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    "Glucose = resultado en prueba de glucosa; variable cuantitativa discreta\n",
    "Outcome = 0 y 1; donde \"0\" indica un paciente sano y \"1\" indica un paciente diabético;
variable cuantitativa discreta"
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    "df = pd.read_csv(\"diabetes.csv\")"
```

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           \n",
    •
           Pregnancies\n",
           Glucose\n",
           BloodPressure\n",
    п
           SkinThickness\n",
    •
           Insulin\n",
           BMI\n",
           DiabetesPedigreeFunction\n",
    •
           Age\n",
           Outcome\n",
         \n",
       </thead>\n",
       \n",
         \langle tr \rangle \langle n'',
```

```
0\n",
..
    6\n",
ш
    148\n",
    72\n",
    35\n",
    0\n",
•
    33.6\n",
    0.627\n",
    50\n",
•
    1\n",
•
   \n",
   \n",
    1\n",
п
    1\n",
•
    85\n",
    66\n",
"
    29\n",
•
    0\n",
•
    26.6\n"
    0.351\n",
    31\n",
ш
    0\n",
   \n",
   \n",
...
    2\n",
•
    8\n",
    183\n",
    64\n",
•
    0\n",
•
    0\n",
    23.3\n",
    0.672\n",
•
    32\n",
•
    1\n",
   \n",
   \n",
п
    3\n",
•
    1\n",
    89\n",
•
    66\n",
•
    23\n",
...
    94\n",
    28.1\n"
...
    0.167\n",
•
    21\n",
"
    0\n",
   \n",
•
    n",
ш
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    0\n",
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•
    40\n",
•
    35\n",
    168\n",
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•
    2.288\n",
•
    33\n",
    1\n",
   \n",
  \n",
"\n",
"</div>"
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  Pregnancies Glucose BloodPressure SkinThickness Insulin
                                      BMI \\\n",
```

```
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                       148
                                      72
                                                                33.6
                                                                       \n",
    "1
                                                                       \n",
                 1
                        85
                                                    29
                                                             0 26.6
                                      66
    "2
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                 8
                                                     0
                                                                23.3
                       183
                                      64
                                                             0
    "3
                                                                       \n",
                                                    23
                                                                28.1
                 1
                        89
                                      66
                                                            94
    "4
                                                                       \n",
                       137
                                      40
                                                    35
                                                           168 43.1
    "\n",
    11
        DiabetesPedigreeFunction
                               Age Outcome \n",
    "0
                                50
                                             \n",
    "1
                                             \n",
                         0.351
                                31
                                          0
    "2
                                            \n",
                         0.672
                                32
                                          1
    "3
                                             \n",
                         0.167
                                 21
                                          0
    "4
                         2.288
                                 33
                                          1
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    "\n",
         .dataframe thead th {\n",
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            text-align: right;\n",
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    "</style>\n",
    "\n",
       <thead>\n",
    ...
         \n",
           \n",
           Pregnancies\n",
    •
           Glucose\n",
    •
           BloodPressure\n",
           SkinThickness\n",
           Insulin\n",
    •
           BMI\n",
    •
           DiabetesPedigreeFunction\n",
           Age\n",
           Outcome\n",
    •
         \n",
       </thead>\n",
       \n",
    ...
         \langle tr \rangle \langle n'',
    ..
           763\n",
          10\n",
```

```
101\n",
..
     76\n",
ш
     48\n"
     180\n"
     32.9\n".
..
     0.171\n",
•
     63\n",
     0\n",
    \n",
•
    \langle tr \rangle \langle n'',
•
     764\n",
"
     2\n",
     122\n",
п
     70\n",
•
     27\n",
     0\n",
"
     36.8\n"
•
     0.340\n",
•
     27\n",
     0\n",
"
    \n",
ш
    \langle tr \rangle \ n''
     765\n",
     5\n",
...
     121\n",
•
     72\n",
...
     23\n",
     112\n"
•
     26.2\n"
•
     0.245\n",
     30\n",
     0\n",
•
    \n",
•
    \langle tr \rangle \langle n'',
     766\n",
     1\n",
п
     126\n",
•
     60\n",
     0\n",
...
     0\n",
•
     30.1\n",
...
     0.349\n",
"
     47\n",
"
     1\n",
•
    \n",
"
    \langle tr \rangle \backslash n''
     767\n",
...
     1\n",
ш
     93\n"
     70\n",
     31\n",
•
     0\n",
•
     30.4\n",
     0.315\n",
     23\n",
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              Glucose
                    BloodPressure SkinThickness
                                          Insulin
                                                 BMI
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                                             180
                                                      \n",
                 101
                                       48
                                                32.9
           10
"764
                                                      \n",
                            70
                                       27
                 122
                                              0
                                                36.8
```

```
72
                                                                                   \n",
                       5
                              121
                                                                       112 26.2
       "766
                                                                                   \n",
                       1
                              126
                                               60
                                                               0
                                                                         0 30.1
       "767
                               93
                                               70
                                                                         0 30.4
                                                                                   n",
                       1
                                                              31
             DiabetesPedigreeFunction Age Outcome
                                                      \n",
                                                      \n",
       "763
                                 0.171
                                        63
                                                   0
       "764
                                                      \n",
                                0.340
                                         27
                                                   0
       "765
                                                   0 \n",
                                 0.245
                                         30
       "766
                                 0.349
                                         47
                                                      \n",
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       "767
                                 0.315
                                         23
                                                   0
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      "Data columns (total 9 columns):\n",
      "#
            Column
                                      Non-Null Count Dtype
      "---
                                                              \n",
            ----
      " 0
            Pregnancies
                                      768 non-null
                                                       int64
                                                              \n"
      " 1
            Glucose
                                      768 non-null
                                                              \n"
                                                       int64
      " 2
            BloodPressure
                                      768 non-null
                                                       int64
      " 3
            SkinThickness
                                      768 non-null
                                                       int64
                                                              \n";
      " 4
            Insulin
                                      768 non-null
                                                       int64
                                                              \n",
      " 5
                                      768 non-null
                                                       float64\n",
      " 6
            DiabetesPedigreeFunction
                                      768 non-null
                                                       float64\n",
     " 7
            Age
                                                       int64 \n",
                                       768 non-null
      " 8
            Outcome
                                       768 non-null
                                                       int64 n,
      "dtypes: float64(2), int64(7)\n",
      "memory usage: 54.1 KB\n"
     ]
   }
   ],
    "#Revisa la información mas completa del conjunto de datos usando la función info()\n",
    "#Muestra el total de datos, las columnas y su tipo correspondiente, dice si contiene nulos o
no\n",
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    "BloodPressure
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    "Insulin
                                186\n",
    "BMI
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                                517\n",
    "DiabetesPedigreeFunction
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    "Outcome
                                  2\n",
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 "df.nunique()"
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             vertical-align: top;\n",
    ...
         }\n",
    "\n",
         .dataframe thead th {\n",
    •
             text-align: right; \n",
         }\n",
    "</style>\n",
    "\n",
      <thead>\n",
         \n",
```

```
\n",
..
    Pregnancies\n",
...
    Glucose\n",
    BloodPressure\n",
    SkinThickness\n",
    Insulin\n",
...
    BMI\n",
    DiabetesPedigreeFunction\n",
    Age\n",
•
    Outcome\n",
   \n",
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•
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•
    768.000000\n'
    768.000000\n"
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ш
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•
   \n",
ш
   <tr>\n",
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    120.894531\n",
•
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    20.536458\n",
    79.799479\n",
п
    31.992578\n",
•
    0.471876\n",
    33.240885\n"
    0.348958\n",
п
   \n",
   \n",
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    3.369578\n",
•
    31.972618\n"
...
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    15.952218\n"
    115.244002\n",
•
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    0.331329\n",
    11.760232\n",
•
    0.476951\n",
ш
   \n",
   \n",
    min\n",
    0.000000\n",
"
    0.000000\n",
    0.000000\n",
    0.000000\n",
п
    0.000000\n"
•
    0.000000\n"
    0.078000\n"
    21.000000\n",
п
    0.000000\n",
   \n",
   \langle tr \rangle \langle n"
    25%\n",
...
    1.000000\n",
    99.000000\n",
```

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...
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       27.300000\n"
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•
       24.000000\n",
•
       0.000000
     \n",
     \n"
•
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...
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       117.000000\n",
       72.000000\n",
•
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"
       30.500000\n",
       32.000000\n",
••
       0.372500\n"
...
       29.000000\n"
•
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     \n",
..
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...
       32.000000\n"
..
       127.250000\n",
       36.600000\n",
•
       0.626250\n"
"
       41.000000\n",
       1.000000
     \n",
•
      n",
...
       max\n",
       17.000000\n"
      199.000000\n"
•
      122.000000\n",
"
       99.000000\n",
       846.000000\n",
...
       67.100000\n",
...
       2.420000\n",
..
       81.000000\n",
      1.000000\n",
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   \n",
"\n",
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                                          SkinThickness
       Pregnancies
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                                                          Insulin
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                   120.894531
                                 69.105469
                                              20.536458
                                                        79.799479
"std
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                   31.972618
                                 19.355807
                                              15.952218
                                                        115.244002
"min
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                    0.000000
                                  0.000000
                                               0.000000
                                                         0.000000
                                                                   \n"
"25%
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                   99.000000
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                                               0.000000
                                                         0.000000
"50%
                                                                   \n",
          3.000000
                   117.000000
                                 72.000000
                                              23.000000
                                                         30.500000
"75%
                                                                   \n",
          6.000000
                   140.250000
                                 80.000000
                                              32.000000
                                                        127.250000
"max
         17.000000
                   199.000000
                                122.000000
                                              99.000000
                                                        846.000000
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"\n",
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             BMI
                  DiabetesPedigreeFunction
                                                      Outcome
                                               Age
"count
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                              768.000000
                                         768.000000
                                                   768.000000
"mean
        31.992578
                                0.471876
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                                                     0.348958
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                                                     0.476951
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"std
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                                         11.760232
"min
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```

```
"50%
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     "75%
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     "Glucose
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     "BloodPressure
                                   0\n",
     "SkinThickness
     "Insulin
                                   0\n",
                                   0\n",
                                   0\n",
     "DiabetesPedigreeFunction
                                   0\n",
     "Age
     "Outcome
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 }
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"source": [
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             145, 117, 109, 158, 88, 92, 122, 138, 102, 90, 111, 180, 133,\n",
    11
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     "
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     ш
             152, 104, 87, 75, 179, 130, 194, 181, 135, 184, 140, 177, 164,\n"
             91, 165, 86, 193, 191, 161, 167, 77, 182, 157, 178, 61, 98,\n",
     ..
             127, 82, 72, 172, 94, 175, 195, 68, 186, 198, 121, 67, 174,\n",
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 "#Revisar valores únicos por columna usando función unique(): nombre-columna.unique()\n",
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 "\n",
  "### Medidas de tendencia central\n"
```

```
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    "Median_pregnancies: 3.0\n",
    "Mode_pregnancies: 0
                            1\n",
    "Name: Pregnancies, dtype: int64\n"
   ]
 }
 ],
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 "#Pregnancies\n",
  "#Se puede obtener la media, mediana y moda para\n",
  "mean_pregnancies = df['Pregnancies'].mean()\n",
  "median_pregnancies = df['Pregnancies'].median()\n",
  "mode pregnancies = df['Pregnancies'].mode()\n",
  "print(\"Mean_pregnancies:\",mean_pregnancies)\n"
  "print(\"Median_pregnancies:\", median_pregnancies)\n",
  "print(\"Mode_pregnancies:\",mode_pregnancies)"
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  "El promedio de embarazos fue de 3 \n",
  "La cantidad de embarazos al centro es 3 \n",
  "La cantidad de embarazos más repetida fue de 0 y 1"
 ]
},
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   "text": [
    "Mean_glucose: 120.89453125\n",
    "Median_glucose: 117.0\n",
    "Mode_glucose: 0
          100\n",
    "Name: Glucose, dtype: int64\n"
   ]
 }
],
"source": [
```

```
"#Glucose\n",
 "#Se puede obtener la media, mediana y moda para\n",
  "mean_glucose = df['Glucose'].mean()\n",
  "median_glucose = df['Glucose'].median()\n",
  "mode_glucose = df['Glucose'].mode()\n",
  "print(\"Mean_glucose:\",mean_glucose)\n"
 "print(\"Median_glucose:\",median_glucose)\n",
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  "La glucosa más repetida fue de 0, 1, 99 y 100"
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    "Median_outcome: 0.0\n",
   "Mode_outcome: 0
                        0\n",
   "Name: Outcome, dtype: int64\n"
  ]
 }
 ],
"source": [
 "#Outcome\n",
  "#Se puede obtener la media, mediana y moda para\n",
 "mean_outcome = df['Outcome'].mean()\n",
  "median outcome = df['Outcome'].median()\n",
  "mode outcome = df['Outcome'].mode()\n",
  "print(\"Mean_outcome:\",mean_outcome)\n";
  "print(\"Median_outcome:\",median_outcome)\n",
  "print(\"Mode outcome:\",mode outcome)"
},
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"Conclusiones:\n",
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 "El resultado al centro es 0 \n",
 "El resultado más repetido fue de 0"
]
},
```

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    "Cabe mencionar que, en las discusiones en Kaggle, se menciona que el dato \"0\" significa que el
paciente es sano y el dato \"1\" significa que el paciente tiene diabetes. Por lo tanto, la mayoría
de los datos indican un paciente sano."
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   "# Variables Categóricas"
   ]
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   "outputs": [
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       "1
              135\n",
       "0
              111\n",
       "2
              103\n",
       "3
              75\n",
       "4
               68\n",
       "5
               57\n",
       "6
               50\n",
       "7
               45\n",
       "8
               38\n",
       "9
               28\n",
       "10
               24\n",
       "11
               11\n"
       "13
               10\n"
       "12
                9\n"
                2\n",
       "14
       "15
                1\n",
      "17
                1\n",
       "Name: count, dtype: int64"
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     "output_type": "execute_result"
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   ],
   "source": [
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"# nombreDataframe['columna'].value_counts()\n",
    "df.Pregnancies.value_counts()"
  ]
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"outputs": [
 {
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    "text/plain": [
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     "99
             17\n"
     "100
             17\n"
     "111
             14\n",
             14\n",
     "129
     "125
             14\n",
              ..\n",
     "191
              1\n",
     "177
              1\n",
     "44
              1\n"
     "62
              1\n"
     "190
              1\n",
     "Name: count, Length: 136, dtype: int64"
    ]
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  "df.Glucose.value_counts()"
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     "1
           268\n",
     "Name: count, dtype: int64"
    ]
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   "metadata": {},
   "output_type": "execute_result"
  }
 ],
 "source": [
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  "# nombreDataframe.columna.value_counts()\n",
  "# nombreDataframe['columna'].value_counts()\n",
  "df.Outcome.value_counts()"
```

```
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   },
"outputs": [
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               135\n",
       "0
               111\n",
       "2
               103\n",
       "3
                75\n",
       "4
                68\n",
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                57\n",
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                50\n",
       "7
                45\n",
       "8
                38\n",
       "9
                28\n",
       "10
                24\n",
       "11
                11\n"
       "13
                10\n"
       "12
                 9\n",
       "14
                 2\n"
       "15
                 1\n",
       "17
                 1\n",
       "Name: count, dtype: int64"
      ]
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\n",
    "# nombreDataframe.columna.value_counts()\n",
    "# nombreDataframe['columna'].value_counts()\n",
"df[\"Pregnancies\"].value_counts()"
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  "data": {
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       "Glucose\n",
       "99
                17\n",
       "100
                17\n",
       "111
                14\n",
       "129
                14\n",
       "125
                14\n"
                ..\n",
       "191
                 1\n",
```

```
"177
                1\n",
       "44
                1\n",
       "62
                1\n"
       "190
                1\n",
       "Name: count, Length: 136, dtype: int64"
     },
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   "# nombreDataframe.columna.value_counts()\n",
    "# nombreDataframe['columna'].value_counts()\n",
    "df[\"Glucose\"].value_counts()"
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  },
"outputs": [
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       "Outcome\n",
             500\n",
       "0
       "1
             268\n",
       "Name: count, dtype: int64"
     },
     "execution_count": 29,
     "metadata": {},
     "output_type": "execute_result"
   }
   ],
   "source": [
    "#Para conteo de cada valor en una columna, en orden descendente usar función value counts():
\n",
   "# nombreDataframe.columna.value_counts()\n",
    "# nombreDataframe['columna'].value counts()\n",
    "df[\"Outcome\"].value counts()"
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    "# Crear variable totalPregDiabetic que incluya la suma de las columnas Pregnancies y Outcome con
valor \"1\"\n",
    "# Mostrar el total por cada tamaño de familia\n",
    "conteo_preg = df[\"Pregnancies\"].count()\n",
    "conteo_outcome = (df[\"Outcome\"] == 1).sum()\n",
"df[\"totalPregDiabetic\"] = df[\"Pregnancies\"] + (df[\"Outcome\"] == 1).astype(int)"
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Insulin BMI \\\n",
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                                                                                          \n",
                                 148
                                                   72
                                                                               0
                                                                                  33.6
                         6
        "1
                         1
                                  85
                                                   66
                                                                    29
                                                                               0
                                                                                  26.6
                                                                                          \n"
        "2
                         8
                                 183
                                                   64
                                                                     0
                                                                               0
                                                                                  23.3
                                                                                          \n",
       "3
                                                                    23
                                                                             94 28.1
                                                                                          \n",
                         1
                                                   66
                                  89
       "4
                                                                             168 43.1
                                                                    35
                                                                                          \n",
                         0
                                 137
                                                   40
       "..
                                                                                          \n"
                                                                                   . . .
                       . . .
                                                  . . .
                                                                   . . .
                                                                             . . .
                                 . . .
       "763
                                                                                          \n"
                        10
                                 101
                                                   76
                                                                   48
                                                                             180 32.9
       "764
                                                                                          \n"
                         2
                                 122
                                                   70
                                                                    27
                                                                               0 36.8
       "765
                                                                                          \n"
                         5
                                 121
                                                   72
                                                                    23
                                                                             112
                                                                                  26.2
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                         1
                                 126
                                                   60
                                                                     0
                                                                                  30.1
                                                                                          \n",
                                                                               0
       "767
                         1
                                  93
                                                   70
                                                                    31
                                                                               0 30.4
                                                                                          \n",
       "\n",
                                                                               \n",
              DiabetesPedigreeFunction
                                           Age Outcome
                                                          totalPregDiabetic
       "0
                                   0.627
                                            50
                                                       1
                                                                                \n",
       "1
                                   0.351
                                                                                \n"
                                            31
                                                       0
                                                                             1
       "2
                                   0.672
                                                                                \n"
                                            32
                                                       1
                                                                             9
       "3
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                                   0.167
                                            21
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       "765
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                                            47
                                                       1
       "767
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    "Pregnancies
    "Glucose
                                 148.000\n",
    "BloodPressure
                                 72.000\n"
    "SkinThickness
                                  35.000\n",
    "Insulin
                                  0.000\n",
    "BMI
                                  33.600\n",
    "DiabetesPedigreeFunction
                                  0.627\n",
    "Age
                                  50.000\n",
    "Outcome
                                  1.000\n",
    "totalPregDiabetic
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  "# Acceder a la primera fila\n",
 "df.iloc[0]"
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    "
         }\n",
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             vertical-align: top;\n",
    •
         }\n",
    "\n",
         .dataframe thead th {\n",
             text-align: right;\n",
         }\n",
    "</style>\n",
    "\n",
       <thead>\n",
    ...
         \n",
           </n",
```

```
Pregnancies\n",
..
     Glucose\n",
ш
     BloodPressure\n",
     SkinThickness\n",
     Insulin\n",
...
     BMI\n",
...
     DiabetesPedigreeFunction\n",
     Age\n",
     Outcome\n",
•
     totalPregDiabetic\n",
•
    \n",
  </thead>\n",
  \n",
•
    \n",
•
     0\n",
     6\n",
"
     148\n",
•
     72\n",
•
     35\n",
     0\n",
     33.6\n"
ш
     0.627\n",
...
     50\n",
     1\n",
...
     7\n",
•
    \n",
...
     n",
     1\n",
•
     1\n",
•
     85\n",
     66\n",
     29\n",
•
     0\n",
•
     26.6\n",
     0.351\n",
     31\n",
п
     0\n",
•
     1\n",
    \n",
...
    \n",
•
     2\n",
...
     8\n",
     183\n",
...
     64\n",
•
     0\n",
"
     0\n",
     23.3\n",
...
     0.672\n",
ш
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...
     1\n",
     9\n",
    \n",
  \n",
"\n",
"</div>"
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            Glucose
                  BloodPressure SkinThickness
                                        Insulin
                                               BMI
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               148
                          72
                                     35
                                            0
                                              33.6
                                                   \n",
"1
          1
                                     29
                                            0
                                                    \n",
                85
                          66
                                              26.6
"2
          8
               183
                          64
                                      0
                                              23.3
                                                   \n",
"\n"
                                             \n",
   DiabetesPedigreeFunction
                     Age Outcome totalPregDiabetic
"0
                                             \n",
                      50
                             1
                                           7
                0.627
"1
                             0
                0.351
                                           1 \n",
```

```
0.672
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    •
        }\n",
    "\n",
        .dataframe thead th {\n",
    11
            text-align: right;\n",
    •
        }\n",
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    "\n",
      <thead>\n",
        \n",
          \n",
          Pregnancies\n",
    •
          Glucose\n",
        \n",
      </thead>\n",
      \n",
    ш
        \langle tr \rangle \ n''
    ...
          0\n",
          6\n",
    ...
          148\n",
    ш
        \n",
         n",
          1\n",
    ...
          1\n",
    •
          85\n",
        \n",
        \langle tr \rangle \langle n"
    •
          2\n",
    •
          8\n",
    "
          183\n",
        \n",
    •
        \n",
    •
          3\n",
    "
          1\n",
    "
          89\n",
    ...
        \n",
        \langle tr \rangle \langle n"
```

```
4\n",
   ..
         0\n",
   ...
         137\n",
   ...
       \n",
       \n",
   ...
         \...\n",
   •
         \td>\\n",
         \td>\\n",
       \n",
   •
       \langle tr \rangle \langle n'',
   •
         763\n",
   "
         10\n",
         101\n",
   •
       \n",
   "
       \langle tr \rangle \ n'',
         764\n",
   "
         2\n",
   •
         122\n",
   •
       \n",
       \n",
         765\n",
   ...
         5\n",
   ...
         121\n",
       \n",
   ...
       \n",
   ш
         766\n",
   ...
         1\n",
         126\n",
   •
       \n",
   •
       \langle tr \rangle \langle n'',
         767\n",
         1\n",
   11
         93\n",
       \n",
     \n",
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                 6
   "1
                        85\n",
                 1
   "2
                 8
                        183\n",
   "3
                        89\n",
                 1
   "4
                 0
                        137\n",
                        ...\n",
                . . .
   "763
                10
                        101\n",
   "764
                        122\n",
                 2
   "765
                        121\n",
                 5
                        126\n",
   "766
                 1
   "767
                 1
                        93\n",
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  ]
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"df[[\"Pregnancies\", \"Glucose\"]]"
```

```
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        }\n",
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    "\n",
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        \n",
    •
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    "528
                                                                        188 30.8
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                                                               31
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                                              66
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                                                                        210 22.1
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                                               62
                                                               17
                                                                                     \n"
    "506
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                                               90
                                                               26
                                                                         90 36.5
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                                              78
                                                               32
                                                                        265 46.5
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..
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"595
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                              82
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            0
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                                         44
                                               510 43.3
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     DiabetesPedigreeFunction
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