Data_Prepartion

 $July\ 5,\ 2023$

[1]: import pandas as pd

[2]: pd.read_csv("C:\\Users\\ddaya\\OneDrive\\Documents\\Python_

programming\\P1-OfficeSupplies.csv")

| [2]: | | OrderDate | Region | Rep | Item | Units | Unit Price |
|------|----|-----------|---------|---------|---------|-------|------------|
| | 0 | 4-Jul-14 | East | Richard | Pen Set | 62 | 4.99 |
| | 1 | 12-Jul-14 | East | Nick | Binder | 29 | 1.99 |
| | 2 | 21-Jul-14 | Central | Morgan | Pen Set | 55 | 12.49 |
| | 3 | 29-Jul-14 | East | Susan | Binder | 81 | 19.99 |
| | 4 | 7-Aug-14 | Central | Matthew | Pen Set | 42 | 23.95 |
| | 5 | 15-Aug-14 | East | Richard | Pencil | 35 | 4.99 |
| | 6 | 24-Aug-14 | West | James | Desk | 3 | 275.00 |
| | 7 | 1-Sep-14 | Central | Smith | Desk | 2 | 125.00 |
| | 8 | 10-Sep-14 | Central | Bill | Pencil | 7 | 1.29 |
| | 9 | 18-Sep-14 | East | Richard | Pen Set | 16 | 15.99 |
| | 10 | 27-Sep-14 | West | James | Pen | 76 | 1.99 |
| | 11 | 5-Oct-14 | Central | Morgan | Binder | 28 | 8.99 |
| | 12 | 14-Oct-14 | West | Thomas | Binder | 57 | 19.99 |
| | 13 | 22-Oct-14 | East | Richard | Pen | 64 | 8.99 |
| | 14 | 31-0ct-14 | Central | Rachel | Pencil | 14 | 1.29 |
| | 15 | 8-Nov-14 | East | Susan | Pen | 15 | 19.99 |
| | 16 | 17-Nov-14 | Central | Alex | Binder | 11 | 4.99 |
| | 17 | 25-Nov-14 | Central | Matthew | Pen Set | 96 | 4.99 |
| | 18 | 4-Dec-14 | Central | Alex | Binder | 94 | 19.99 |
| | 19 | 12-Dec-14 | Central | Smith | Pencil | 67 | 1.29 |
| | 20 | 21-Dec-14 | Central | Rachel | Binder | 28 | 4.99 |
| | 21 | 29-Dec-14 | East | Susan | Pen Set | 74 | 15.99 |
| | 22 | 6-Jan-15 | East | Richard | Pencil | 95 | 1.99 |
| | 23 | 15-Jan-15 | Central | Bill | Binder | 46 | 8.99 |
| | 24 | 23-Jan-15 | Central | Matthew | Binder | 50 | 19.99 |
| | 25 | 1-Feb-15 | Central | Smith | Binder | 87 | 15.00 |
| | 26 | 9-Feb-15 | Central | Alex | Pencil | 36 | 4.99 |
| | 27 | 18-Feb-15 | East | Richard | Binder | 4 | 4.99 |
| | 28 | 26-Feb-15 | Central | Bill | Pen | 27 | 19.99 |
| | 29 | 7-Mar-15 | West | James | Binder | 7 | 19.99 |
| | 30 | 15-Mar-15 | West | James | Pencil | 56 | 2.99 |
| | 31 | 24-Mar-15 | Central | Alex | Pen Set | 50 | 4.99 |

```
32
     1-Apr-15
                   East
                          Richard
                                     Binder
                                                 60
                                                            4.99
                                                            1.99
33
    10-Apr-15
                                                 66
                Central
                           Rachel
                                     Pencil
34
    18-Apr-15
                Central
                           Rachel
                                     Pencil
                                                 75
                                                            1.99
35
    27-Apr-15
                   East
                             Nick
                                        Pen
                                                 96
                                                            4.99
36
     5-May-15
                                                 90
                                                            4.99
                Central
                             Alex
                                     Pencil
37
    14-May-15
                Central
                             Bill
                                     Pencil
                                                 53
                                                            1.29
    22-May-15
                                                 32
38
                   West
                           Thomas
                                     Pencil
                                                            1.99
39
    31-May-15
                Central
                             Bill
                                     Binder
                                                 80
                                                            8.99
40
     8-Jun-15
                   East
                          Richard
                                     Binder
                                                 60
                                                            8.99
41
    17-Jun-15
                                                  5
                                                          125.00
                Central
                          Matthew
                                       Desk
    25-Jun-15
                Central
                           Morgan
                                     Pencil
                                                 90
                                                            4.99
```

[3]: import os

[4]: print(os.getcwd()) # current working directory

C:\Users\ddaya\Documents\Practice_3

[5]: pd.read_csv("P1-OfficeSupplies.csv")

```
[5]:
         OrderDate
                      Region
                                   Rep
                                            Item
                                                   Units
                                                          Unit Price
     0
          4-Jul-14
                         East
                               Richard
                                         Pen Set
                                                      62
                                                                 4.99
                                                      29
                                                                 1.99
     1
         12-Jul-14
                         East
                                  Nick
                                          Binder
         21-Jul-14
     2
                     Central
                                Morgan
                                         Pen Set
                                                      55
                                                                12.49
     3
         29-Jul-14
                        East
                                 Susan
                                          Binder
                                                                19.99
                                                      81
     4
          7-Aug-14
                     Central
                               Matthew
                                         Pen Set
                                                      42
                                                                23.95
     5
         15-Aug-14
                        East
                               Richard
                                          Pencil
                                                      35
                                                                 4.99
     6
         24-Aug-14
                        West
                                                       3
                                                               275.00
                                 James
                                            Desk
     7
          1-Sep-14
                     Central
                                 Smith
                                            Desk
                                                       2
                                                               125.00
     8
         10-Sep-14
                     Central
                                  Bill
                                                       7
                                                                 1.29
                                          Pencil
     9
         18-Sep-14
                        East
                               Richard
                                         Pen Set
                                                      16
                                                                15.99
     10
         27-Sep-14
                         West
                                 James
                                              Pen
                                                      76
                                                                 1.99
                                                                 8.99
     11
          5-0ct-14
                     Central
                                Morgan
                                          Binder
                                                      28
     12
         14-Oct-14
                         West
                                Thomas
                                          Binder
                                                      57
                                                                19.99
     13
         22-Oct-14
                                                      64
                                                                 8.99
                         East
                               Richard
                                              Pen
     14
         31-Oct-14
                     Central
                                Rachel
                                          Pencil
                                                      14
                                                                 1.29
     15
          8-Nov-14
                        East
                                 Susan
                                             Pen
                                                      15
                                                                19.99
         17-Nov-14
                                                                 4.99
     16
                     Central
                                   Alex
                                          Binder
                                                      11
     17
         25-Nov-14
                                                      96
                                                                 4.99
                     Central
                               Matthew
                                         Pen Set
     18
          4-Dec-14
                     Central
                                          Binder
                                                                19.99
                                   Alex
                                                      94
                                                                 1.29
     19
         12-Dec-14
                     Central
                                 Smith
                                          Pencil
                                                      67
     20
         21-Dec-14
                     Central
                                Rachel
                                          Binder
                                                      28
                                                                 4.99
     21
         29-Dec-14
                                        Pen Set
                                                      74
                                                                15.99
                        East
                                 Susan
     22
          6-Jan-15
                        East Richard
                                          Pencil
                                                      95
                                                                 1.99
     23
         15-Jan-15
                                  Bill
                                          Binder
                                                      46
                                                                 8.99
                     Central
     24
                                          Binder
                                                                19.99
         23-Jan-15
                     Central
                               Matthew
                                                      50
     25
          1-Feb-15
                     Central
                                 Smith
                                          Binder
                                                      87
                                                                15.00
                                          Pencil
                                                      36
                                                                 4.99
     26
          9-Feb-15
                     Central
                                  Alex
```

```
4.99
27
    18-Feb-15
                  East
                         Richard
                                   Binder
    26-Feb-15
                                      Pen
                                               27
                                                         19.99
28
              Central
                            Bill
29
    7-Mar-15
                  West
                           James
                                   Binder
                                                7
                                                         19.99
    15-Mar-15
                                                          2.99
30
                  West
                           James
                                   Pencil
                                               56
31
    24-Mar-15
               Central
                            Alex
                                  Pen Set
                                               50
                                                          4.99
     1-Apr-15
                                                          4.99
32
                  East
                        Richard
                                   Binder
                                               60
33
    10-Apr-15
               Central
                          Rachel
                                   Pencil
                                                          1.99
                                               66
    18-Apr-15
               Central
                                   Pencil
                                                          1.99
34
                          Rachel
                                               75
    27-Apr-15
                  East
                            Nick
                                      Pen
                                                          4.99
35
                                               96
36
     5-May-15
               Central
                            Alex
                                   Pencil
                                               90
                                                          4.99
    14-May-15
               Central
                            Bill
                                   Pencil
                                               53
                                                          1.29
37
38
    22-May-15
                  West
                          Thomas
                                   Pencil
                                               32
                                                          1.99
39
    31-May-15
               Central
                            Bill
                                   Binder
                                               80
                                                          8.99
40
    8-Jun-15
                  East
                         Richard
                                   Binder
                                               60
                                                          8.99
    17-Jun-15
               Central
                                      Desk
                                                5
                                                        125.00
41
                         Matthew
                                                          4.99
42
    25-Jun-15
               Central
                          Morgan
                                   Pencil
                                               90
```

[6]: os.chdir("C:\\Users\\ddaya\\OneDrive\\Documents\\Python programming")

\

[7]: pd.read_csv("Movie-Ratings.csv")

| [7]: | | Film | Genre | Rotten Tomatoes Ratings % | ` |
|------|-----|----------------------|-----------|---------------------------|---|
| | 0 | (500) Days of Summer | Comedy | 87 | |
| | 1 | 10,000 B.C. | Adventure | 9 | |
| | 2 | 12 Rounds | Action | 30 | |
| | 3 | 127 Hours | Adventure | 93 | |
| | 4 | 17 Again | Comedy | 55 | |
| | | | ••• | | |
| | 554 | Your Highness | Comedy | 26 | |
| | 555 | Youth in Revolt | Comedy | 68 | |
| | 556 | Zodiac | Thriller | 89 | |
| | 557 | Zombieland | Action | 90 | |
| | 558 | Zookeeper | Comedy | 14 | |
| | | | | | |

| | Audience Ratings % | Budget (mil. | Lion \$) Ye | ear of release |
|-----|--------------------|--------------|-------------|----------------|
| 0 | 81 | | 8 | 2009 |
| 1 | 44 | | 105 | 2008 |
| 2 | 52 | | 20 | 2009 |
| 3 | 84 | | 18 | 2010 |
| 4 | 70 | | 20 | 2009 |
| | ••• | | | ••• |
| 554 | 36 | | 50 | 2011 |
| 555 | 52 | | 18 | 2009 |
| 556 | 73 | | 65 | 2007 |
| 557 | 87 | | 24 | 2009 |
| 558 | 42 | | 80 | 2011 |

[559 rows x 6 columns]

```
[8]: print(os.getcwd())
     C:\Users\ddaya\OneDrive\Documents\Python programming
 [9]: stats2=pd.read_csv("Movie-Ratings.csv")
[10]: stats2
[10]:
                             Film
                                        Genre
                                               Rotten Tomatoes Ratings %
      0
            (500) Days of Summer
                                      Comedy
      1
                     10,000 B.C.
                                   Adventure
                                                                         9
      2
                       12 Rounds
                                       Action
                                                                        30
      3
                       127 Hours
                                   Adventure
                                                                        93
      4
                        17 Again
                                      Comedy
                                                                        55
      . .
      554
                   Your Highness
                                                                        26
                                       Comedy
      555
                 Youth in Revolt
                                       Comedy
                                                                        68
      556
                           Zodiac
                                    Thriller
                                                                        89
      557
                      Zombieland
                                       Action
                                                                        90
      558
                       Zookeeper
                                       Comedy
                                                                        14
            Audience Ratings %
                                 Budget (million $)
                                                       Year of release
      0
                             81
                                                                   2009
      1
                             44
                                                 105
                                                                   2008
      2
                             52
                                                  20
                                                                   2009
      3
                             84
                                                  18
                                                                   2010
      4
                             70
                                                  20
                                                                   2009
                                                                   2011
      554
                             36
                                                  50
      555
                                                                   2009
                             52
                                                  18
      556
                             73
                                                  65
                                                                   2007
      557
                             87
                                                  24
                                                                   2009
      558
                             42
                                                  80
                                                                   2011
      [559 rows x 6 columns]
[11]: stats=pd.read_csv("P1-UK-Bank-Customers.csv")
[12]:
      stats
[12]:
             Customer ID
                                Name
                                        Surname
                                                 Gender
                                                          Age
                                                                          Region \
      0
               10000001
                               Simon
                                          Walsh
                                                    Male
                                                           21
                                                                         England
      1
               40000002
                             Jasmine
                                         Miller
                                                Female
                                                           34
                                                               Northern Ireland
      2
               10000003
                                Liam
                                          Brown
                                                   Male
                                                           46
                                                                         England
      3
               30000004
                              Trevor
                                           Parr
                                                   Male
                                                           32
                                                                           Wales
      4
                                        Pullman Female
               10000005
                             Deirdre
                                                           38
                                                                         England
```

```
4009
              200004010
                                 Sam
                                                   Male
                                                          64
                                                                       Scotland
                                         Lewis
      4010
              200004011
                              Keith
                                        Hughes
                                                   Male
                                                          52
                                                                       Scotland
      4011
              200004012
                             Hannah
                                      Springer
                                                Female
                                                          50
                                                                       Scotland
      4012
              200004013
                          Christian
                                          Reid
                                                   Male
                                                          51
                                                                       Scotland
      4013
              300004014
                            Stephen
                                           May
                                                   Male
                                                          33
                                                                          Wales
           Job Classification Date Joined
                                               Balance
                  White Collar
                                  05.Jan.15
      0
                                              113810.15
      1
                   Blue Collar
                                  06.Jan.15
                                               36919.73
                  White Collar
                                  07.Jan.15
      2
                                              101536.83
      3
                  White Collar
                                  08.Jan.15
                                                1421.52
      4
                   Blue Collar
                                  09.Jan.15
                                               35639.79
      4009
                                  30.Dec.15
                                               19711.66
                         Other
      4010
                   Blue Collar
                                  30.Dec.15
                                              56069.72
                                  30.Dec.15
      4011
                         Other
                                               59477.82
      4012
                   Blue Collar
                                  30.Dec.15
                                                 239.45
                   Blue Collar
                                  30.Dec.15
      4013
                                               30293.19
      [4014 rows x 9 columns]
[13]: len(stats)
[13]: 4014
      stats.columns
[14]:
[14]: Index(['Customer ID', 'Name', 'Surname', 'Gender', 'Age', 'Region',
              'Job Classification', 'Date Joined', 'Balance'],
            dtype='object')
[15]: len(stats.columns)
[15]: 9
      stats.head()
[16]:
         Customer ID
                                                                   Region \
[16]:
                          Name
                                 Surname
                                          Gender
                                                   Age
      0
           100000001
                         Simon
                                   Walsh
                                            Male
                                                    21
                                                                  England
      1
           40000002
                       Jasmine
                                  Miller
                                          Female
                                                    34
                                                        Northern Ireland
      2
           100000003
                          Liam
                                   Brown
                                            Male
                                                    46
                                                                  England
      3
           300000004
                        Trevor
                                    Parr
                                            Male
                                                    32
                                                                    Wales
      4
           100000005
                                                                  England
                       Deirdre
                               Pullman
                                          Female
                                                    38
        Job Classification Date Joined
                                            Balance
      0
              White Collar
                              05.Jan.15
                                          113810.15
      1
               Blue Collar
                              06.Jan.15
                                           36919.73
```

```
2
              White Collar
                              07.Jan.15
                                          101536.83
      3
              White Collar
                              08.Jan.15
                                            1421.52
                              09.Jan.15
      4
               Blue Collar
                                           35639.79
[17]: stats.tail()
            Customer ID
                                       Surname
[17]:
                               Name
                                                Gender
                                                         Age
                                                                Region \
      4009
              200004010
                                Sam
                                         Lewis
                                                  Male
                                                          64
                                                              Scotland
      4010
                                                              Scotland
              200004011
                              Keith
                                        Hughes
                                                  Male
                                                          52
      4011
                                                              Scotland
              200004012
                             Hannah
                                      Springer
                                                Female
                                                          50
      4012
              200004013
                          Christian
                                          Reid
                                                  Male
                                                          51
                                                              Scotland
      4013
              300004014
                            Stephen
                                           May
                                                  Male
                                                          33
                                                                 Wales
           Job Classification Date Joined
                                              Balance
      4009
                         Other
                                 30.Dec.15
                                            19711.66
      4010
                  Blue Collar
                                 30.Dec.15
                                             56069.72
      4011
                         Other
                                 30.Dec.15
                                             59477.82
      4012
                  Blue Collar
                                 30.Dec.15
                                               239.45
      4013
                  Blue Collar
                                 30.Dec.15
                                             30293.19
[18]: stats.head(6)
         Customer ID
                                                                  Region \
[18]:
                          Name
                                Surname
                                          Gender
                                                  Age
      0
           10000001
                         Simon
                                   Walsh
                                            Male
                                                                 England
                                                   21
      1
           400000002
                       Jasmine
                                 Miller
                                          Female
                                                   34
                                                       Northern Ireland
      2
           100000003
                          Liam
                                  Brown
                                            Male
                                                   46
                                                                 England
      3
           300000004
                        Trevor
                                   Parr
                                            Male
                                                   32
                                                                   Wales
      4
           10000005
                      Deirdre
                               Pullman Female
                                                   38
                                                                 England
      5
           30000006
                           Ava
                                Coleman
                                         Female
                                                   30
                                                                   Wales
        Job Classification Date Joined
                                            Balance
      0
              White Collar
                              05.Jan.15
                                          113810.15
      1
               Blue Collar
                              06.Jan.15
                                           36919.73
                              07.Jan.15
      2
              White Collar
                                          101536.83
      3
              White Collar
                              08.Jan.15
                                            1421.52
               Blue Collar
                              09.Jan.15
      4
                                           35639.79
               Blue Collar
                              09.Jan.15 122443.77
[19]: print(stats.columns)
     Index(['Customer ID', 'Name', 'Surname', 'Gender', 'Age', 'Region',
             'Job Classification', 'Date Joined', 'Balance'],
            dtype='object')
[20]:
      stats.tail(6)
[20]:
            Customer ID
                               Name
                                       Surname
                                                Gender
                                                         Age
                                                                Region \
      4008
              200004009
                             Alison
                                         Quinn Female
                                                          64
                                                              Scotland
```

```
4009
              200004010
                                Sam
                                         Lewis
                                                  Male
                                                          64
                                                              Scotland
      4010
                              Keith
                                        Hughes
                                                  Male
                                                          52
                                                              Scotland
              200004011
      4011
              200004012
                             Hannah
                                      Springer
                                                Female
                                                          50
                                                              Scotland
      4012
              200004013
                          Christian
                                          Reid
                                                  Male
                                                          51
                                                              Scotland
      4013
              300004014
                            Stephen
                                                  Male
                                                          33
                                                                 Wales
                                           May
           Job Classification Date Joined
                                              Balance
      4008
                         Other
                                 30.Dec.15
                                             73503.90
      4009
                         Other
                                 30.Dec.15
                                             19711.66
      4010
                  Blue Collar
                                 30.Dec.15
                                             56069.72
                         Other
                                 30.Dec.15
      4011
                                             59477.82
      4012
                  Blue Collar
                                 30.Dec.15
                                               239.45
      4013
                  Blue Collar
                                 30.Dec.15
                                             30293.19
[21]: stats.info()
     <class 'pandas.core.frame.DataFrame'>
     RangeIndex: 4014 entries, 0 to 4013
     Data columns (total 9 columns):
      #
          Column
                                Non-Null Count
                                                Dtype
          _____
                                _____
                                                ----
      0
          Customer ID
                                4014 non-null
                                                 int64
      1
          Name
                                4014 non-null
                                                object
      2
          Surname
                               4014 non-null
                                                object
      3
          Gender
                                4014 non-null
                                                object
                                4014 non-null
      4
          Age
                                                 int64
      5
                                4014 non-null
                                                object
          Region
      6
          Job Classification
                               4014 non-null
                                                object
      7
          Date Joined
                                4014 non-null
                                                 object
      8
          Balance
                                4014 non-null
                                                 float64
     dtypes: float64(1), int64(2), object(6)
     memory usage: 282.4+ KB
[22]: stats.describe()
              Customer ID
                                    Age
                                                Balance
             4.014000e+03
                            4014.000000
                                            4014.000000
      count
      mean
             1.696831e+08
                              38.611111
                                           39766.448274
      std
             8.865374e+07
                               9.819121
                                           29859.489192
      min
             1.000000e+08
                              15.000000
                                              11.520000
      25%
             1.000020e+08
                              31.000000
                                           16115.367500
      50%
             1.000038e+08
                              37.000000
                                           33567.330000
      75%
             2.000031e+08
                              45.000000
                                           57533.930000
             4.000038e+08
                              64.000000
                                          183467.700000
      max
```

[22]:

[23]: stats.describe().transpose()

```
[23]:
                    count
                                    mean
                                                    std
                                                                  min
                                                                                 25%
      Customer ID
                   4014.0
                            1.696831e+08
                                          8.865374e+07
                                                         1.000000e+08 1.000020e+08
                   4014.0
                                          9.819121e+00
                                                         1.500000e+01
                                                                       3.100000e+01
      Age
                            3.861111e+01
      Balance
                   4014.0
                           3.976645e+04
                                          2.985949e+04
                                                         1.152000e+01 1.611537e+04
                             50%
                                           75%
                                                         max
      Customer ID
                   1.000038e+08
                                  2.000031e+08
                                                 400003848.0
      Age
                   3.700000e+01
                                  4.500000e+01
                                                        64.0
                   3.356733e+04
      Balance
                                  5.753393e+04
                                                    183467.7
[24]:
     stats.columns
[24]: Index(['Customer ID', 'Name', 'Surname', 'Gender', 'Age', 'Region',
             'Job Classification', 'Date Joined', 'Balance'],
            dtype='object')
[25]: stats.columns=['Customer ID', 'Name', 'Surname', 'Gender', 'Age', 'Region',
              'Job_Classification', 'Date_Joined', 'Balance']
[26]:
      stats
[26]:
            Customer_ID
                               Name
                                      Surname
                                               Gender
                                                                        Region \
                                                        Age
              10000001
                                        Walsh
                                                  Male
                                                                       England
      0
                              Simon
                                                         21
      1
              40000002
                            Jasmine
                                       Miller Female
                                                         34
                                                             Northern Ireland
      2
                                                                      England
              10000003
                               Liam
                                        Brown
                                                 Male
                                                         46
      3
              30000004
                             Trevor
                                         Parr
                                                 Male
                                                         32
                                                                         Wales
              10000005
      4
                            Deirdre
                                      Pullman Female
                                                                      England
                                                         38
      4009
              200004010
                                Sam
                                        Lewis
                                                 Male
                                                         64
                                                                     Scotland
      4010
                                       Hughes
                                                  Male
                                                                     Scotland
              200004011
                              Keith
                                                         52
      4011
              200004012
                             Hannah
                                     Springer
                                               Female
                                                         50
                                                                     Scotland
      4012
                                         Reid
                                                                     Scotland
              200004013
                         Christian
                                                  Male
                                                         51
      4013
              300004014
                            Stephen
                                          May
                                                  Male
                                                         33
                                                                         Wales
           Job_Classification Date_Joined
                                              Balance
      0
                 White Collar
                                 05.Jan.15
                                            113810.15
                  Blue Collar
                                 06.Jan.15
      1
                                             36919.73
      2
                 White Collar
                                 07.Jan.15
                                            101536.83
      3
                 White Collar
                                 08.Jan.15
                                               1421.52
                  Blue Collar
                                 09.Jan.15
                                             35639.79
      4
                                   ...
      4009
                        Other
                                 30.Dec.15
                                             19711.66
      4010
                  Blue Collar
                                 30.Dec.15
                                             56069.72
                                 30.Dec.15
      4011
                         Other
                                             59477.82
      4012
                  Blue Collar
                                 30.Dec.15
                                               239.45
                  Blue Collar
                                 30.Dec.15
      4013
                                             30293.19
```

[4014 rows x 9 columns]

```
[27]:
     stats[20:30]
[27]:
                                               Gender
                                                                         Region \
          Customer_ID
                             Name
                                      Surname
                                                        Age
      20
             300000021
                            Boris
                                     Johnston
                                                  Male
                                                         37
                                                                          Wales
      21
             200000022
                            Jason
                                       Butler
                                                  Male
                                                         58
                                                                       Scotland
      22
             300000023
                                     McDonald
                                               Female
                                                                          Wales
                          Deirdre
                                                          41
      23
             200000024
                             Carl
                                        Quinn
                                                  Male
                                                          52
                                                                       Scotland
      24
                         Jennifer
                                               Female
             100000025
                                       Hughes
                                                          38
                                                                       England
      25
             200000026
                          Richard
                                       Fraser
                                                  Male
                                                         55
                                                                       Scotland
      26
                           Rachel
                                      McGrath Female
                                                              Northern Ireland
             40000027
                                                         37
      27
             100000028
                           Alison
                                       Fisher
                                               Female
                                                         33
                                                                       England
      28
             200000029
                            Lucas
                                   Mackenzie
                                                  Male
                                                         50
                                                                       Scotland
      29
                                      Wilkins
                                                                       England
             100000030
                             Luke
                                                  Male
                                                         42
          Job_Classification Date_Joined
                                             Balance
                                16.Jan.15
      20
                        Other
                                            31778.90
      21
                 Blue Collar
                                18.Jan.15
                                            21252.97
      22
                White Collar
                                            66785.78
                                18.Jan.15
      23
                 Blue Collar
                                19.Jan.15
                                             6580.81
      24
                White Collar
                                20.Jan.15
                                            20505.32
      25
                 Blue Collar
                                21.Jan.15
                                            43249.26
      26
                White Collar
                                23.Jan.15
                                             3967.20
                White Collar
                                25.Jan.15
      27
                                             3428.56
      28
                 Blue Collar
                                25.Jan.15
                                            20516.10
      29
                White Collar
                                27.Jan.15
                                            10813.83
[28]:
     stats[110:120]
[28]:
            Customer_ID
                             Name
                                      Surname
                                               Gender
                                                        Age
                                                                         Region \
                                                                          Wales
      110
              300000111
                            Sonia
                                               Female
                                   Robertson
                                                         25
      111
              300000112
                           Nathan
                                     Paterson
                                                  Male
                                                         26
                                                                          Wales
      112
              400000113
                              Tim
                                     Hardacre
                                                  Male
                                                          29
                                                              Northern Ireland
                                                              Northern Ireland
      113
              400000114
                            Fiona
                                        Mills
                                              Female
                                                          18
      114
              400000115
                             Ruth
                                       Oliver
                                               Female
                                                         43
                                                              Northern Ireland
      115
              100000116
                           Alison
                                     Johnston
                                               Female
                                                          36
                                                                        England
      116
              100000117
                              Amy
                                      McGrath
                                               Female
                                                          40
                                                                        England
      117
              200000118
                                      McGrath
                                                  Male
                                                         52
                                                                       Scotland
                             Adam
      118
              100000119
                          Vanessa
                                        Lyman
                                               Female
                                                          18
                                                                        England
      119
              100000120
                           Andrea
                                      Dickens
                                               Female
                                                                       England
           Job_Classification Date_Joined
                                               Balance
      110
                         Other
                                 16.Mar.15
                                               70799.64
                 White Collar
                                 16.Mar.15
      111
                                               20627.65
      112
                 White Collar
                                  16.Mar.15
                                               82229.52
                         Other
                                  16.Mar.15
      113
                                               51171.29
```

```
114
                  Blue Collar
                                 16.Mar.15
                                              37889.38
      115
                         Other
                                 19.Mar.15
                                              21806.30
      116
                         Other
                                 25.Mar.15
                                              12415.50
                         Other
                                 28.Mar.15
      117
                                              67682.92
      118
                 White Collar
                                 31.Mar.15
                                              33524.41
                 White Collar
                                 31.Mar.15
      119
                                             136370.38
      stats[4010:]
[29]:
             Customer ID
                                        Surname
                                                 Gender
                                                                  Region \
[29]:
                                Name
                                                          Age
      4010
               200004011
                               Keith
                                         Hughes
                                                    Male
                                                           52
                                                                Scotland
      4011
               200004012
                              Hannah
                                       Springer
                                                 Female
                                                           50
                                                                Scotland
                                                                Scotland
      4012
               200004013
                          Christian
                                           Reid
                                                    Male
                                                           51
      4013
               300004014
                             Stephen
                                            May
                                                    Male
                                                           33
                                                                   Wales
            Job_Classification Date_Joined
                                               Balance
      4010
                   Blue Collar
                                  30.Dec.15
                                              56069.72
      4011
                          Other
                                  30.Dec.15
                                              59477.82
      4012
                   Blue Collar
                                  30.Dec.15
                                                 239.45
      4013
                   Blue Collar
                                  30.Dec.15
                                              30293.19
[30]:
      stats[:6]
[30]:
         Customer_ID
                           Name
                                 Surname
                                                                    Region \
                                           Gender
                                                    Age
      0
            10000001
                          Simon
                                    Walsh
                                             Male
                                                     21
                                                                   England
      1
            400000002
                        Jasmine
                                  Miller
                                           Female
                                                     34
                                                         Northern Ireland
      2
            10000003
                                    Brown
                                                     46
                                                                   England
                           Liam
                                             Male
      3
                                                                     Wales
            300000004
                         Trevor
                                    Parr
                                             Male
                                                     32
      4
            100000005
                       Deirdre
                                 Pullman
                                           Female
                                                     38
                                                                   England
      5
            300000006
                                 Coleman
                                           Female
                                                     30
                                                                     Wales
                            Ava
        Job Classification Date Joined
                                             Balance
      0
               White Collar
                               05.Jan.15
                                           113810.15
                Blue Collar
      1
                               06.Jan.15
                                            36919.73
      2
               White Collar
                               07.Jan.15
                                           101536.83
      3
               White Collar
                               08.Jan.15
                                             1421.52
      4
                Blue Collar
                               09.Jan.15
                                            35639.79
      5
                Blue Collar
                               09.Jan.15
                                           122443.77
[31]: stats[::-1]
[31]:
             Customer_ID
                                Name
                                        Surname
                                                 Gender
                                                          Age
                                                                           Region \
      4013
               300004014
                                                    Male
                                                           33
                                                                            Wales
                             Stephen
                                            May
      4012
               200004013
                           Christian
                                           Reid
                                                    Male
                                                           51
                                                                         Scotland
      4011
               200004012
                              Hannah
                                       Springer
                                                 Female
                                                           50
                                                                         Scotland
      4010
               200004011
                               Keith
                                         Hughes
                                                    Male
                                                           52
                                                                         Scotland
      4009
               200004010
                                 Sam
                                          Lewis
                                                    Male
                                                           64
                                                                         Scotland
```

```
4
               10000005
                             Deirdre
                                        Pullman Female
                                                           38
                                                                         England
      3
               30000004
                              Trevor
                                           Parr
                                                    Male
                                                           32
                                                                           Wales
      2
               10000003
                                Liam
                                          Brown
                                                    Male
                                                           46
                                                                         England
      1
               400000002
                             Jasmine
                                         Miller
                                                 Female
                                                           34
                                                               Northern Ireland
      0
               10000001
                               Simon
                                          Walsh
                                                    Male
                                                           21
                                                                         England
            Job_Classification Date_Joined
                                                Balance
      4013
                   Blue Collar
                                  30.Dec.15
                                               30293.19
      4012
                   Blue Collar
                                  30.Dec.15
                                                 239.45
      4011
                          Other
                                  30.Dec.15
                                               59477.82
      4010
                   Blue Collar
                                  30.Dec.15
                                               56069.72
      4009
                         Other
                                  30.Dec.15
                                               19711.66
      4
                                               35639.79
                   Blue Collar
                                  09.Jan.15
      3
                  White Collar
                                  08.Jan.15
                                                1421.52
      2
                  White Collar
                                  07.Jan.15
                                              101536.83
      1
                   Blue Collar
                                  06.Jan.15
                                               36919.73
                  White Collar
                                  05.Jan.15
      0
                                              113810.15
      [4014 rows x 9 columns]
      stats[130:120:-1]
[32]:
[32]:
                                                               Region \
           Customer_ID
                              Name
                                       Surname
                                                Gender
                                                         Age
      130
              100000131
                              Anna
                                        Wright
                                                Female
                                                          41
                                                              England
      129
              100000130
                            Alison
                                       MacLeod
                                               Female
                                                          27
                                                              England
      128
              100000129
                             Peter
                                       Pullman
                                                  Male
                                                          47
                                                              England
      127
              100000128
                         Virginia
                                                Female
                                                              England
                                         Berry
                                                          41
                                                              England
      126
              100000127
                              Emma
                                        Fraser
                                               Female
                                                          27
      125
                         Benjamin
                                                              England
              100000126
                                         Blake
                                                  Male
                                                          42
                                                              England
      124
              100000125
                          Jonathan
                                    MacDonald
                                                  Male
                                                          27
                                                              England
      123
              100000124
                              John
                                         Black
                                                  Male
                                                          39
      122
              100000123
                             Harry
                                                  Male
                                                              England
                                         Short
                                                          50
      121
                                                              England
              100000122
                             Jacob
                                         Payne
                                                  Male
                                                          25
          Job_Classification Date_Joined
                                               Balance
      130
                 White Collar
                                 01.Apr.15
                                              27557.08
                                 01.Apr.15
      129
                 White Collar
                                              27738.77
      128
                 White Collar
                                 01.Apr.15
                                              15093.04
      127
                 White Collar
                                 01.Apr.15
                                               4347.79
      126
                 White Collar
                                 01.Apr.15
                                              10481.48
      125
                 White Collar
                                 01.Apr.15
                                              55661.50
      124
                 White Collar
                                 01.Apr.15
                                              12312.49
      123
                        Other
                                 01.Apr.15
                                             111149.47
      122
                                 31.Mar.15
                 White Collar
                                              43234.21
      121
                        Other
                                 31.Mar.15
                                               3738.10
```

```
[33]: stats[::20]
[33]:
            Customer ID
                                Name
                                         Surname
                                                   Gender
                                                                   Region \
                                                            Age
      0
               10000001
                               Simon
                                            Walsh
                                                     Male
                                                             21
                                                                  England
                                                                    Wales
      20
               300000021
                               Boris
                                         Johnston
                                                     Male
                                                             37
      40
               100000041
                              Edward
                                                                  England
                                           Terry
                                                     Male
                                                             27
                                                                  England
      60
               100000061
                               Kylie
                                          Howard Female
                                                             35
                                        Buckland Female
                                                                  England
      80
               100000081
                                Joan
                                                             36
      3920
               100003921
                                         Buckland
                                                     Male
                                                             37
                                                                  England
                               Isaac
      3940
                                                             59
                                                                 Scotland
               200003941
                              Joshua
                                      Sutherland
                                                     Male
      3960
               100003961
                             Leonard
                                            Grant
                                                     Male
                                                             48
                                                                  England
      3980
               200003981
                          Elizabeth
                                            James
                                                   Female
                                                                 Scotland
                                                             43
      4000
               300004001
                          Gabrielle
                                                   Female
                                                             34
                                                                    Wales
                                          Duncan
           Job_Classification Date_Joined
                                                Balance
      0
                  White Collar
                                  05.Jan.15
                                              113810.15
      20
                         Other
                                  16.Jan.15
                                               31778.90
                   Blue Collar
                                  01.Feb.15
      40
                                               51412.60
      60
                  White Collar
                                  12.Feb.15
                                                4586.23
                  White Collar
                                  16.Mar.15
      80
                                               59935.75
      •••
      3920
                  White Collar
                                  24.Dec.15
                                               35743.13
                         Other
                                  25.Dec.15
      3940
                                                2114.65
      3960
                         Other
                                  27.Dec.15
                                               72061.71
      3980
                         Other
                                  28.Dec.15
                                               19695.66
      4000
                  White Collar
                                  29.Dec.15
                                               92083.79
      [201 rows x 9 columns]
[34]: stats.columns
[34]: Index(['Customer_ID', 'Name', 'Surname', 'Gender', 'Age', 'Region',
              'Job_Classification', 'Date_Joined', 'Balance'],
            dtype='object')
      stats.head()
[35]:
[35]:
         Customer_ID
                          Name
                                 Surname
                                          Gender
                                                                   Region \
                                                   Age
           100000001
                                   Walsh
                                                                  England
      0
                         Simon
                                             Male
                                                    21
      1
           40000002
                       Jasmine
                                  Miller
                                          Female
                                                    34
                                                        Northern Ireland
                                   Brown
      2
           100000003
                          Liam
                                             Male
                                                    46
                                                                  England
                                                                    Wales
      3
           300000004
                        Trevor
                                    Parr
                                             Male
                                                    32
      4
           100000005
                       Deirdre
                                          Female
                                Pullman
                                                    38
                                                                  England
        Job_Classification Date_Joined
                                             Balance
      0
              White Collar
                               05.Jan.15
                                           113810.15
```

```
Blue Collar
      1
                              06.Jan.15
                                           36919.73
      2
              White Collar
                              07.Jan.15
                                          101536.83
                              08.Jan.15
      3
              White Collar
                                            1421.52
      4
               Blue Collar
                              09.Jan.15
                                           35639.79
[36]: stats['Name']
[36]: 0
                   Simon
      1
                 Jasmine
      2
                    Liam
      3
                 Trevor
      4
                Deirdre
      4009
                     Sam
      4010
                  Keith
      4011
                 Hannah
      4012
              Christian
      4013
                Stephen
      Name: Name, Length: 4014, dtype: object
[37]: stats['Name'].head()
[37]: 0
             Simon
      1
           Jasmine
      2
              Liam
      3
            Trevor
      4
           Deirdre
      Name: Name, dtype: object
[38]: stats[['Name', 'Surname']].head()
[38]:
            Name
                  Surname
           Simon
                     Walsh
      0
      1
         Jasmine
                    Miller
      2
            Liam
                     Brown
      3
          Trevor
                      Parr
      4 Deirdre Pullman
[39]: stats.Name.head()
[39]: 0
             Simon
      1
           Jasmine
      2
              Liam
      3
            Trevor
      4
           Deirdre
      Name: Name, dtype: object
[40]: stats.head().Name
```

```
[40]: 0
              Simon
            Jasmine
      1
      2
               Liam
      3
             Trevor
      4
           Deirdre
      Name: Name, dtype: object
[41]: stats[10:21][['Name', 'Surname']]
[41]:
                Name
                         Surname
      10
             Dominic
                           Lewis
      11
            Benjamin
                           Grant
      12
                Ryan
                       MacDonald
      13
              Thomas
                        Lawrence
      14
          Madeleine
                        Marshall
      15
            Nicholas
                          Newman
      16
               Grace
                            Hill
      17
            Samantha
                         Coleman
      18
             William
                            Ince
      19
              Audrey
                           Jones
      20
               Boris
                        Johnston
[42]:
      stats[['Name', 'Surname']][10:21]
[42]:
                Name
                         Surname
      10
                           Lewis
             Dominic
      11
            Benjamin
                           Grant
      12
                Ryan
                      MacDonald
      13
              Thomas
                        Lawrence
      14
          Madeleine
                        Marshall
      15
            Nicholas
                          Newman
      16
               Grace
                            Hill
      17
            Samantha
                         Coleman
      18
             William
                            Ince
      19
                           Jones
              Audrey
      20
               Boris
                        Johnston
[43]: df=stats[['Name', 'Surname']]
      df[2:10]
[43]:
             Name
                    Surname
      2
             Liam
                       Brown
                        Parr
      3
          Trevor
         Deirdre
      4
                    Pullman
      5
                    Coleman
              Ava
      6
         Dorothy
                    Thomson
      7
             Lisa
                       Knox
      8
             Ruth
                   Campbell
```

9 Dominic Parr

```
[44]: Result=stats['Balance*2']=stats.Balance*2
[45]: Result
[45]: 0
               227620.30
      1
                73839.46
      2
               203073.66
      3
                 2843.04
      4
                71279.58
                 •••
      4009
                39423.32
      4010
               112139.44
      4011
               118955.64
      4012
                  478.90
      4013
                60586.38
      Name: Balance, Length: 4014, dtype: float64
[46]: stats
[46]:
             Customer_ID
                                Name
                                        Surname
                                                 Gender
                                                                          Region \
                                                          Age
      0
               10000001
                                          Walsh
                                                           21
                                                                         England
                               Simon
                                                    Male
      1
               40000002
                             Jasmine
                                        Miller
                                                 Female
                                                           34
                                                               Northern Ireland
      2
               10000003
                                Liam
                                          Brown
                                                    Male
                                                           46
                                                                         England
      3
               30000004
                                           Parr
                                                    Male
                                                           32
                                                                           Wales
                              Trevor
      4
               10000005
                             Deirdre
                                        Pullman
                                                 Female
                                                           38
                                                                         England
                                            ... ...
      4009
                                                                        Scotland
               200004010
                                 Sam
                                          Lewis
                                                   Male
                                                           64
                               Keith
      4010
               200004011
                                         Hughes
                                                   Male
                                                           52
                                                                        Scotland
      4011
                                      Springer
                                                                        Scotland
               200004012
                              Hannah
                                                 Female
                                                           50
      4012
                                           Reid
                                                                        Scotland
               200004013
                          Christian
                                                   Male
                                                           51
      4013
               300004014
                             Stephen
                                            May
                                                   Male
                                                           33
                                                                           Wales
            Job_Classification Date_Joined
                                                Balance
                                                          Balance*2
      0
                  White Collar
                                  05.Jan.15
                                              113810.15
                                                          227620.30
                                  06.Jan.15
      1
                   Blue Collar
                                               36919.73
                                                           73839.46
      2
                  White Collar
                                  07.Jan.15
                                              101536.83
                                                          203073.66
      3
                                  08.Jan.15
                  White Collar
                                                1421.52
                                                            2843.04
      4
                   Blue Collar
                                  09.Jan.15
                                               35639.79
                                                           71279.58
      •••
      4009
                         Other
                                  30.Dec.15
                                               19711.66
                                                           39423.32
      4010
                   Blue Collar
                                  30.Dec.15
                                               56069.72
                                                          112139.44
                                  30.Dec.15
      4011
                         Other
                                               59477.82
                                                          118955.64
      4012
                   Blue Collar
                                  30.Dec.15
                                                 239.45
                                                             478.90
                   Blue Collar
                                  30.Dec.15
                                               30293.19
      4013
                                                           60586.38
```

[4014 rows x 10 columns]

```
[47]: stats['Balance*2']=stats.Balance*2
[48]:
      stats
[48]:
             Customer_ID
                                        Surname
                                                 Gender
                                                                          Region \
                                Name
                                                          Age
      0
               10000001
                               Simon
                                          Walsh
                                                   Male
                                                           21
                                                                         England
      1
               40000002
                             Jasmine
                                        Miller
                                                 Female
                                                           34
                                                               Northern Ireland
      2
                                          Brown
               100000003
                                Liam
                                                   Male
                                                                         England
                                                           46
      3
               30000004
                              Trevor
                                           Parr
                                                   Male
                                                           32
                                                                           Wales
      4
                             Deirdre
                                                                         England
               100000005
                                       Pullman Female
                                                           38
      4009
               200004010
                                 Sam
                                          Lewis
                                                   Male
                                                           64
                                                                        Scotland
      4010
               200004011
                                         Hughes
                                                   Male
                                                                        Scotland
                               Keith
                                                           52
      4011
               200004012
                              Hannah
                                      Springer
                                                 Female
                                                           50
                                                                        Scotland
      4012
               200004013
                          Christian
                                           Reid
                                                                        Scotland
                                                   Male
                                                           51
      4013
                                                           33
               300004014
                             Stephen
                                            May
                                                   Male
                                                                           Wales
            Job_Classification Date_Joined
                                                Balance
                                                          Balance*2
      0
                  White Collar
                                  05.Jan.15
                                              113810.15
                                                          227620.30
                   Blue Collar
                                  06.Jan.15
      1
                                               36919.73
                                                           73839.46
      2
                  White Collar
                                  07.Jan.15
                                              101536.83
                                                          203073.66
      3
                  White Collar
                                  08.Jan.15
                                                1421.52
                                                            2843.04
      4
                   Blue Collar
                                  09.Jan.15
                                               35639.79
                                                           71279.58
                                               19711.66
                                                           39423.32
      4009
                         Other
                                  30.Dec.15
      4010
                   Blue Collar
                                  30.Dec.15
                                               56069.72
                                                          112139.44
      4011
                         Other
                                  30.Dec.15
                                               59477.82
                                                          118955.64
      4012
                   Blue Collar
                                  30.Dec.15
                                                 239.45
                                                             478.90
      4013
                   Blue Collar
                                  30.Dec.15
                                               30293.19
                                                           60586.38
      [4014 rows x 10 columns]
[49]:
      stats.head()
[49]:
         Customer_ID
                           Name
                                 Surname
                                           Gender
                                                                    Region \
                                                   Age
      0
            10000001
                         Simon
                                   Walsh
                                                     21
                                                                   England
                                             Male
      1
            400000002
                       Jasmine
                                  Miller
                                           Female
                                                    34
                                                         Northern Ireland
      2
            10000003
                           Liam
                                   Brown
                                             Male
                                                    46
                                                                   England
      3
            300000004
                        Trevor
                                    Parr
                                             Male
                                                     32
                                                                     Wales
      4
            100000005
                       Deirdre
                                 Pullman
                                           Female
                                                     38
                                                                   England
        Job_Classification Date_Joined
                                             Balance
                                                      Balance*2
      0
               White Collar
                               05.Jan.15
                                           113810.15
                                                       227620.30
      1
                Blue Collar
                               06.Jan.15
                                            36919.73
                                                        73839.46
               White Collar
                               07.Jan.15
      2
                                           101536.83
                                                       203073.66
```

```
4
                Blue Collar
                               09.Jan.15
                                            35639.79
                                                        71279.58
[50]: stats['Balance*3']=stats.Balance*3
[51]:
      stats
[51]:
             Customer_ID
                                Name
                                        Surname
                                                 Gender
                                                          Age
                                                                          Region \
      0
               10000001
                               Simon
                                          Walsh
                                                   Male
                                                           21
                                                                         England
      1
               40000002
                             Jasmine
                                        Miller
                                                 Female
                                                               Northern Ireland
                                                           34
      2
               10000003
                                Liam
                                          Brown
                                                   Male
                                                           46
                                                                         England
      3
                                           Parr
                                                   Male
                                                           32
                                                                           Wales
               300000004
                              Trevor
      4
               100000005
                             Deirdre
                                       Pullman Female
                                                           38
                                                                         England
                                            ...
      4009
                                                                        Scotland
               200004010
                                 Sam
                                          Lewis
                                                   Male
                                                           64
      4010
               200004011
                               Keith
                                         Hughes
                                                   Male
                                                           52
                                                                        Scotland
      4011
               200004012
                                      Springer
                                                                        Scotland
                              Hannah
                                                 Female
                                                           50
      4012
               200004013
                           Christian
                                           Reid
                                                   Male
                                                           51
                                                                        Scotland
      4013
               300004014
                             Stephen
                                            May
                                                   Male
                                                           33
                                                                           Wales
            Job_Classification Date_Joined
                                                Balance
                                                          Balance*2
                                                                      Balance*3
      0
                  White Collar
                                  05.Jan.15
                                                          227620.30
                                                                      341430.45
                                              113810.15
                   Blue Collar
                                  06.Jan.15
      1
                                               36919.73
                                                           73839.46
                                                                      110759.19
      2
                  White Collar
                                  07.Jan.15
                                              101536.83
                                                          203073.66
                                                                      304610.49
      3
                  White Collar
                                  08.Jan.15
                                                1421.52
                                                            2843.04
                                                                        4264.56
                                  09.Jan.15
      4
                   Blue Collar
                                               35639.79
                                                           71279.58
                                                                      106919.37
                                  30.Dec.15
      4009
                         Other
                                               19711.66
                                                           39423.32
                                                                       59134.98
                   Blue Collar
      4010
                                  30.Dec.15
                                               56069.72
                                                          112139.44
                                                                      168209.16
                                                          118955.64
      4011
                          Other
                                  30.Dec.15
                                               59477.82
                                                                      178433.46
      4012
                   Blue Collar
                                  30.Dec.15
                                                 239.45
                                                             478.90
                                                                         718.35
                   Blue Collar
      4013
                                  30.Dec.15
                                               30293.19
                                                           60586.38
                                                                       90879.57
      [4014 rows x 11 columns]
[52]:
      stats.drop('Balance*3',1)
[52]:
             Customer_ID
                                        Surname
                                                                          Region \
                                Name
                                                 Gender
                                                          Age
      0
               10000001
                               Simon
                                          Walsh
                                                   Male
                                                           21
                                                                         England
      1
               40000002
                             Jasmine
                                         Miller
                                                 Female
                                                           34
                                                               Northern Ireland
      2
               10000003
                                Liam
                                          Brown
                                                   Male
                                                           46
                                                                         England
      3
                                           Parr
                                                   Male
                                                                           Wales
               300000004
                              Trevor
                                                           32
      4
               10000005
                             Deirdre
                                       Pullman
                                                Female
                                                           38
                                                                         England
      4009
               200004010
                                 Sam
                                          Lewis
                                                   Male
                                                           64
                                                                        Scotland
      4010
                                                   Male
                                                                        Scotland
               200004011
                               Keith
                                         Hughes
                                                           52
                                      Springer
      4011
                              Hannah
                                                                        Scotland
               200004012
                                                 Female
                                                           50
```

3

White Collar

08.Jan.15

1421.52

2843.04

| 4012 4013 | 200004013 300004014 | | | eid May | Male Male | 51 33 | Scotland Wales |
|---|---|--|--|---|--|---|-------------------|
| 0 1 2 3 4 4009 4010 4011 4012 | Job_Classifi White Blue White White Blue Blue | ication Collar Collar Collar Collar Collar Other Collar Other Collar | Date_Joined 05.Jan.15 06.Jan.15 07.Jan.15 08.Jan.15 09.Jan.15 30.Dec.15 30.Dec.15 30.Dec.15 30.Dec.15 | Ba 1138 369 1015 14 356 197 560 594 | alance 310.15 319.73 536.83 421.52 539.79 711.66 069.72 477.82 | Balance*2 227620.30 73839.46 203073.66 2843.04 71279.58 39423.32 112139.44 118955.64 478.90 | wales |
| 4013 | Blue | Collar | 30.Dec.15 | 302 | 293.19 | 60586.38 | |

\

[4014 rows x 10 columns]

[53]: stats.drop('Balance*2',1)

| [53]: | Customer_ID | Name | Surname | e Gender | Age | Region |
|-------|---------------|--------------|----------|----------|-------|------------------|
| 0 | 10000001 | Simon | Walsh | n Male | 21 | England |
| 1 | 40000002 | Jasmine | Miller | Female | 34 | Northern Ireland |
| 2 | 100000003 | Liam | Brown | n Male | 46 | England |
| 3 | 300000004 | Trevor | Parr | . Male | 32 | Wales |
| 4 | 100000005 | Deirdre | Pullmar | n Female | 38 | England |
| ••• | ••• | ••• | | | | ••• |
| 400 | 9 200004010 | Sam | Lewis | s Male | 64 | Scotland |
| 401 | 0 200004011 | Keith | Hughes | s Male | 52 | Scotland |
| 401 | 1 200004012 | Hannah | Springer | Female | 50 | Scotland |
| 401 | 2 200004013 | Christian | Reid | d Male | 51 | Scotland |
| 401 | 3 300004014 | Stephen | May | 7 Male | 33 | Wales |
| | | | | | | |
| | Job_Classific | cation Date_ | Joined | Balance | Balan | .ce*3 |
| 0 | White (| Collar 05. | Jan.15 1 | 13810.15 | 34143 | 0.45 |
| 1 | Blue (| Collar 06. | Jan.15 | 36919.73 | 11075 | 9.19 |
| 2 | White (| Collar 07. | Jan.15 1 | 01536.83 | 30461 | 0.49 |

3 White Collar 08.Jan.15 1421.52 4264.56 4 Blue Collar 09.Jan.15 35639.79 106919.37 4009 Other30.Dec.15 19711.66 59134.98 4010 Blue Collar 30.Dec.15 56069.72 168209.16 4011 Other 30.Dec.15 59477.82 178433.46 4012 Blue Collar 30.Dec.15 239.45 718.35 4013 Blue Collar 30.Dec.15 30293.19 90879.57

[4014 rows x 10 columns]

[54]: stats [54]: Customer ID Name Surname Gender Region \ Age 0 10000001 Simon Walsh Male 21 England 1 40000002 Jasmine Miller Female 34 Northern Ireland 2 10000003 Liam Brown Male 46 England 3 300000004 Trevor Parr Male 32 Wales 4 100000005 Deirdre Pullman Female 38 England 4009 200004010 Sam Lewis Male 64 Scotland 4010 Scotland 200004011 Keith Hughes Male 52 4011 200004012 Hannah Springer Female 50 Scotland 4012 Scotland 200004013 Christian Reid Male 51 4013 300004014 Stephen May Male 33 Wales Job_Classification Date_Joined Balance Balance*2 Balance*3 0 White Collar 05.Jan.15 113810.15 227620.30 341430.45 1 Blue Collar 06.Jan.15 36919.73 73839.46 110759.19 2 White Collar 07.Jan.15 101536.83 203073.66 304610.49 3 White Collar 08.Jan.15 1421.52 2843.04 4264.56 4 Blue Collar 09.Jan.15 35639.79 71279.58 106919.37 ••• 39423.32 4009 Other 30.Dec.15 19711.66 59134.98 4010 30.Dec.15 Blue Collar 56069.72 112139.44 168209.16 4011 Other 30.Dec.15 59477.82 118955.64 178433.46 4012 Blue Collar 30.Dec.15 239.45 478.90 718.35 4013 Blue Collar 30.Dec.15 30293.19 60586.38 90879.57 [4014 rows x 11 columns] [55]: stats=stats.drop('Balance*3',1) [56]: stats [56]: Customer_ID Surname Gender Region \ Name Age 10000001 Walsh Male England 0 Simon 21 1 400000002 Jasmine Miller Female 34 Northern Ireland 2 Male 10000003 Liam Brown 46 England 3 Male 32 Wales 300000004 Trevor Parr 4 Deirdre Pullman Female 38 England 100000005 4009 200004010 Sam Lewis Male 64 Scotland 4010 200004011 Keith Hughes Male 52 Scotland 4011 200004012 Hannah Springer Female 50 Scotland 4012 Reid 200004013 Christian Male 51 Scotland 4013 300004014 Stephen May Male 33 Wales

```
Job_Classification Date_Joined
                                        Balance
                                                 Balance*2
0
           White Collar
                          05.Jan.15
                                      113810.15
                                                 227620.30
            Blue Collar
                          06.Jan.15
1
                                       36919.73
                                                  73839.46
                          07.Jan.15
2
           White Collar
                                      101536.83
                                                 203073.66
3
           White Collar
                          08.Jan.15
                                        1421.52
                                                   2843.04
            Blue Collar
                          09.Jan.15
                                       35639.79
4
                                                  71279.58
4009
                  Other
                          30.Dec.15
                                       19711.66
                                                  39423.32
4010
            Blue Collar
                          30.Dec.15
                                                 112139.44
                                       56069.72
4011
                  Other
                          30.Dec.15
                                       59477.82
                                                 118955.64
4012
            Blue Collar
                          30.Dec.15
                                         239.45
                                                    478.90
4013
            Blue Collar
                          30.Dec.15
                                       30293.19
                                                  60586.38
```

[4014 rows x 10 columns]

```
[57]: stats=stats.drop('Balance*2',1)
```

[58]: stats

| [58]: | Customer_ID | Name | Surname | Gender | Age | Region | \ |
|-------|-------------|-----------|----------|--------|-----|------------------|---|
| 0 | 10000001 | Simon | Walsh | Male | 21 | England | |
| 1 | 400000002 | Jasmine | Miller | Female | 34 | Northern Ireland | |
| 2 | 100000003 | Liam | Brown | Male | 46 | England | |
| 3 | 300000004 | Trevor | Parr | Male | 32 | Wales | |
| 4 | 100000005 | Deirdre | Pullman | Female | 38 | England | |
| ••• | ••• | ••• | | | | ••• | |
| 4009 | 200004010 | Sam | Lewis | Male | 64 | Scotland | |
| 4010 | 200004011 | Keith | Hughes | Male | 52 | Scotland | |
| 4011 | 200004012 | Hannah | Springer | Female | 50 | Scotland | |
| 4012 | 200004013 | Christian | Reid | Male | 51 | Scotland | |
| 4013 | 300004014 | Stephen | May | Male | 33 | Wales | |

| | _ | | _ | |
|------|-------|--------|-----------|-----------|
| 0 | White | Collar | 05.Jan.15 | 113810.15 |
| 1 | Blue | Collar | 06.Jan.15 | 36919.73 |
| 2 | White | Collar | 07.Jan.15 | 101536.83 |
| 3 | White | Collar | 08.Jan.15 | 1421.52 |
| 4 | Blue | Collar | 09.Jan.15 | 35639.79 |
| ••• | | | ••• | |
| 4009 | | Other | 30.Dec.15 | 19711.66 |
| 4010 | Blue | Collar | 30.Dec.15 | 56069.72 |
| 4011 | | Other | 30.Dec.15 | 59477.82 |
| 4012 | Blue | Collar | 30.Dec.15 | 239.45 |
| 4013 | Blue | Collar | 30.Dec.15 | 30293.19 |
| | | | | |

Job_Classification Date_Joined

[4014 rows x 9 columns]

Balance

```
[59]: stats
                                                                          Region \
[59]:
            Customer_ID
                                Name
                                       Surname
                                                Gender
                                                         Age
      0
               10000001
                               Simon
                                         Walsh
                                                   Male
                                                          21
                                                                         England
                                                               Northern Ireland
      1
               40000002
                             Jasmine
                                        Miller
                                                Female
                                                           34
      2
               10000003
                                Liam
                                         Brown
                                                   Male
                                                          46
                                                                         England
      3
                                                                           Wales
               30000004
                              Trevor
                                          Parr
                                                   Male
                                                           32
      4
               10000005
                            Deirdre
                                       Pullman Female
                                                                         England
                                                           38
      4009
               200004010
                                 Sam
                                         Lewis
                                                   Male
                                                           64
                                                                        Scotland
      4010
               200004011
                                        Hughes
                                                   Male
                                                           52
                                                                        Scotland
                               Keith
      4011
               200004012
                              Hannah
                                      Springer
                                                 Female
                                                           50
                                                                        Scotland
      4012
               200004013
                          Christian
                                          Reid
                                                           51
                                                                        Scotland
                                                   Male
      4013
               300004014
                            Stephen
                                           May
                                                   Male
                                                           33
                                                                           Wales
           Job_Classification Date_Joined
                                                Balance
      0
                  White Collar
                                  05.Jan.15
                                              113810.15
                   Blue Collar
      1
                                  06.Jan.15
                                               36919.73
      2
                  White Collar
                                  07.Jan.15
                                              101536.83
                  White Collar
      3
                                  08.Jan.15
                                                1421.52
      4
                   Blue Collar
                                  09.Jan.15
                                               35639.79
      •••
                                               19711.66
      4009
                         Other
                                  30.Dec.15
      4010
                   Blue Collar
                                  30.Dec.15
                                               56069.72
      4011
                         Other
                                  30.Dec.15
                                               59477.82
      4012
                   Blue Collar
                                  30.Dec.15
                                                 239.45
      4013
                   Blue Collar
                                  30.Dec.15
                                               30293.19
      [4014 rows x 9 columns]
[60]: filter=stats.Age>63
[61]:
      filter
[61]: 0
              False
              False
      1
      2
              False
      3
              False
      4
              False
      4009
               True
      4010
              False
      4011
              False
      4012
              False
      4013
               False
      Name: Age, Length: 4014, dtype: bool
```

[62]: Customer_ID Name Surname Gender Region \ Age 631 200000632 Nicholas Allan Male 64 Scotland 841 200000842 Matt Manning Male 64 Scotland 1498 Ellison 200001499 Cameron Male 64 Scotland 1586 Jake Ellison Male Scotland 200001587 1608 200001609 Yvonne Dickens Female Scotland 64 1639 200001640 Christopher Underwood Male Scotland 2040 200002041 Abigail Fraser Female Scotland 2055 Scotland 200002056 Joshua Carr Male 64 2310 200002311 Kevin Howard Male Scotland 2352 200002353 Leonard Lyman Male 64 Scotland 2752 Ian Hunter Male Scotland 200002753 64 2772 200002773 Alan Watson Male 64 Scotland 3676 200003677 Anthony Lewis Male Scotland 4008 200004009 Alison Quinn Female Scotland 4009 200004010 Lewis Male Scotland Sam64 Job_Classification Date_Joined Balance Blue Collar 22.May.15 631 15909.96 10.Jun.15 841 Blue Collar 3775.44 03.Aug.15 1498 Blue Collar 71106.33 11.Aug.15 1586 Other 14242.57 1608 Other 13.Aug.15 23522.36 Blue Collar 16.Aug.15 1639 47115.07 13.Sep.15 2040 Blue Collar 24729.53 2055 14.Sep.15 Other 14558.13 2310 Blue Collar 26.Sep.15 10325.52 2352 Blue Collar 28.Sep.15 139415.88 2752 Blue Collar 23.0ct.15 92921.99 24.0ct.15 2772 Blue Collar 24994.57 3676 Blue Collar 12.Dec.15 48456.48 30.Dec.15 4008 Other 73503.90 4009 Other 30.Dec.15 19711.66 [63]: filter2=stats.Balance>5000 [64]:filter [64]: 0 False 1 False 2 False 3 False 4 False

[62]: stats[filter]

4009

True

4010 False 4011 False 4012 False 4013 False Name: Age, Length: 4014, dtype: bool [65]: stats[filter2] [65]: Customer_ID Name Surname Gender Age Region \ 10000001 England 0 Simon Walsh Male 21 1 40000002 Jasmine Miller Female 34 Northern Ireland 2 Brown Male 46 England 10000003 Liam 38 4 100000005 Deirdre Pullman Female England 5 30000006 Ava Coleman Female 30 Wales 4008 200004009 Alison Quinn Female 64 Scotland 4009 200004010 Sam Lewis Male 64 Scotland 4010 Scotland 200004011 Keith Hughes Male 52 4011 200004012 Hannah Springer 50 Scotland Female 4013 300004014 Stephen May Male 33 Wales Job_Classification Date_Joined Balance 0 White Collar 05.Jan.15 113810.15 1 Blue Collar 06.Jan.15 36919.73 2 White Collar 07.Jan.15 101536.83 4 Blue Collar 09.Jan.15 35639.79 5 Blue Collar 09.Jan.15 122443.77 4008 Other 30.Dec.15 73503.90 4009 Other 30.Dec.15 19711.66 56069.72 4010 Blue Collar 30.Dec.15 4011 Other 30.Dec.15 59477.82 4013 Blue Collar 30.Dec.15 30293.19

[3690 rows x 9 columns]

stats[stats.Balance<100] [66]:

[66]: Customer_ID Gender Region Name Surname Age Northern Ireland 74 400000075 Olivia Dowd Female 30 774 200000775 Warren Roberts Male 37 Scotland 1319 100001320 Jane King Female 38 England 2045 400002046 Megan Hart Female 19 Northern Ireland 3467 Stewart Johnston Male 41 Wales 300003468 Wales 3496 300003497 Rebecca Howard Female 30 3884 100003885 Abigail Mills Female 29 England

```
74
                  White Collar
                                   12.Feb.15
                                                 21.03
      774
                   Blue Collar
                                   01.Jun.15
                                                 69.01
      1319
                  White Collar
                                   22.Jul.15
                                                 11.52
      2045
                   Blue Collar
                                   13.Sep.15
                                                 69.78
      3467
                   Blue Collar
                                   30.Nov.15
                                                 77.46
                   Blue Collar
                                   02.Dec.15
                                                 96.26
      3496
      3884
                  White Collar
                                   23.Dec.15
                                                 98.68
[67]: stats[filter & filter2]
             Customer_ID
                                  Name
                                           Surname
                                                     Gender
                                                                     Region \
[67]:
                                                              Age
      631
               200000632
                              Nicholas
                                             Allan
                                                       Male
                                                               64
                                                                   Scotland
      1498
               200001499
                               Cameron
                                           Ellison
                                                       Male
                                                               64
                                                                   Scotland
      1586
               200001587
                                   Jake
                                           Ellison
                                                       Male
                                                               64
                                                                   Scotland
                                                                   Scotland
      1608
               200001609
                                Yvonne
                                           Dickens
                                                     Female
      1639
               200001640
                           Christopher
                                         Underwood
                                                       Male
                                                                   Scotland
      2040
               200002041
                               Abigail
                                            Fraser
                                                     Female
                                                                   Scotland
      2055
                                Joshua
                                               Carr
                                                                   Scotland
               200002056
                                                       Male
                                                               64
      2310
               200002311
                                 Kevin
                                            Howard
                                                       Male
                                                               64
                                                                   Scotland
      2352
                                             Lyman
                                                                   Scotland
               200002353
                               Leonard
                                                       Male
                                                               64
      2752
               200002753
                                    Ian
                                            Hunter
                                                       Male
                                                               64
                                                                   Scotland
      2772
                                            Watson
                                                                   Scotland
               200002773
                                  Alan
                                                       Male
                                                               64
      3676
               200003677
                               Anthony
                                             Lewis
                                                       Male
                                                                   Scotland
                                                               64
      4008
               200004009
                                Alison
                                             Quinn
                                                     Female
                                                                   Scotland
      4009
               200004010
                                             Lewis
                                                       Male
                                                                   Scotland
                                    Sam
            Job_Classification Date_Joined
                                                 Balance
      631
                   Blue Collar
                                  22.May.15
                                                15909.96
                                   03.Aug.15
      1498
                   Blue Collar
                                                71106.33
                                   11.Aug.15
      1586
                          Other
                                                14242.57
                          Other
                                   13.Aug.15
                                                23522.36
      1608
                                   16.Aug.15
      1639
                   Blue Collar
                                                47115.07
      2040
                   Blue Collar
                                   13.Sep.15
                                                24729.53
                                   14.Sep.15
      2055
                          Other
                                                14558.13
      2310
                   Blue Collar
                                   26.Sep.15
                                                10325.52
      2352
                   Blue Collar
                                   28.Sep.15
                                               139415.88
      2752
                   Blue Collar
                                   23.0ct.15
                                                92921.99
      2772
                   Blue Collar
                                   24.0ct.15
                                                24994.57
      3676
                   Blue Collar
                                   12.Dec.15
                                                48456.48
      4008
                          Other
                                   30.Dec.15
                                                73503.90
      4009
                          Other
                                   30.Dec.15
                                                19711.66
      stats[(stats.Age>63)&(stats.Balance>5000)]
[68]:
[68]:
             Customer_ID
                                   Name
                                           Surname
                                                     Gender
                                                              Age
                                                                      Region \
                                                                   Scotland
      631
               200000632
                              Nicholas
                                             Allan
                                                       Male
                                                               64
```

Balance

Job_Classification Date_Joined

```
1498
               200001499
                               Cameron
                                           Ellison
                                                       Male
                                                               64
                                                                   Scotland
      1586
               200001587
                                   Jake
                                           Ellison
                                                       Male
                                                                   Scotland
                                                               64
      1608
               200001609
                                Yvonne
                                           Dickens
                                                     Female
                                                                   Scotland
      1639
               200001640
                           Christopher
                                         Underwood
                                                       Male
                                                               64
                                                                   Scotland
      2040
                               Abigail
                                            Fraser
                                                     Female
                                                                   Scotland
               200002041
                                                               64
      2055
               200002056
                                 Joshua
                                               Carr
                                                       Male
                                                               64
                                                                   Scotland
      2310
                                  Kevin
                                                       Male
                                                                   Scotland
               200002311
                                            Howard
                                                               64
      2352
               200002353
                               Leonard
                                              Lyman
                                                       Male
                                                               64
                                                                   Scotland
      2752
                                            Hunter
               200002753
                                    Ian
                                                       Male
                                                               64
                                                                   Scotland
      2772
                                   Alan
                                            Watson
                                                       Male
                                                                   Scotland
               200002773
                                                               64
      3676
                                                       Male
                                                                   Scotland
               200003677
                               Anthony
                                             Lewis
                                                               64
      4008
               200004009
                                Alison
                                              Quinn
                                                    Female
                                                                   Scotland
      4009
               200004010
                                    Sam
                                              Lewis
                                                       Male
                                                               64
                                                                   Scotland
            Job_Classification Date_Joined
                                                 Balance
      631
                   Blue Collar
                                   22.May.15
                                                15909.96
      1498
                   Blue Collar
                                   03.Aug.15
                                                71106.33
                                   11.Aug.15
      1586
                          Other
                                                14242.57
      1608
                          Other
                                   13.Aug.15
                                                23522.36
                                   16.Aug.15
      1639
                   Blue Collar
                                                47115.07
                                   13.Sep.15
      2040
                   Blue Collar
                                                24729.53
      2055
                                   14.Sep.15
                          Other
                                                14558.13
      2310
                   Blue Collar
                                   26.Sep.15
                                                10325.52
                   Blue Collar
                                   28.Sep.15
      2352
                                               139415.88
      2752
                   Blue Collar
                                   23.0ct.15
                                                92921.99
      2772
                   Blue Collar
                                   24.0ct.15
                                                24994.57
                   Blue Collar
                                                48456.48
      3676
                                   12.Dec.15
      4008
                          Other
                                   30.Dec.15
                                                73503.90
      4009
                          Other
                                   30.Dec.15
                                                19711.66
[69]:
      stats[stats.Region=='England']
[69]:
             Customer_ID
                               Name
                                        Surname
                                                  Gender
                                                           Age
                                                                 Region
      0
               10000001
                              Simon
                                          Walsh
                                                    Male
                                                                England
                                                            21
      2
                                                                England
               10000003
                               Liam
                                          Brown
                                                    Male
                                                            46
      4
                            Deirdre
                                        Pullman
                                                  Female
                                                            38
                                                                England
               100000005
      6
               10000007
                            Dorothy
                                        Thomson
                                                  Female
                                                            34
                                                                England
      9
                            Dominic
                                                    Male
                                                            42
                                                                England
               100000010
                                           Parr
      4003
                                                                England
               100004004
                                Jane
                                       Hemmings Female
                                                            28
      4004
               100004005
                                John
                                       Hamilton
                                                    Male
                                                            45
                                                                England
      4005
                                                  Female
                                                            44
                                                                England
               100004006
                           Kimberly
                                           Gray
      4006
               100004007
                             Rachel
                                         Davies
                                                  Female
                                                            34
                                                                England
      4007
               100004008
                                      Sanderson
                                                    Male
                                                            28
                                                                England
                                Sam
            Job_Classification Date_Joined
                                                 Balance
```

113810.15

05.Jan.15

White Collar

0

```
2
           White Collar
                           07.Jan.15
                                       101536.83
            Blue Collar
                           09.Jan.15
4
                                        35639.79
6
            Blue Collar
                           11.Jan.15
                                        42879.84
9
           White Collar
                           12.Jan.15
                                        10912.45
                           30.Dec.15
4003
            Blue Collar
                                        68518.55
4004
           White Collar
                           30.Dec.15
                                         8435.91
4005
                   Other
                           30.Dec.15
                                        64470.77
4006
            Blue Collar
                           30.Dec.15
                                         4561.22
4007
            Blue Collar
                           30.Dec.15
                                        42128.29
```

[2159 rows x 9 columns]

```
[70]: stats.Region.unique()
```

```
[70]: array(['England', 'Northern Ireland', 'Wales', 'Scotland'], dtype=object)
```

```
[71]: stats.Job_Classification.unique()
```

```
[71]: array(['White Collar', 'Blue Collar', 'Other'], dtype=object)
```

```
[72]: len(stats.Name.unique())
```

[72]: 172

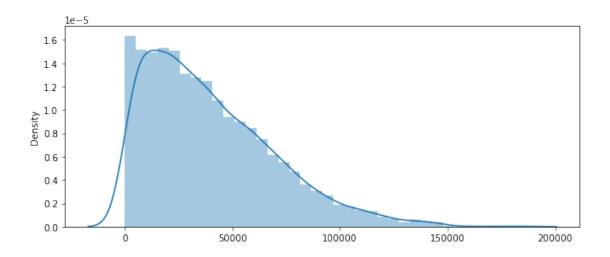
[74]: stats.index

1 .at and .iat

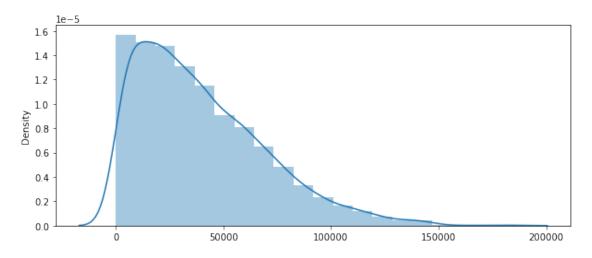
```
[73]: stats.head()
[73]:
         Customer_ID
                          Name
                                Surname
                                         Gender
                                                                 Region \
                                                  Age
      0
           10000001
                        Simon
                                  Walsh
                                            Male
                                                   21
                                                                 England
                                                       Northern Ireland
      1
           40000002
                       Jasmine
                                 Miller Female
                                                   34
      2
                                  Brown
                                                                England
           10000003
                          Liam
                                            Male
                                                   46
                                                                  Wales
      3
           30000004
                        Trevor
                                   Parr
                                            Male
                                                   32
           100000005 Deirdre Pullman Female
                                                   38
                                                                 England
        Job_Classification Date_Joined
                                            Balance
      0
              White Collar
                              05.Jan.15
                                         113810.15
               Blue Collar
                              06.Jan.15
      1
                                          36919.73
      2
              White Collar
                              07.Jan.15
                                         101536.83
      3
              White Collar
                              08.Jan.15
                                            1421.52
               Blue Collar
                              09.Jan.15
                                          35639.79
```

```
[74]: RangeIndex(start=0, stop=4014, step=1)
```

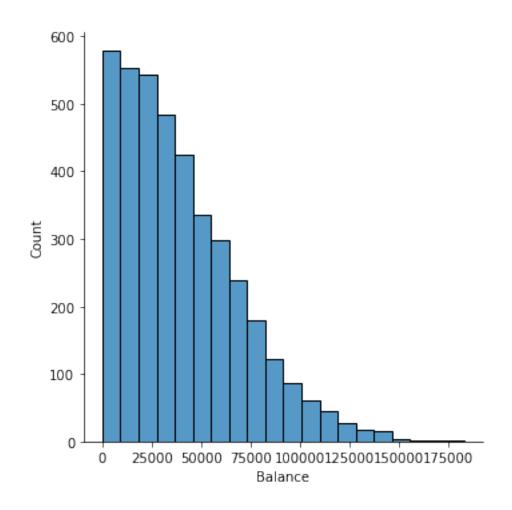
```
[75]: stats.iat[2,1]
[75]: 'Liam'
      stats.at[2,'Name']
[76]: 'Liam'
       why we need?
[77]: sub1000=stats[::1000]
[78]: sub1000
[78]:
            Customer_ID
                               Name
                                     Surname
                                              Gender
                                                                      Region \
                                                      Age
      0
              10000001
                              Simon
                                       Walsh
                                                Male
                                                        21
                                                                     England
      1000
              400001001
                              Grace
                                      Duncan Female
                                                        31
                                                           Northern Ireland
      2000
              100002001 Bernadette
                                        Ince Female
                                                        43
                                                                     England
      3000
              100003001
                               Matt
                                     Abraham
                                                Male
                                                        47
                                                                     England
      4000
                                                                       Wales
              300004001
                          Gabrielle
                                      Duncan Female
                                                        34
           Job_Classification Date_Joined
                                             Balance
      0
                 White Collar
                                05.Jan.15 113810.15
      1000
                        Other
                                26.Jun.15
                                            32162.34
      2000
                 White Collar
                                11.Sep.15
                                            57739.46
      3000
                  Blue Collar
                                03.Nov.15
                                             8576.46
                 White Collar
                                29.Dec.15
      4000
                                            92083.79
[79]: sub1000.iat[1,1]
[79]: 'Grace'
      sub1000.at[1000,'Name']
[80]: 'Grace'
[81]: import matplotlib.pyplot as plt
      import seaborn as sns
      import warnings
      warnings.filterwarnings("ignore")
      %matplotlib inline
      plt.rcParams['figure.figsize']=10,4
[82]: sns.distplot([stats.Balance])
      plt.show()
```

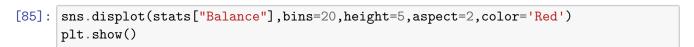


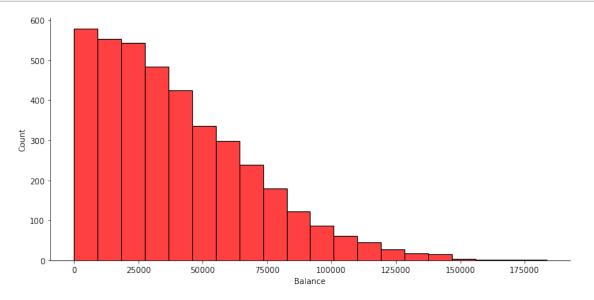
[83]: sns.distplot([stats.Balance],bins=20) plt.show()



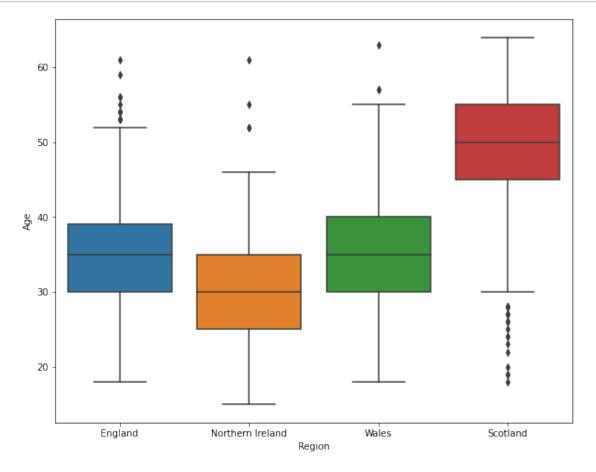
```
[84]: vis1=sns.displot(stats["Balance"],bins=20)
plt.rcParams['figure.figsize']=10,8
plt.show()
```



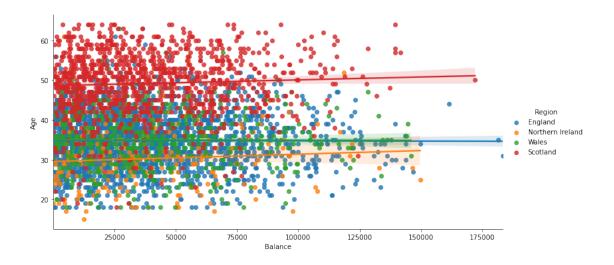




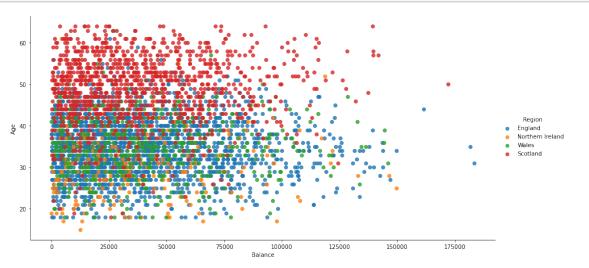
```
[86]: sns.boxplot(data=stats,x="Region",y='Age')
plt.show()
```



```
[87]: sns.lmplot(data=stats,x='Balance',y="Age",hue='Region',aspect=2) plt.show()
```

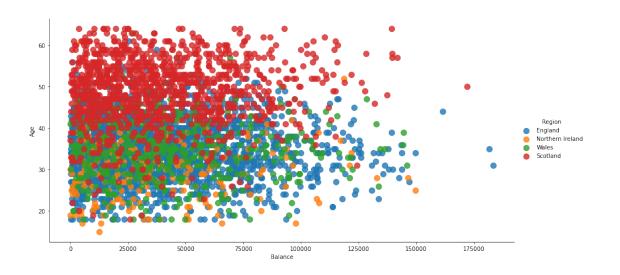




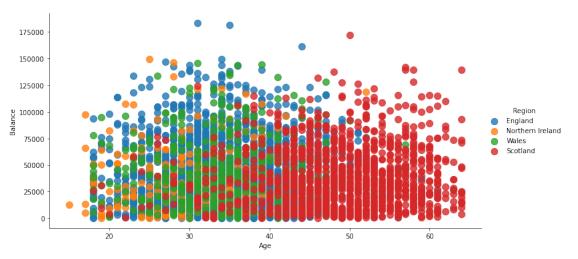


```
[89]: sns.lmplot(data=stats,x='Balance',y='Age',fit_reg=False,hue='Region',\
size=6,scatter_kws={'s':100},aspect=2)
```

[89]: <seaborn.axisgrid.FacetGrid at 0x20ceb66a490>



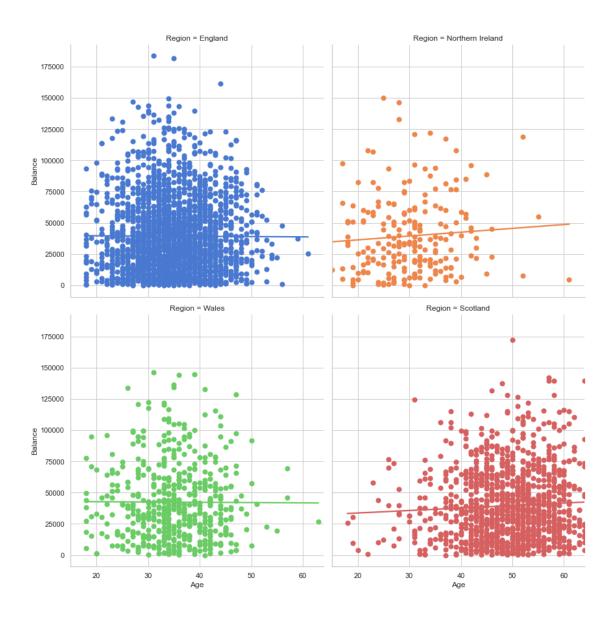


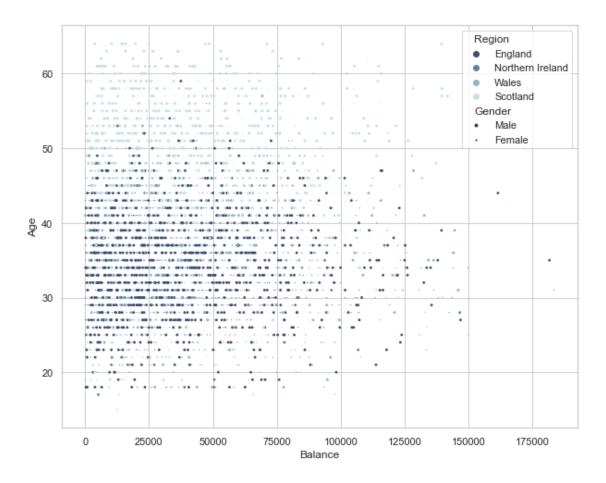


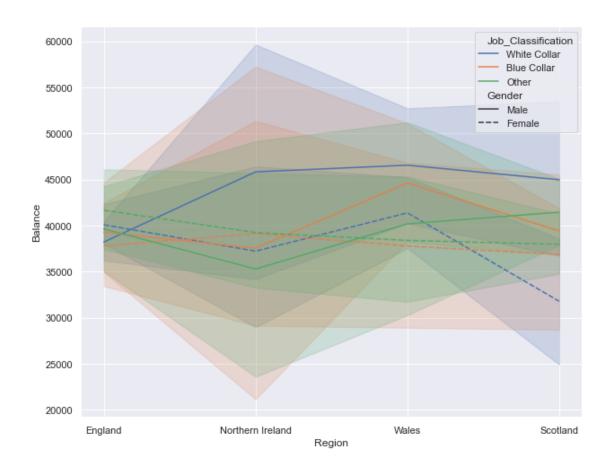
| [91]: sta | ats | | | | | |
|-----------|-------------|---------|---------|--------|-----|------------------|
| [91]: | Customer_ID | Name | Surname | Gender | Age | Region \ |
| 0 | 10000001 | Simon | Walsh | Male | 21 | England |
| 1 | 40000002 | Jasmine | Miller | Female | 34 | Northern Ireland |
| 2 | 10000003 | Liam | Brown | Male | 46 | England |
| 3 | 30000004 | Trevor | Parr | Male | 32 | Wales |
| 4 | 100000005 | Deirdre | Pullman | Female | 38 | England |
| ••• | ••• | ••• | | | | *** |

```
4009
                          {\tt Sam}
        200004010
                                  Lewis
                                           Male
                                                   64
                                                                Scotland
4010
                        Keith
                                 Hughes
                                            Male
                                                   52
                                                                Scotland
        200004011
4011
        200004012
                       Hannah
                               Springer
                                         Female
                                                   50
                                                                Scotland
4012
        200004013 Christian
                                   Reid
                                                   51
                                                                Scotland
                                            Male
4013
        300004014
                      Stephen
                                    May
                                            Male
                                                   33
                                                                   Wales
     Job_Classification Date_Joined
                                        Balance
0
           White Collar
                           05.Jan.15
                                     113810.15
            Blue Collar
                           06.Jan.15
1
                                       36919.73
2
           White Collar
                           07.Jan.15 101536.83
           White Collar
                           08.Jan.15
3
                                        1421.52
4
            Blue Collar
                           09.Jan.15
                                       35639.79
4009
                           30.Dec.15
                  Other
                                       19711.66
4010
            Blue Collar
                           30.Dec.15
                                       56069.72
4011
                  Other
                           30.Dec.15
                                       59477.82
4012
            Blue Collar
                           30.Dec.15
                                         239.45
4013
            Blue Collar
                           30.Dec.15
                                       30293.19
[4014 rows x 9 columns]
```

```
[92]: sns.set theme(style="whitegrid") #ticks
      sns.
       →lmplot(data=stats,x="Age",y="Balance",col="Region",hue="Region",col_wrap=2,ci=None,palette=
                scatter_kws={"s":50,"alpha":1})
      plt.show()
```

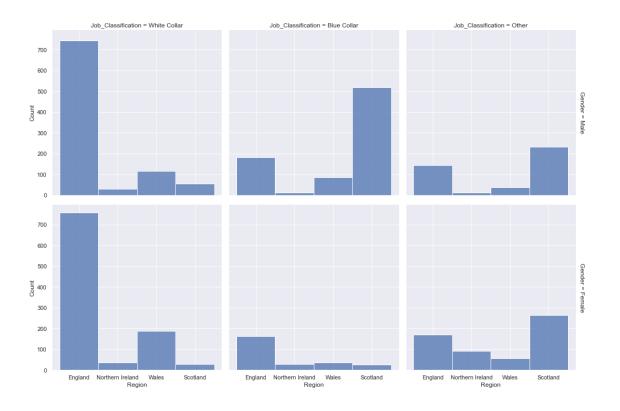


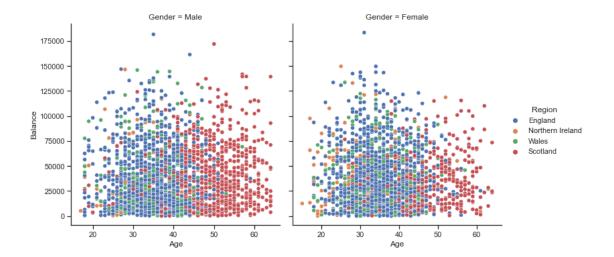




```
[95]: sns.

displot(data=stats,x="Region",col="Job_Classification",row="Gender",binwidth=3,
height=5,\
facet_kws=dict(margin_titles=True),)
plt.show()
```





```
[102]: w=range(20),5
[103]: w
[103]: (range(0, 20), 5)
[109]: l=range(0,20,4)
[111]: print(1)
         range(0, 20, 4)
[112]: import numpy as np
         np.arange(0,20,4)
[112]: array([ 0,  4,  8, 12, 16])
[ ]:
```