1) Pengumpulan Data

2) Menelaah Data

```
import pandas as pd
import numpy as np
import re
import itertools
```

Load Data masukkan dataset yang dibutuhkan

```
#dir merupakan variabel yang digunakan untuk menyimpan data yang akan
diproses
dir = 'hungarian.data'

#membuka file dengan path atau nama file yang disimpan dalam variabel
dir.
with open(dir, encoding='Latin1') as file:
  #membaca setiap baris, menghapus whitespace di awal dan akhir setiap
baris, dan menyimpannya dalam list lines.
  lines = [line.strip() for line in file]
#Kemudian, 10 baris pertama dari list tersebut dicetak.
lines[0:10]
```

```
['1254 0 40 1 1 0 0',
 '-9 2 140 0 289 -9 -9 -9',
 '0 -9 -9 0 12 16 84 0',
 '0 0 0 0 150 18 -9 7',
 '172 86 200 110 140 86 0 0',
 '0 -9 26 20 -9 -9 -9 -9',
 '-9 -9 -9 -9 -9 -9 -9 12',
 '20 84 0 -9 -9 -9 -9 -9',
 '-9 -9 -9 -9 -9 1 1 1',
 '1 1 -9. -9. name']
```

```
import itertools

#mengambil setiap kelompok 10 baris dari list lines, menggabungkannya
menjadi satu string, membaginya menjadi list hingga panjang 76
data = itertools.takewhile(
    lambda x: len(x) ==76,
    (' '.join(lines[i:(i+10)]).split() for i in range(0,
len(lines),10))
)
#Hasilnya dimasukkan ke dalam DataFrame.
df = pd.DataFrame.from_records(data)
```

```
#lima baris terakhir dari DataFrame dicetak.
df.tail()
```

```
       0  1   2  3  4  5  6   7  8    9   ...  66   67 68 69 70 71 72
73  \
289  1053  0  48  0  0  0  0  -9  2   -9  ...  -9  -9  1  1  1  1  1
-9.
290  1054  0  36  1  1  0  0  -9  2  120  ...  -9  -9  1  1  1  1  1
-9.
291  5001  0  48  1  0  0  0  -9  3  110  ...  -9  -9  1  1  1  1  1
-9.
292  5000  0  47  0  0  0  0  -9  2  140  ...  -9  -9  1  1  1  1  1
-9.
293  5002  0  53  1  1  1  1  -9  4  130  ...   1   1  1  1  1  1  1
-9.

      74    75
289  -9.  name
290  -9.  name
291  -9.  name
292  -9.  name
293  -9.  name

[5 rows x 76 columns]
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 294 entries, 0 to 293
Data columns (total 76 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   0       294 non-null    object
 1   1       294 non-null    object
 2   2       294 non-null    object
 3   3       294 non-null    object
 4   4       294 non-null    object
 5   5       294 non-null    object
 6   6       294 non-null    object
 7   7       294 non-null    object
 8   8       294 non-null    object
 9   9       294 non-null    object
 10  10      294 non-null    object
 11  11      294 non-null    object
 12  12      294 non-null    object
 13  13      294 non-null    object
 14  14      294 non-null    object
 15  15      294 non-null    object
 16  16      294 non-null    object
 17  17      294 non-null    object
 18  18      294 non-null    object
 19  19      294 non-null    object
 20  20      294 non-null    object
 21  21      294 non-null    object
 22  22      294 non-null    object
 23  23      294 non-null    object
 24  24      294 non-null    object
 25  25      294 non-null    object
 26  26      294 non-null    object
 27  27      294 non-null    object
 28  28      294 non-null    object
 29  29      294 non-null    object
 30  30      294 non-null    object
 31  31      294 non-null    object
 32  32      294 non-null    object
 33  33      294 non-null    object
 34  34      294 non-null    object
 35  35      294 non-null    object
 36  36      294 non-null    object
 37  37      294 non-null    object
 38  38      294 non-null    object
 39  39      294 non-null    object
 40  40      294 non-null    object
 41  41      294 non-null    object
 42  42      294 non-null    object
 43  43      294 non-null    object
 44  44      294 non-null    object
 45  45      294 non-null    object
 46  46      294 non-null    object
 47  47      294 non-null    object
 48  48      294 non-null    object
 49  49      294 non-null    object
 50  50      294 non-null    object
 51  51      294 non-null    object
 52  52      294 non-null    object
 53  53      294 non-null    object
 54  54      294 non-null    object
 55  55      294 non-null    object
 56  56      294 non-null    object
 57  57      294 non-null    object
 58  58      294 non-null    object
 59  59      294 non-null    object
 60  60      294 non-null    object
 61  61      294 non-null    object
 62  62      294 non-null    object
 63  63      294 non-null    object
 64  64      294 non-null    object
 65  65      294 non-null    object
 66  66      294 non-null    object
 67  67      294 non-null    object
 68  68      294 non-null    object
 69  69      294 non-null    object
 70  70      294 non-null    object
 71  71      294 non-null    object
 72  72      294 non-null    object
 73  73      294 non-null    object
 74  74      294 non-null    object
 75  75      294 non-null    object
dtypes: object(76)
memory usage: 174.7+ KB

#menghapus colomn pertama dan terakhir
df = df.iloc[:,:-1]
df = df.drop(df.columns[0], axis=1)
```

mengubah tipe data file daaset menjadi tipe data float sesuai dengan nilai null yaitu -9.0

```
df = df.astype(float)

df.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 294 entries, 0 to 293
Data columns (total 74 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   1       294 non-null    float64
 1   2       294 non-null    float64
 2   3       294 non-null    float64
 3   4       294 non-null    float64
 4   5       294 non-null    float64
 5   6       294 non-null    float64
 6   7       294 non-null    float64
 7   8       294 non-null    float64
 8   9       294 non-null    float64
 9   10      294 non-null    float64
 10  11      294 non-null    float64
 11  12      294 non-null    float64
 12  13      294 non-null    float64
 13  14      294 non-null    float64
 14  15      294 non-null    float64
 15  16      294 non-null    float64
 16  17      294 non-null    float64
 17  18      294 non-null    float64
 18  19      294 non-null    float64
 19  20      294 non-null    float64
 20  21      294 non-null    float64
 21  22      294 non-null    float64
 22  23      294 non-null    float64
 23  24      294 non-null    float64
 24  25      294 non-null    float64
 25  26      294 non-null    float64
 26  27      294 non-null    float64
 27  28      294 non-null    float64
 28  29      294 non-null    float64
 29  30      294 non-null    float64
 30  31      294 non-null    float64
 31  32      294 non-null    float64
 32  33      294 non-null    float64
 33  34      294 non-null    float64
 34  35      294 non-null    float64
 35  36      294 non-null    float64
 36  37      294 non-null    float64
 37  38      294 non-null    float64
 38  39      294 non-null    float64
 39  40      294 non-null    float64
 40  41      294 non-null    float64
 41  42      294 non-null    float64
 42  43      294 non-null    float64
 43  44      294 non-null    float64
 44  45      294 non-null    float64
 45  46      294 non-null    float64
 46  47      294 non-null    float64
 47  48      294 non-null    float64
 48  49      294 non-null    float64
 49  50      294 non-null    float64
 50  51      294 non-null    float64
 51  52      294 non-null    float64
 52  53      294 non-null    float64
 53  54      294 non-null    float64
 54  55      294 non-null    float64
 55  56      294 non-null    float64
 56  57      294 non-null    float64
 57  58      294 non-null    float64
 58  59      294 non-null    float64
 59  60      294 non-null    float64
 60  61      294 non-null    float64
 61  62      294 non-null    float64
 62  63      294 non-null    float64
 63  64      294 non-null    float64
 64  65      294 non-null    float64
 65  66      294 non-null    float64
 66  67      294 non-null    float64
 67  68      294 non-null    float64
 68  69      294 non-null    float64
 69  70      294 non-null    float64
 70  71      294 non-null    float64
 71  72      294 non-null    float64
 72  73      294 non-null    float64
 73  74      294 non-null    float64
dtypes: float64(74)
memory usage: 170.1 KB
```

```
##menganti nilai -9.0 menjadi NaN
df.replace(-9.0, np.nan, inplace=True)

##informasi jumlah NaN dalam setiap DataFrame
df.isnull().sum()
```

```
1       0
2       0
3       0
4       0
5       0
     ...
70      0
71      0
72      0
73    266
74    294
Length: 74, dtype: int64
```

```
df.head()
```

```
    1     2    3    4    5    6   7    8      9    10  ...   65   66
67   68  \
0  0.0  40.0  1.0  1.0  0.0  0.0 NaN  2.0  140.0  0.0  ... NaN  NaN
NaN  1.0
1  0.0  49.0  0.0  1.0  0.0  0.0 NaN  3.0  160.0  1.0  ... NaN  NaN
NaN  1.0
2  0.0  37.0  1.0  1.0  0.0  0.0 NaN  2.0  130.0  0.0  ... NaN  NaN
NaN  1.0
3  0.0  48.0  0.0  1.0  1.0  1.0 NaN  4.0  138.0  0.0  ... NaN  2.0
NaN  1.0
4  0.0  54.0  1.0  1.0  0.0  1.0 NaN  3.0  150.0  0.0  ... NaN  1.0
NaN  1.0

    69   70   71   72  73  74
0  1.0  1.0  1.0  1.0 NaN NaN
1  1.0  1.0  1.0  1.0 NaN NaN
2  1.0  1.0  1.0  1.0 NaN NaN
3  1.0  1.0  1.0  1.0 NaN NaN
4  1.0  1.0  1.0  1.0 NaN NaN

[5 rows x 74 columns]
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 294 entries, 0 to 293
Data columns (total 74 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   1       294 non-null    float64
 1   2       294 non-null    float64
 2   3       294 non-null    float64
 3   4       294 non-null    float64
 4   5       294 non-null    float64
 5   6       294 non-null    float64
 6   7       0 non-null      float64
 7   8       294 non-null    float64
 8   9       293 non-null    float64
 9   10      293 non-null    float64
 10  11      271 non-null    float64
 11  12      12 non-null     float64
 12  13      1 non-null      float64
 13  14      0 non-null      float64
 14  15      286 non-null    float64
 15  16      21 non-null     float64
 16  17      1 non-null      float64
 17  18      293 non-null    float64
 18  19      294 non-null    float64
 19  20      294 non-null    float64
 20  21      294 non-null    float64
 21  22      293 non-null    float64
 22  23      292 non-null    float64
 23  24      293 non-null    float64
 24  25      293 non-null    float64
 25  26      293 non-null    float64
 26  27      285 non-null    float64
 27  28      292 non-null    float64
 28  29      104 non-null    float64
 29  30      292 non-null    float64
 30  31      293 non-null    float64
 31  32      293 non-null    float64
 32  33      293 non-null    float64
 33  34      293 non-null    float64
 34  35      293 non-null    float64
 35  36      293 non-null    float64
 36  37      293 non-null    float64
 37  38      292 non-null    float64
 38  39      294 non-null    float64
 39  40      104 non-null    float64
 40  41      293 non-null    float64
 41  42      294 non-null    float64
 42  43      4 non-null      float64
 43  44      0 non-null      float64
 44  45      0 non-null      float64
 45  46      0 non-null      float64
 46  47      3 non-null      float64
 47  48      0 non-null      float64
 48  49      2 non-null      float64
 49  50      28 non-null     float64
 50  51      27 non-null     float64
 51  52      17 non-null     float64
 52  53      0 non-null      float64
 53  54      294 non-null    float64
 54  55      294 non-null    float64
 55  56      294 non-null    float64
 56  57      294 non-null    float64
 57  58      19 non-null     float64
 58  59      58 non-null     float64
 59  60      48 non-null     float64
 60  61      18 non-null     float64
 61  62      59 non-null     float64
 62  63      9 non-null      float64
 63  64      23 non-null     float64
 64  65      5 non-null      float64
 65  66      50 non-null     float64
 66  67      25 non-null     float64
 67  68      294 non-null    float64
 68  69      294 non-null    float64
 69  70      294 non-null    float64
 70  71      294 non-null    float64
 71  72      294 non-null    float64
 72  73      28 non-null     float64
 73  74      0 non-null      float64
dtypes: float64(74)
memory usage: 170.1 KB
```

4) Menentukan Object Data

memilih 14 fitur yang akan digunakan sesuai deskripsi dataset

```
#mementukan object data yang sudah diketahui pada dataset
df_selected = df.iloc[0:, [1, 2, 7, 8, 10, 14, 17, 30, 36, 38, 39, 42,
49, 56]]

df_selected.head()
```

```
      2    3    8      9      11    15    18     31    37    39   40   43
50   57
0  40.0  1.0  2.0  140.0  289.0  0.0  0.0  172.0  0.0  0.0  NaN NaN
NaN  0.0
1  49.0  0.0  3.0  160.0  180.0  0.0  0.0  156.0  0.0  1.0  2.0 NaN
NaN  1.0
```

```
2  37.0  1.0  2.0  130.0  283.0  0.0  1.0   98.0  0.0  0.0  NaN NaN
NaN  0.0
3  48.0  0.0  4.0  138.0  214.0  0.0  0.0  108.0  1.0  1.5  2.0 NaN
NaN  3.0
4  54.0  1.0  3.0  150.0    NaN  0.0  0.0  122.0  0.0  0.0  NaN NaN
NaN  0.0
```

```
df_selected.tail()
```

```
       2    3    8      9      11   15   18     31   37   39   40  43
50  \
289  48.0  0.0  2.0    NaN  308.0  0.0  1.0    NaN  NaN  2.0  1.0 NaN
NaN
290  36.0  1.0  2.0  120.0  166.0  0.0  0.0  180.0  0.0  0.0  NaN NaN
NaN
291  48.0  1.0  3.0  110.0  211.0  0.0  0.0  138.0  0.0  0.0  NaN NaN
6.0
292  47.0  0.0  2.0  140.0  257.0  0.0  0.0  135.0  0.0  1.0  1.0 NaN
NaN
293  53.0  1.0  4.0  130.0  182.0  0.0  0.0  148.0  0.0  0.0  NaN NaN
NaN

      57
289  0.0
290  0.0
291  0.0
292  0.0
293  0.0
```

```
df_selected.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 294 entries, 0 to 293
Data columns (total 14 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   2       294 non-null    float64
 1   3       294 non-null    float64
 2   8       294 non-null    float64
 3   9       293 non-null    float64
 4   11      271 non-null    float64
 5   15      286 non-null    float64
 6   18      293 non-null    float64
 7   31      293 non-null    float64
 8   37      293 non-null    float64
 9   39      294 non-null    float64
 10  40      104 non-null    float64
 11  43      4 non-null      float64
 12  50      28 non-null     float64
 13  57      294 non-null    float64
```

```
dtypes: float64(14)
memory usage: 32.3 KB
```

mengganti nama kolom sesuai dengan 14 nama kolom yang ada pada deskripsi dataset

```python
import re

columns_mapping = {
    2: 'age',
    3: 'sex',
    8: 'cp',
    9: 'trestbps',
    11: 'chol',
    15: 'fbs',
    18: 'restecg',
    31: 'thalach',
    37: 'exang',
    39: 'oldpeak',
    40: 'slope',
    43: 'ca',
    50: 'thal',
    57: 'target'
}

df_selected.rename(columns = columns_mapping, inplace=True)

df_selected.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 294 entries, 0 to 293
Data columns (total 14 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   age       294 non-null    float64
 1   sex       294 non-null    float64
 2   cp        294 non-null    float64
 3   trestbps  293 non-null    float64
 4   chol      271 non-null    float64
 5   fbs       286 non-null    float64
 6   restecg   293 non-null    float64
 7   thalach   293 non-null    float64
 8   exang     293 non-null    float64
 9   oldpeak   294 non-null    float64
 10  slope     104 non-null    float64
 11  ca        4 non-null      float64
 12  thal      28 non-null     float64
 13  target    294 non-null    float64
dtypes: float64(14)
memory usage: 32.3 KB
```

```
#melihat nilai mana yang paling sering muncul dan paling jarang
df_selected.value_counts()

age   sex  cp   trestbps  chol   fbs  restecg  thalach  exang  oldpeak
slope  ca   thal  target
47.0  1.0  4.0  150.0     226.0  0.0  0.0      98.0     1.0    1.5
2.0    0.0  7.0   1.0        1
dtype: int64
```

5) Membersihkan data

```
#melihat banyak nilai null pada setiap object
df_selected.isnull().sum()

age           0
sex           0
cp            0
trestbps      1
chol         23
fbs           8
restecg       1
thalach       1
exang         1
oldpeak       0
slope       190
ca          290
thal        266
target        0
dtype: int64

#menghapus object yang memiliki nilai null yang sangat banyak
columns_to_drop = ['ca','slope','thal']
df_selected = df_selected.drop(columns_to_drop, axis =1)

df_selected.isnull().sum()

age          0
sex          0
cp           0
trestbps     1
chol        23
fbs          8
restecg      1
thalach      1
exang        1
oldpeak      0
target       0
dtype: int64
```

```
#menghapus nilai NaN sehingga nanti bisa diisi nilai baru
meanTBPS = df_selected['trestbps'].dropna()
meanChol = df_selected['chol'].dropna()
meanFbs = df_selected['fbs'].dropna()
meanRestCG = df_selected['restecg'].dropna()
meanThalach = df_selected['thalach'].dropna()
meanExang = df_selected['exang'].dropna()
#konversi tipe data object menjadi float
meanTBPS = meanTBPS.astype(float)
meanChol = meanChol.astype(float)
meanFbs = meanFbs.astype(float)
meanRestCG = meanRestCG.astype(float)
meanThalach = meanThalach.astype(float)
meanExang = meanExang.astype(float)
#membuat nilai baru dari perhitungan rata2 dari nilai yang kemudian
dibulatkan
meanTBPS = round(meanTBPS.mean())
meanChol = round(meanChol.mean())
meanFbs = round(meanFbs.mean())
meanRestCG = round(meanRestCG.mean())
meanThalach = round(meanThalach.mean())
meanExang = round(meanExang.mean())

#mengisi nilai NaN tadi dengan nilai rata2 yang sebelumnya sudah
dihitung
fill_values = {'trestbps' : meanTBPS,'chol' : meanChol,
               'fbs' : meanFbs,'thalach' : meanThalach,
               'exang' : meanExang,'restecg' : meanRestCG}
dfClean = df_selected.fillna(value=fill_values)

dfClean.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 294 entries, 0 to 293
Data columns (total 11 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   age       294 non-null    float64
 1   sex       294 non-null    float64
 2   cp        294 non-null    float64
 3   trestbps  294 non-null    float64
 4   chol      294 non-null    float64
 5   fbs       294 non-null    float64
 6   restecg   294 non-null    float64
 7   thalach   294 non-null    float64
 8   exang     294 non-null    float64
 9   oldpeak   294 non-null    float64
 10  target    294 non-null    float64
dtypes: float64(11)
memory usage: 25.4 KB
```

```
dfClean.isnull().sum()
```

```
age         0
sex         0
cp          0
trestbps    0
chol        0
fbs         0
restecg     0
thalach     0
exang       0
oldpeak     0
target      0
dtype: int64
```

```
#mengidentifikasi baris-baris yang merupakan duplikat
duplicate_rows = dfClean.duplicated()
dfClean[duplicate_rows]
```

```
      age  sex   cp  trestbps   chol  fbs  restecg  thalach  exang
oldpeak  \
163  49.0  0.0  2.0     110.0  251.0  0.0      0.0    160.0    0.0
0.0

     target
163     0.0
```

```
#melihat baris duplikat
print("All Duplicate_rows")
dfClean[dfClean.duplicated(keep=False)]
```

```
All Duplicate_rows

      age  sex   cp  trestbps   chol  fbs  restecg  thalach  exang
oldpeak  \
90   49.0  0.0  2.0     110.0  251.0  0.0      0.0    160.0    0.0
0.0
163  49.0  0.0  2.0     110.0  251.0  0.0      0.0    160.0    0.0
0.0

     target
90      0.0
163     0.0
```

```
#menghapus semua baris duplikat
dfClean = dfClean.drop_duplicates()
#mengecek kembali apakah ada baris yang masih duplikat
print("All Duplicate Rows : ")
dfClean[dfClean.duplicated(keep=False)]
```

```
All Duplicate Rows :
```

```
Empty DataFrame
Columns: [age, sex, cp, trestbps, chol, fbs, restecg, thalach, exang,
oldpeak, target]
Index: []
```

```
dfClean.head()
```

```
    age  sex   cp  trestbps   chol  fbs  restecg  thalach  exang
oldpeak  \
0  40.0  1.0  2.0     140.0  289.0  0.0      0.0    172.0    0.0
0.0
1  49.0  0.0  3.0     160.0  180.0  0.0      0.0    156.0    0.0
1.0
2  37.0  1.0  2.0     130.0  283.0  0.0      1.0     98.0    0.0
0.0
3  48.0  0.0  4.0     138.0  214.0  0.0      0.0    108.0    1.0
1.5
4  54.0  1.0  3.0     150.0  251.0  0.0      0.0    122.0    0.0
0.0

   target
0     0.0
1     1.0
2     0.0
3     3.0
4     0.0
```

```
#melihat jumlah kemunculan setiap nilai unik dalam kolom target
dfClean['target'].value_counts()
```

```
0.0    187
1.0     37
3.0     28
2.0     26
4.0     15
Name: target, dtype: int64
```

```
import seaborn as sns
import matplotlib.pyplot as plt
```

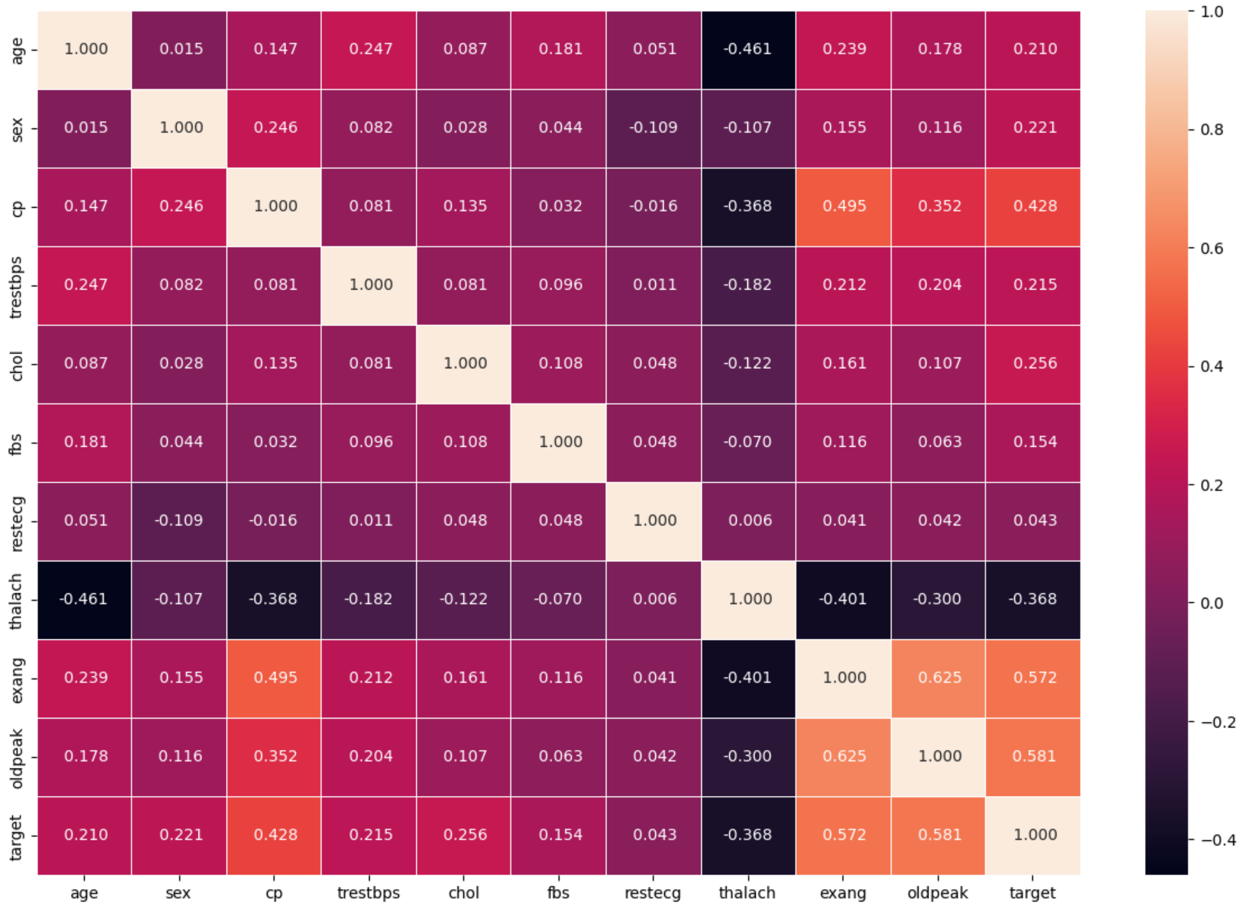
```
#meghitung matriks korelasi
dfClean.corr()
```

```
               age       sex        cp  trestbps      chol
fbs  \
age       1.000000  0.014516  0.146616  0.246571  0.087101  0.181130

sex       0.014516  1.000000  0.245769  0.082064  0.027695  0.044372

cp        0.146616  0.245769  1.000000  0.081293  0.134697  0.031930
```

```
trestbps   0.246571  0.082064  0.081293  1.000000  0.080818  0.096222

chol       0.087101  0.027695  0.134697  0.080818  1.000000  0.107686

fbs        0.181130  0.044372  0.031930  0.096222  0.107686  1.000000

restecg    0.050672 -0.108656 -0.016372  0.011256  0.048081  0.047988

thalach   -0.460514 -0.106959 -0.367819 -0.181824 -0.122038 -0.069722

exang      0.239223  0.154925  0.494674  0.211507  0.161055  0.115503

oldpeak    0.178172  0.115959  0.351735  0.204000  0.106743  0.063179

target     0.210429  0.220732  0.427536  0.214898  0.256027  0.154319


            restecg   thalach     exang   oldpeak    target
age        0.050672 -0.460514  0.239223  0.178172  0.210429
sex       -0.108656 -0.106959  0.154925  0.115959  0.220732
cp        -0.016372 -0.367819  0.494674  0.351735  0.427536
trestbps   0.011256 -0.181824  0.211507  0.204000  0.214898
chol       0.048081 -0.122038  0.161055  0.106743  0.256027
fbs        0.047988 -0.069722  0.115503  0.063179  0.154319
restecg    1.000000  0.006084  0.041290  0.042193  0.042643
thalach    0.006084  1.000000 -0.400508 -0.300458 -0.367525
exang      0.041290 -0.400508  1.000000  0.624965  0.571710
oldpeak    0.042193 -0.300458  0.624965  1.000000  0.580732
target     0.042643 -0.367525  0.571710  0.580732  1.000000
```

```python
#visualiasi matriks korelasi
cor_mat = dfClean.corr()
# Membuat objek gambar (fig) dan sumbu (ax) menggunakan subplots dari matplotlib
fig,ax = plt.subplots(figsize=(15,10))
#membuat heatmap dari matriks korelasi. Parameter annot=True menambahkan label nilai korelasi pada sel heatmap. linewidth=0.5 menentukan lebar garis pembatas antar sel. fmt=".3f" menentukan format nilai desimal untuk label (tiga desimal).
sns.heatmap(cor_mat, annot=True, linewidth=0.5, fmt=" .3f")
```

```
<Axes: >
```



	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	target
age	1.000	0.015	0.147	0.247	0.087	0.181	0.051	-0.461	0.239	0.178	0.210
sex	0.015	1.000	0.246	0.082	0.028	0.044	-0.109	-0.107	0.155	0.116	0.221
cp	0.147	0.246	1.000	0.081	0.135	0.032	-0.016	-0.368	0.495	0.352	0.428
trestbps	0.247	0.082	0.081	1.000	0.081	0.096	0.011	-0.182	0.212	0.204	0.215
chol	0.087	0.028	0.135	0.081	1.000	0.108	0.048	-0.122	0.161	0.107	0.256
fbs	0.181	0.044	0.032	0.096	0.108	1.000	0.048	-0.070	0.116	0.063	0.154
restecg	0.051	-0.109	-0.016	0.011	0.048	0.048	1.000	0.006	0.041	0.042	0.043
thalach	-0.461	-0.107	-0.368	-0.182	-0.122	-0.070	0.006	1.000	-0.401	-0.300	-0.368
exang	0.239	0.155	0.495	0.212	0.161	0.116	0.041	-0.401	1.000	0.625	0.572
oldpeak	0.178	0.116	0.352	0.204	0.107	0.063	0.042	-0.300	0.625	1.000	0.581
target	0.210	0.221	0.428	0.215	0.256	0.154	0.043	-0.368	0.572	0.581	1.000