Sprint 1

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```
[1]: %matplotlib inline
```

```
[2]: #IMPORT REQUIRED LIBRARIES
     import pandas as pd
     import numpy as np
     import matplotlib.pyplot as plt
     import seaborn as sns
     import warnings

     warnings.filterwarnings('ignore')
```

```
[3]: #import dataset and load in dataframe
     df=pd.read_csv('chronickidneydisease.csv')
     df.head()
```

```
[3]:    id   age    bp     sg   al   su     rbc        pc         pcc          ba  \
     0   0  48.0  80.0  1.020  1.0  0.0     NaN    normal  notpresent  notpresent
     1   1   7.0  50.0  1.020  4.0  0.0     NaN    normal  notpresent  notpresent
     2   2  62.0  80.0  1.010  2.0  3.0  normal    normal  notpresent  notpresent
     3   3  48.0  70.0  1.005  4.0  0.0  normal  abnormal     present  notpresent
     4   4  51.0  80.0  1.010  2.0  0.0  normal    normal  notpresent  notpresent

        …  pcv    wc   rc  htn   dm  cad appet   pe  ane classification
     0  …   44  7800  5.2  yes  yes   no  good   no   no            ckd
     1  …   38  6000  NaN   no   no   no  good   no   no            ckd
     2  …   31  7500  NaN   no  yes   no  poor   no  yes            ckd
     3  …   32  6700  3.9  yes   no   no  poor  yes  yes            ckd
     4  …   35  7300  4.6   no   no   no  good   no   no            ckd

     [5 rows x 26 columns]
```

```
[4]: #dataset adjustment
     df['classification']=df['classification'].replace(['ckd\t'],['notckd'])
```

```
[5]: df['classification'].value_counts()
```

```
[5]: ckd       248
     notckd    152
     Name: classification, dtype: int64
```

```
[6]: #checking the description and gathering the information about the dataset
     df.describe().T
```

```
[6]:       count        mean         std     min     25%     50%     75%      max
     id    400.0  199.500000  115.614301   0.000   99.75  199.50  299.25  399.000
     age   391.0   51.483376   17.169714   2.000   42.00   55.00   64.50   90.000
     bp    388.0   76.469072   13.683637  50.000   70.00   80.00   80.00  180.000
     sg    353.0    1.017408    0.005717   1.005    1.01    1.02    1.02    1.025
     al    354.0    1.016949    1.352679   0.000    0.00    0.00    2.00    5.000
     su    351.0    0.450142    1.099191   0.000    0.00    0.00    0.00    5.000
     bgr   356.0  148.036517   79.281714  22.000   99.00  121.00  163.00  490.000
     bu    381.0   57.425722   50.503006   1.500   27.00   42.00   66.00  391.000
     sc    383.0    3.072454    5.741126   0.400    0.90    1.30    2.80   76.000
     sod   313.0  137.528754   10.408752   4.500  135.00  138.00  142.00  163.000
     pot   312.0    4.627244    3.193904   2.500    3.80    4.40    4.90   47.000
     hemo  348.0   12.526437    2.912587   3.100   10.30   12.65   15.00   17.800
```

```
[7]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 400 entries, 0 to 399
Data columns (total 26 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   id              400 non-null    int64
 1   age             391 non-null    float64
 2   bp              388 non-null    float64
 3   sg              353 non-null    float64
 4   al              354 non-null    float64
 5   su              351 non-null    float64
 6   rbc             248 non-null    object
 7   pc              335 non-null    object
 8   pcc             396 non-null    object
 9   ba              396 non-null    object
 10  bgr             356 non-null    float64
 11  bu              381 non-null    float64
 12  sc              383 non-null    float64
 13  sod             313 non-null    float64
 14  pot             312 non-null    float64
 15  hemo            348 non-null    float64
 16  pcv             330 non-null    object
 17  wc              295 non-null    object
 18  rc              270 non-null    object
 19  htn             398 non-null    object
 20  dm              398 non-null    object
 21  cad             398 non-null    object
 22  appet           399 non-null    object
 23  pe              399 non-null    object
 24  ane             399 non-null    object
 25  classification  400 non-null    object
dtypes: float64(11), int64(1), object(14)
memory usage: 81.4+ KB
```

[8]:

```
#counting for the null values
df.isna().sum()
```

[8]:

```
id                  0
age                 9
bp                 12
sg                 47
al                 46
su                 49
rbc               152
pc                 65
pcc                 4
ba                  4
bgr                44
bu                 19
sc                 17
sod                87
pot                88
hemo               52
pcv                70
wc                105
rc                130
htn                 2
dm                  2
cad                 2
appet               1
pe                  1
ane                 1
classification      0
dtype: int64
```

[9]:

```
#replacing the null values with median and mode
oc=[]#object data type columns
ic=[]#int type columns

for i in df.columns:
    if(df[i].dtype=='object'):
        oc.append(i)
    else:
        ic.append(i)
print("ic\t",ic,"\noc\t",oc)
```

```
ic       ['id', 'age', 'bp', 'sg', 'al', 'su', 'bgr', 'bu', 'sc', 'sod', 'pot',
'hemo']
oc       ['rbc', 'pc', 'pcc', 'ba', 'pcv', 'wc', 'rc', 'htn', 'dm', 'cad',
'appet', 'pe', 'ane', 'classification']
```

[10]:

```
#replacing the null with median
for i in ic:
    if(df[i].isna().any()==True):
        df[i]=df[i].fillna(df[i].median())
    #checking
    print("Attribute "+i+"\t",df[i].isna().sum())
```

```
Attribute id     0
Attribute age    0
Attribute bp     0
Attribute sg     0
Attribute al     0
Attribute su     0
Attribute bgr    0
Attribute bu     0
Attribute sc     0
Attribute sod    0
Attribute pot    0
Attribute hemo   0
```

[11]:

```
#replacing the null with mode
for i in oc:
    if(df[i].isna().any()==True):
        df[i]=df[i].fillna(df[i].mode()[0])
    #checking
    print("Attribute:  "+i+"\t\t\t",df[i].isna().sum())
```

```
Attribute: rbc                  0
Attribute: pc                   0
Attribute: pcc                  0
Attribute: ba                   0
Attribute: pcv                  0
Attribute: wc                   0
Attribute: rc                   0
Attribute: htn                  0
Attribute: dm                   0
Attribute: cad                  0
Attribute: appet                        0
```

```
Attribute: pe                    0
Attribute: ane                   0
Attribute: classification                       0
```

[12]:
```
df.isna().sum().sum()
```

[12]:
```
0
```

[13]:
```
#encoding labels
from sklearn.preprocessing import LabelEncoder
le=LabelEncoder()#label encoder object
for i in oc:
    df[i]=le.fit_transform(df[i])#label encoding all the object dtypes

df.head(3)
```

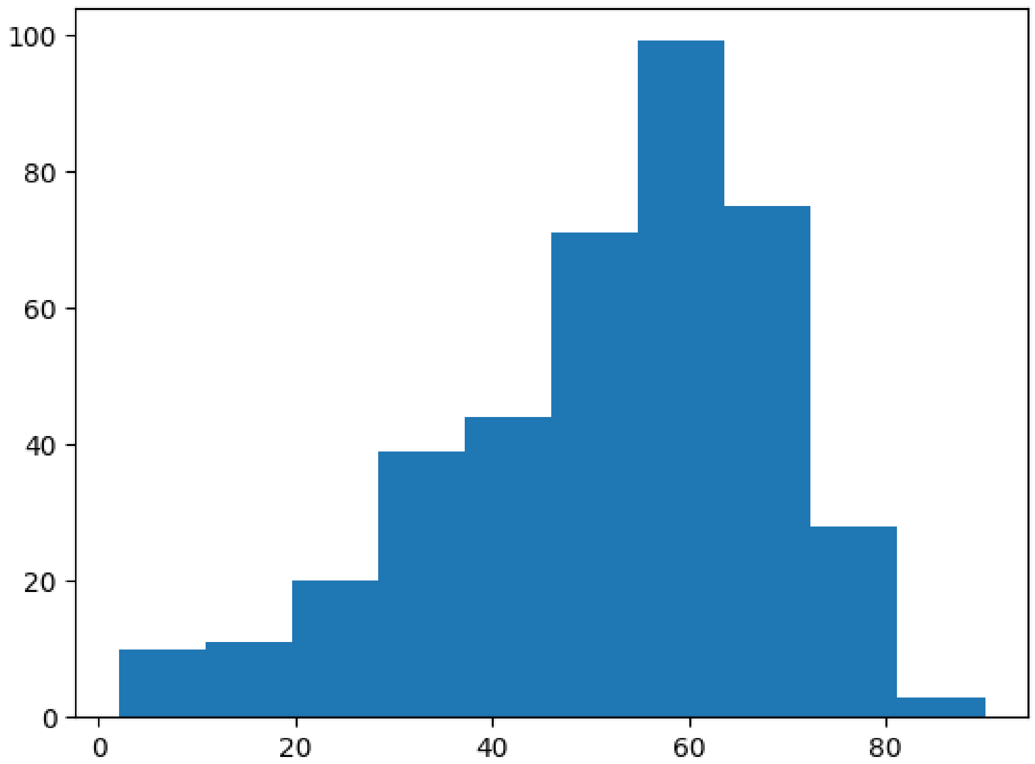
[13]:
```
   id   age    bp    sg   al   su  rbc  pc  pcc  ba  ...  pcv  wc  rc  htn  \
0   0  48.0  80.0  1.02  1.0  0.0    1   1    0   0  ...   32  72  34    1
1   1   7.0  50.0  1.02  4.0  0.0    1   1    0   0  ...   26  56  34    0
2   2  62.0  80.0  1.01  2.0  3.0    1   1    0   0  ...   19  70  34    0

   dm  cad  appet  pe  ane  classification
0   4    1      0   0    0               0
1   3    1      0   0    0               0
2   4    1      1   0    1               0

[3 rows x 26 columns]
```

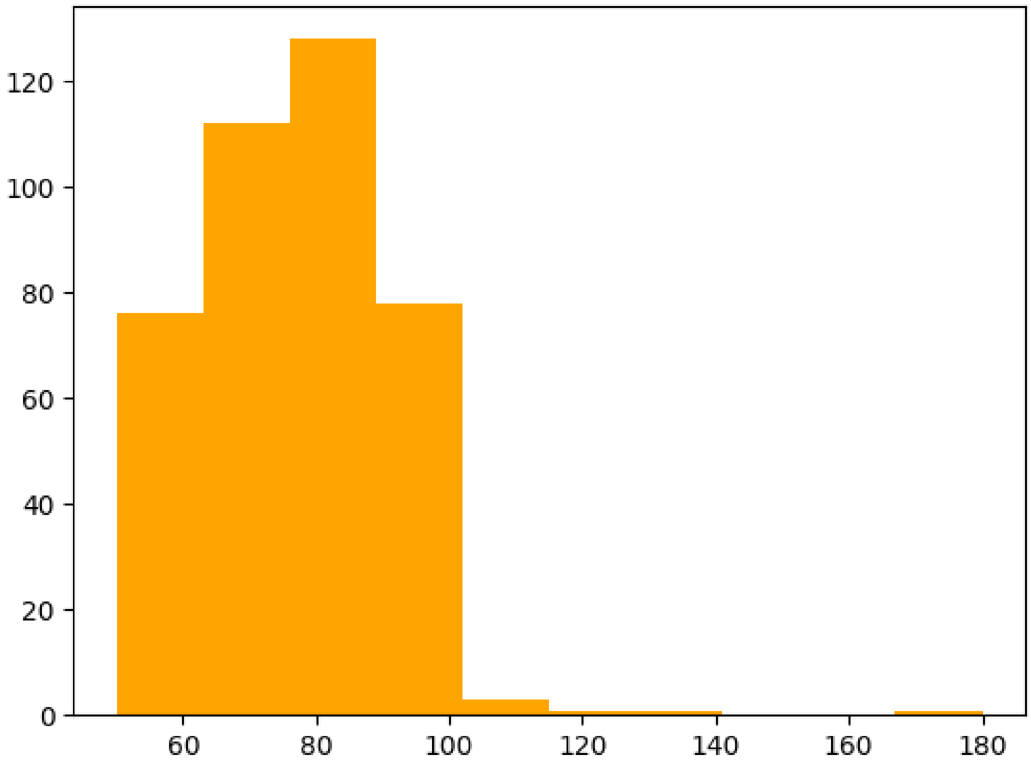
[14]:
```
plt.hist(df['age'])
```

[14]:
```
(array([10., 11., 20., 39., 44., 71., 99., 75., 28.,  3.]),
 array([ 2. , 10.8, 19.6, 28.4, 37.2, 46. , 54.8, 63.6, 72.4, 81.2, 90. ]),
 <BarContainer object of 10 artists>)
```



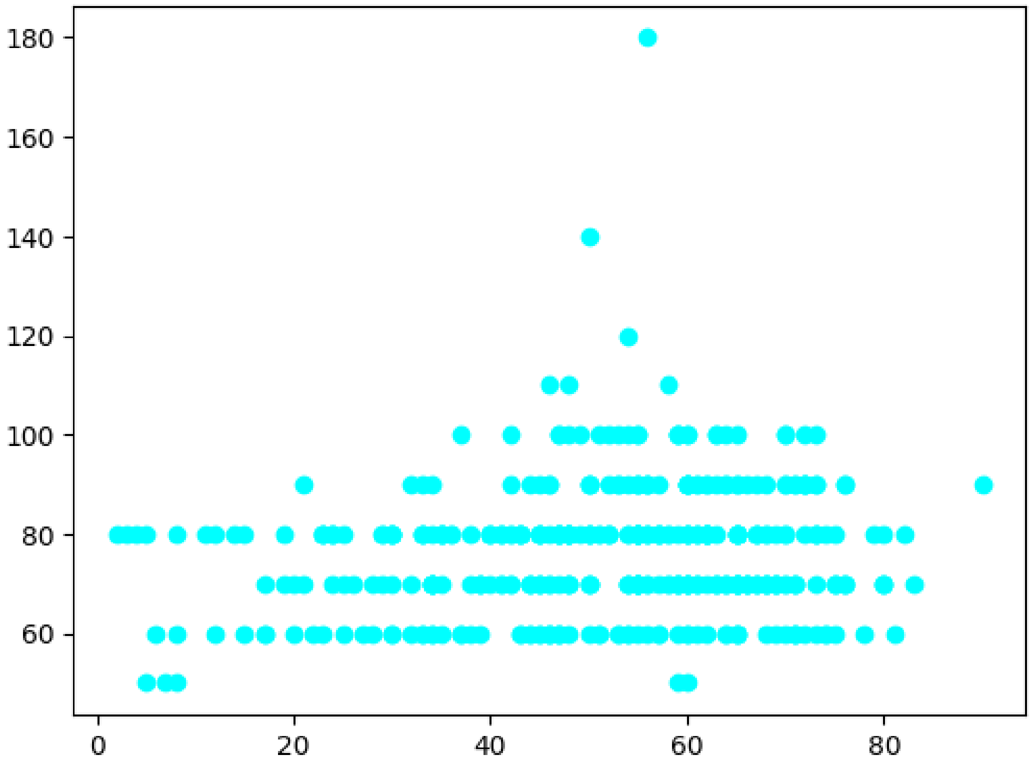
```
[15]: plt.hist(df['bp'],color="orange")
```

```
[15]: (array([ 76., 112., 128.,  78.,   3.,   1.,   1.,   0.,   0.,   1.]),
       array([ 50.,  63.,  76.,  89., 102., 115., 128., 141., 154., 167., 180.]),
       <BarContainer object of 10 artists>)
```



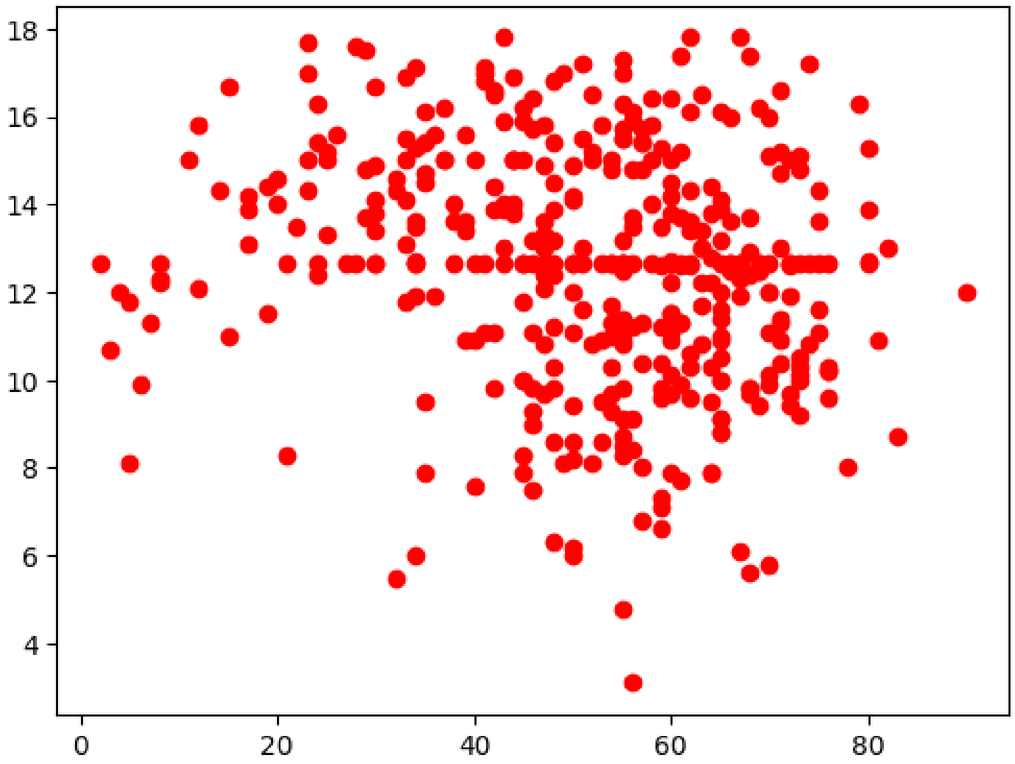
```
[16]: plt.scatter(df['age'],df['bp'],color="cyan")
```

```
[16]: <matplotlib.collections.PathCollection at 0x7fbe95433a00>
```



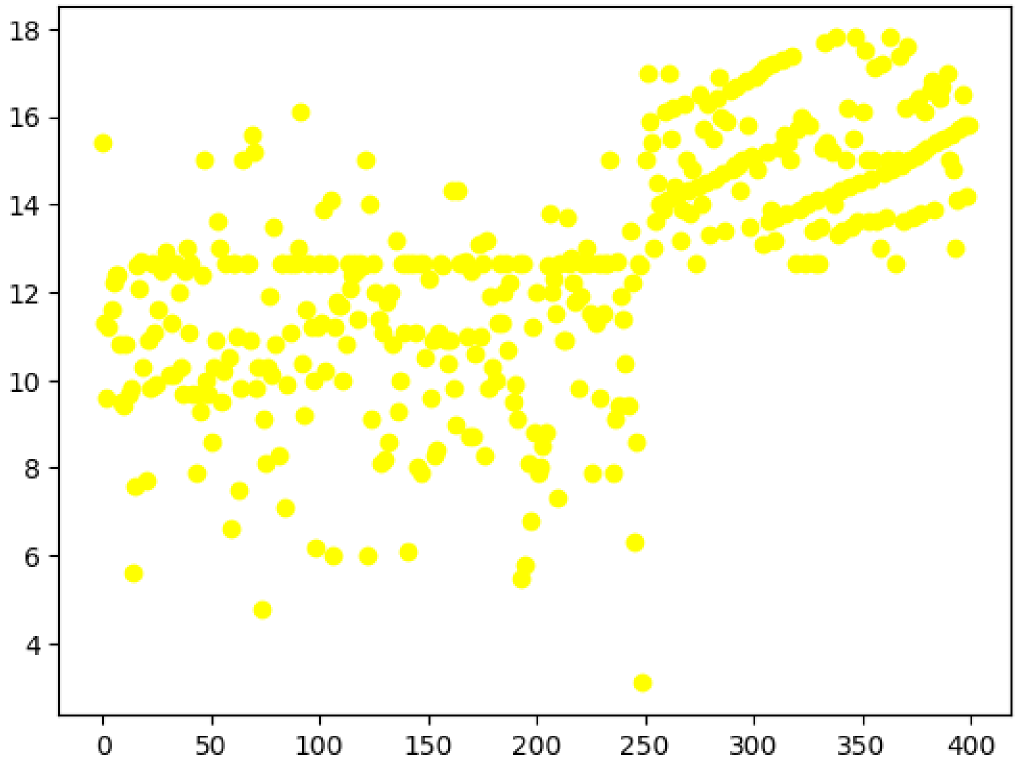
```
[17]: plt.scatter(df['age'],df['hemo'],color='red')
```

```
[17] : <matplotlib.collections.PathCollection at 0x7fbe95269810>
```



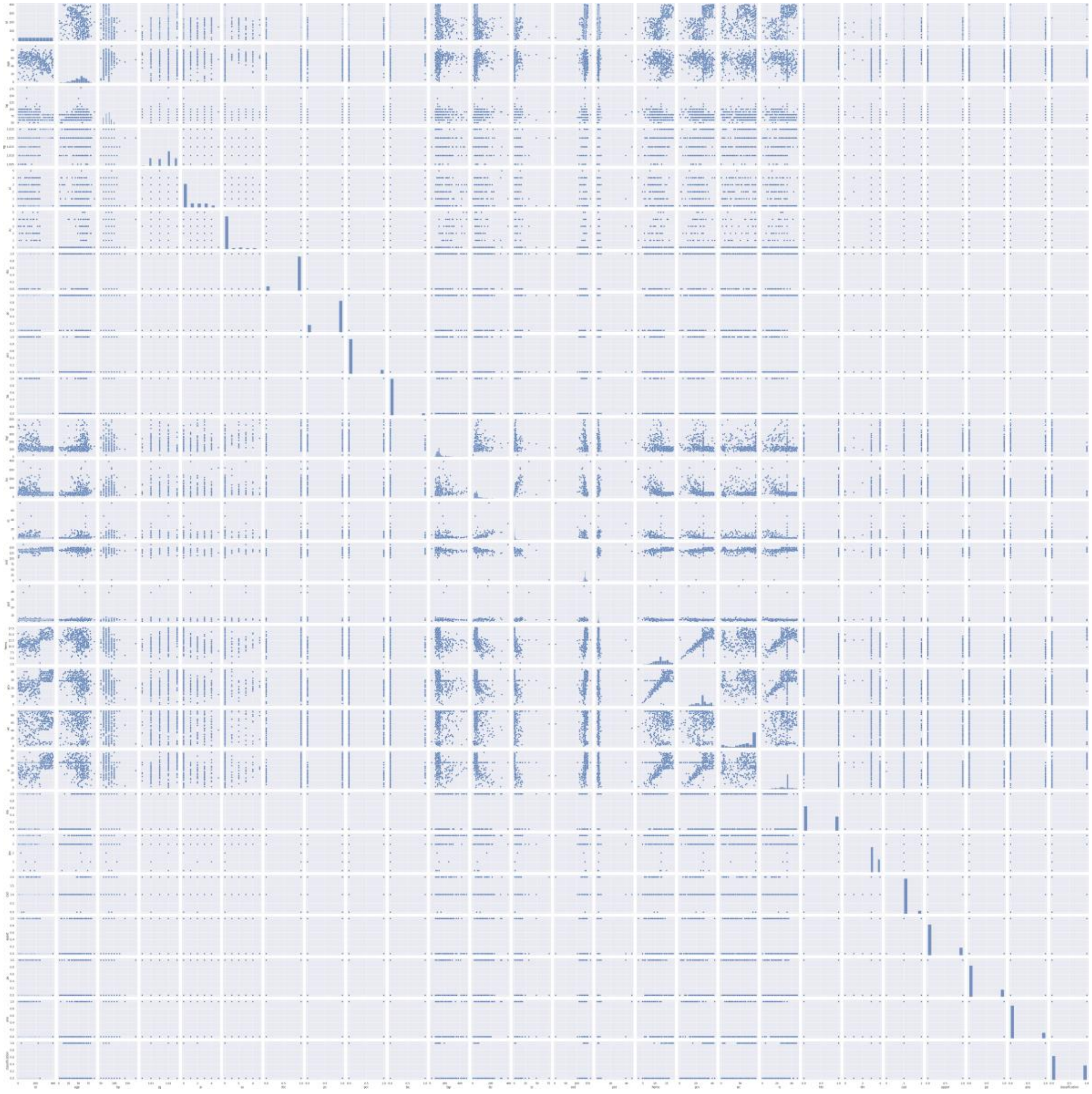
```
[18]: plt.scatter(df[’id’],df[’hemo’],color=″yellow″)
```

```
[18]: <matplotlib.collections.PathCollection at 0x7fbe9532a950>
```



```
[19]: sns.set(rc={'figure.figsize':(13,2)})
      sns.pairplot(df)
```

```
[19]: <seaborn.axisgrid.PairGrid at 0x7fbe952ef2e0>
```


id
age
bp
sg
al
su
rbc
pc
pcc
ba
bgr
bu
sc
sod
pot
hemo
pcv
wc
rc
htn
dm
cad
appet
pe
ane
classification