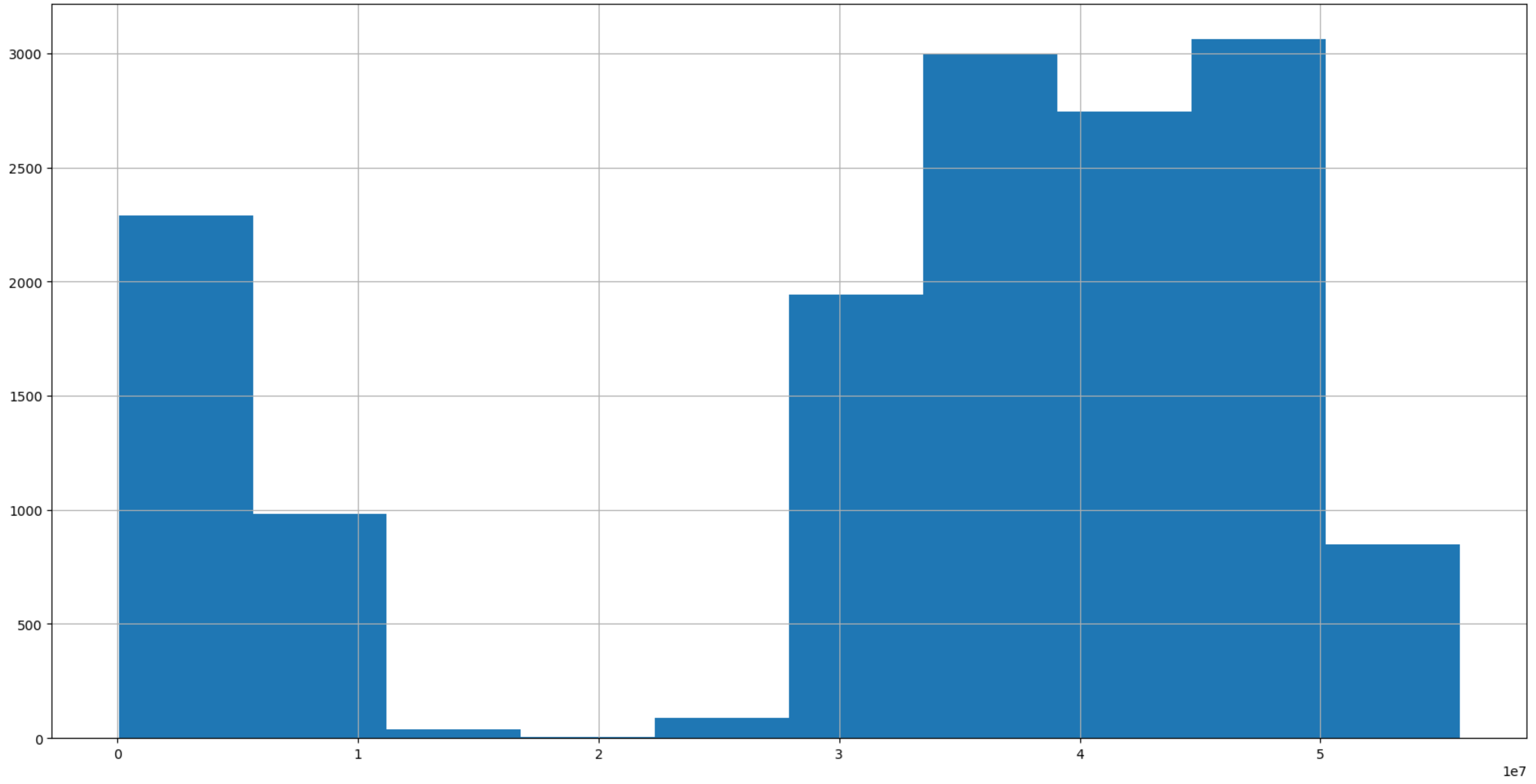
| | product_id | basket_date | basket_count |
|---|---|---|---|
| **customer_id** | | | |
| **4784** | 1 | 1 | 1 |
| **8314** | 2 | 2 | 2 |
| **8857** | 1 | 1 | 1 |
| **9273** | 1 | 1 | 1 |
| **11172** | 1 | 1 | 1 |
| **...** | ... | ... | ... |
| **44460516** | 1 | 1 | 1 |
| **44461180** | 1 | 1 | 1 |
| **44473609** | 1 | 1 | 1 |
| **44486815** | 1 | 1 | 1 |
| **44608245** | 1 | 1 | 1 |

13871 rows × 3 columns

## histogram for the data

```
In [10]: data1['product_id'].hist(figsize=(20,10))
```

```
Out[10]: <Axes: >
```



## merging the datas of both data1 and data2

In [11]:
```
test=pd.merge(data,data1,on ="customer_id") #merges both data1 and data2 haiving customer id
```

In [12]:
```
test
```

Out[12]:

| | customer_id | sex | customer_age | tenure | product_id | basket_date | basket_count |
|---|---|---|---|---|---|---|---|
| **0** | 9500953 | Male | 55.0 | 96 | 3446783 | 2019-06-10 | 3 |
| **1** | 851739 | Male | 40.0 | 129 | 32920704 | 2019-06-19 | 2 |
| **2** | 9654043 | Male | 37.0 | 95 | 51307669 | 2019-06-08 | 2 |
| **3** | 4912369 | Male | 36.0 | 114 | 33923115 | 2019-05-20 | 2 |
| **4** | 9875271 | Male | 34.0 | 92 | 31586037 | 2019-06-06 | 2 |
| **...** | ... | ... | ... | ... | ... | ... | ... |
| **67** | 13278573 | Male | 28.0 | 47 | 4488682 | 2019-05-26 | 2 |
| **68** | 12901520 | Female | 40.0 | 50 | 38610580 | 2019-05-28 | 3 |
| **69** | 12737235 | Male | 39.0 | 51 | 32933848 | 2019-05-21 | 2 |
| **70** | 12737235 | Male | 39.0 | 51 | 46373374 | 2019-05-21 | 3 |
| **71** | 12574807 | Male | 33.0 | 52 | 32056122 | 2019-05-25 | 2 |

72 rows × 7 columns

In [13]:
```
test.describe()
```

Out[13]:

| | customer_id | customer_age | tenure | product_id | basket_count |
|---|---|---|---|---|---|
| **count** | 7.200000e+01 | 72.000000 | 72.000000 | 7.200000e+01 | 72.000000 |
| **mean** | 1.554364e+07 | 68.458333 | 56.180556 | 3.140376e+07 | 2.152778 |
| **std** | 9.961282e+06 | 234.574289 | 38.948621 | 1.616160e+07 | 0.362298 |
| **min** | 3.809750e+05 | 5.000000 | 4.000000 | 8.287500e+04 | 2.000000 |
| **25%** | 1.026443e+07 | 29.000000 | 24.750000 | 2.980404e+07 | 2.000000 |
| **50%** | 1.352736e+07 | 35.500000 | 45.500000 | 3.498005e+07 | 2.000000 |
| **75%** | 2.037478e+07 | 43.000000 | 83.750000 | 4.359420e+07 | 2.000000 |
| **max** | 4.328080e+07 | 2022.000000 | 130.000000 | 5.130767e+07 | 3.000000 |

## gets only a single value

In [14]:
```
test.customer_id.unique()
```

Out[14]:
```
array([ 9500953,   851739,  9654043,  4912369,  9875271, 11737579,
       10619833,  4193819,  4897641,  4643359,   380975, 11623549,
       11724853, 12410433, 10394153,   537173, 11440499, 10439331,
       10629563,  4257099, 11346069,  8508353,  9700145, 10814041,
        9804585,  4238087, 11665521,  1030589, 11072047, 43280797,
       41790413, 39814593, 36623391, 34677755, 29144255, 27081691,
       25055107, 25567283, 23179191, 22524187, 21765975, 21142247,
       20789769, 20236456, 20174063, 17909829, 18256077, 17830393,
       16944627, 16398473, 16029475, 15436141, 15570891, 15192667,
       15067633, 14966315, 15141119, 14248059, 14053193, 13776147,
       13278573, 12901520, 12737235, 12574807])
```

In [15]:
```
data1.head()
```

Out[15]:

| | customer_id | product_id | basket_date | basket_count |
|---|---|---|---|---|
| **0** | 42366585 | 41475073 | 2019-06-19 | 2 |
| **1** | 35956841 | 43279538 | 2019-06-19 | 2 |
| **2** | 26139578 | 31715598 | 2019-06-19 | 3 |
| **3** | 3262253 | 47880260 | 2019-06-19 | 2 |
| **4** | 20056678 | 44747002 | 2019-06-19 | 2 |

## sorting the product value in descending order by giving ascending = False

In [16]:
```
data1.groupby(['product_id'])['basket_count'].sum().sort_values(ascending=False) #descending order
```

Out[16]:
```
product_id
43524799    69
31516269    59
39833031    50
46130148    36
34913531    28
            ..
34003520     2
34003697     2
34004660     2
34013459     2
55790974     2
Name: basket_count, Length: 13161, dtype: int64
```

## sorting the product value in ascending order by giving ascending = True

In [17]:
```
data1.groupby(['product_id'])['basket_count'].sum().sort_values(ascending=True) #ascending order
```

Out[17]:
```
product_id
49390        2
42094163     2
42102274     2
42110403     2
42110580     2
            ..
34913531    28
46130148    36
39833031    50
31516269    59
43524799    69
Name: basket_count, Length: 13161, dtype: int64
```

```
In [18]: test.groupby(['customer_age']).count()
```

Out[18]:

| | customer_id | sex | tenure | product_id | basket_date | basket_count |
|---|---|---|---|---|---|---|
| **customer_age** | | | | | | |
| **5.0** | 1 | 1 | 1 | 1 | 1 | 1 |
| **22.0** | 2 | 2 | 2 | 2 | 2 | 2 |
| **23.0** | 1 | 1 | 1 | 1 | 1 | 1 |
| **24.0** | 2 | 2 | 2 | 2 | 2 | 2 |
| **25.0** | 2 | 2 | 2 | 2 | 2 | 2 |
| **26.0** | 1 | 1 | 1 | 1 | 1 | 1 |
| **27.0** | 4 | 4 | 4 | 4 | 4 | 4 |
| **28.0** | 3 | 3 | 3 | 3 | 3 | 3 |
| **29.0** | 6 | 6 | 6 | 6 | 6 | 6 |
| **30.0** | 3 | 3 | 3 | 3 | 3 | 3 |
| **32.0** | 4 | 4 | 4 | 4 | 4 | 4 |
| **33.0** | 2 | 2 | 2 | 2 | 2 | 2 |
| **34.0** | 3 | 3 | 3 | 3 | 3 | 3 |
| **35.0** | 2 | 2 | 2 | 2 | 2 | 2 |
| **36.0** | 4 | 4 | 4 | 4 | 4 | 4 |
| **37.0** | 2 | 2 | 2 | 2 | 2 | 2 |
| **39.0** | 3 | 3 | 3 | 3 | 3 | 3 |
| **40.0** | 5 | 5 | 5 | 5 | 5 | 5 |
| **41.0** | 1 | 1 | 1 | 1 | 1 | 1 |
| **42.0** | 2 | 2 | 2 | 2 | 2 | 2 |
| **43.0** | 3 | 3 | 3 | 3 | 3 | 3 |
| **45.0** | 1 | 1 | 1 | 1 | 1 | 1 |
| **46.0** | 1 | 1 | 1 | 1 | 1 | 1 |
| **51.0** | 3 | 3 | 3 | 3 | 3 | 3 |
| **55.0** | 1 | 1 | 1 | 1 | 1 | 1 |

| | customer_id | sex | tenure | product_id | basket_date | basket_count |
|---|---|---|---|---|---|---|
| **customer_age** | | | | | | |
| **57.0** | 2 | 2 | 2 | 2 | 2 | 2 |
| **61.0** | 1 | 1 | 1 | 1 | 1 | 1 |
| **67.0** | 2 | 2 | 2 | 2 | 2 | 2 |
| **123.0** | 4 | 4 | 4 | 4 | 4 | 4 |
| **2022.0** | 1 | 1 | 1 | 1 | 1 | 1 |

## corelation for the data

In [19]:
```
cor=data1.corr()
cor
```

```
/tmp/ipykernel_5639/870474124.py:1: FutureWarning: The default value of numeric_only in DataFrame.corr is
deprecated. In a future version, it will default to False. Select only valid columns or specify the value
of numeric_only to silence this warning.
  cor=data1.corr()
```

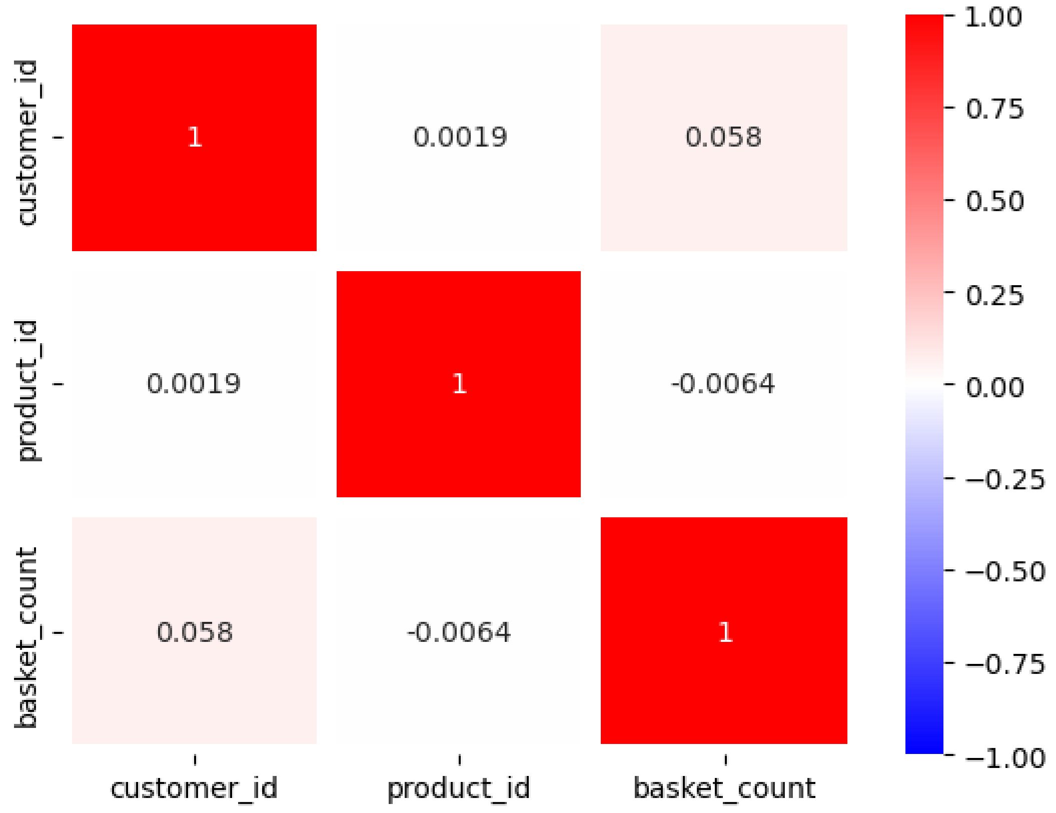
Out[19]:

| | customer_id | product_id | basket_count |
|---|---|---|---|
| **customer_id** | 1.000000 | 0.001937 | 0.058235 |
| **product_id** | 0.001937 | 1.000000 | -0.006407 |
| **basket_count** | 0.058235 | -0.006407 | 1.000000 |

## calculating the heatmap for the corelation data

```
In [21]: sns.heatmap(cor,vmax=1,vmin=-1,annot=True,linewidth=6,cmap='bwr')
```

```
Out[21]: <Axes: >
```



```
In [ ]:
```