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class :D17A Roll No. : 57

ADS Experiment No. : 1

```
import pandas as pd
import numpy as np
import matplotlib as plt
import statistics as st
```

```
from google.colab import files
uploaded = files.upload()
```

Choose Files diabetes.csv

- **diabetes.csv**(text/csv) - 23873 bytes, last modified: 2/27/2023 - 100% done

Saving diabetes.csv to diabetes.csv

```
import pandas as pd
import io
df = pd.read_csv(io.BytesIO(uploaded['diabetes.csv']))
print(df)
```

```
     Pregnancies  Glucose  BloodPressure  SkinThickness  Insulin   BMI  \
0              6      148             72             35        0  33.6
1              1       85             66             29        0  26.6
2              8      183             64              0        0  23.3
3              1       89             66             23       94  28.1
4              0      137             40             35      168  43.1
..           ...      ...            ...            ...      ...   ...
763           10      101             76             48      180  32.9
764            2      122             70             27        0  36.8
765            5      121             72             23      112  26.2
766            1      126             60              0        0  30.1
767            1       93             70             31        0  30.4

     DiabetesPedigreeFunction  Age  Outcome
0                       0.627   50        1
1                       0.351   31        0
2                       0.672   32        1
3                       0.167   21        0
4                       2.288   33        1
..                        ...  ...      ...
763                     0.171   63        0
764                     0.340   27        0
765                     0.245   30        0
766                     0.349   47        1
767                     0.315   23        0

[768 rows x 9 columns]
```

```
df.head()
```

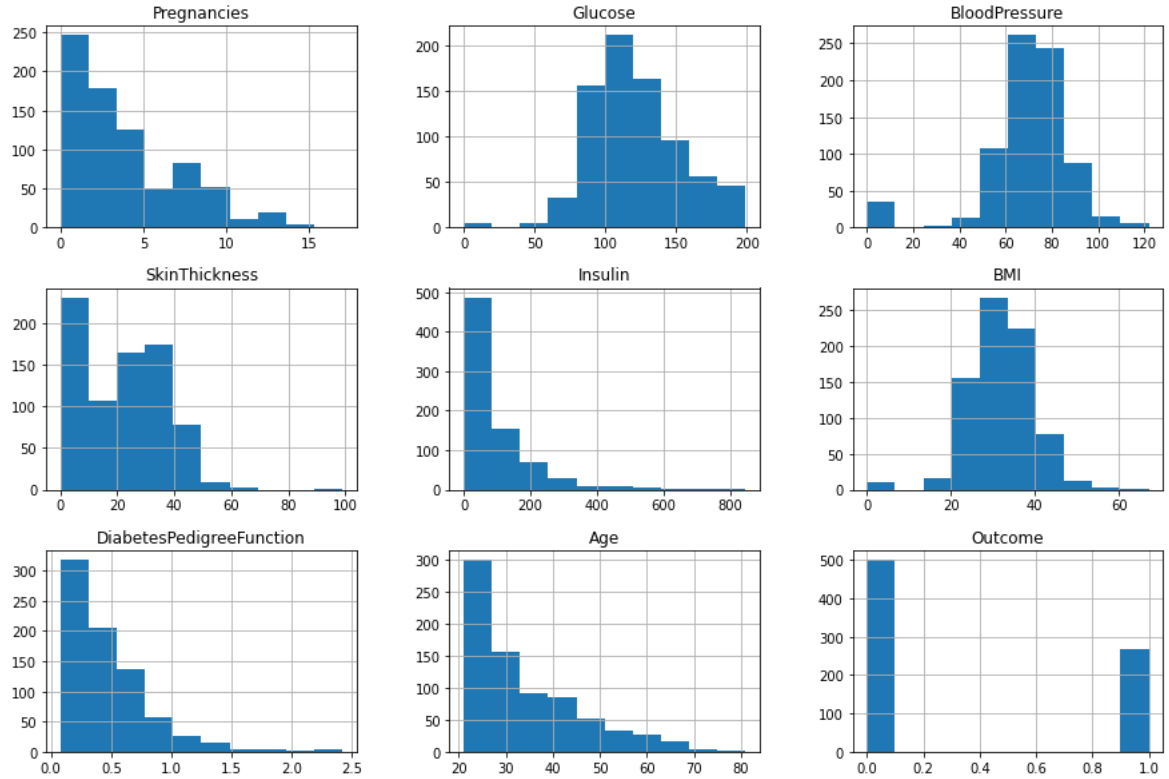
	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Out
0	6	148	72	35	0	33.6	0.627	50	
1	1	85	66	29	0	26.6	0.351	31	
2	8	183	64	0	0	23.3	0.672	32	
3	1	89	66	23	94	28.1	0.167	21	
4	0	137	40	35	168	43.1	2.288	33	

```
df.describe()
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
count	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000
mean	3.845052	120.894531	69.105469	20.536458	79.799479	31.992578	0.471876	33.240885	0.348958
std	3.369578	31.972618	19.355807	15.952218	115.244002	7.884160	0.331329	11.760232	0.476951
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.078000	21.000000	0.000000

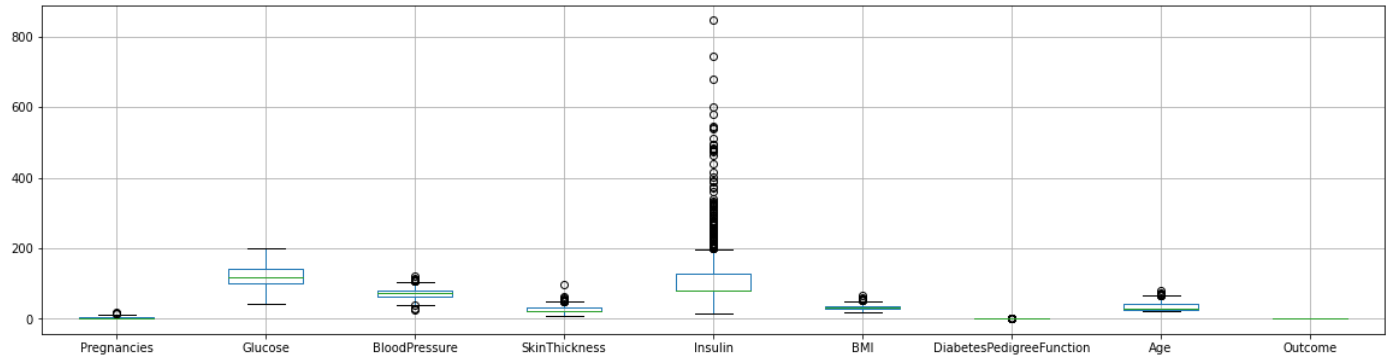
```
df.hist(figsize=(15, 10))
```

```
array([[<AxesSubplot:title={'center':'Pregnancies'}>,
        <AxesSubplot:title={'center':'Glucose'}>,
        <AxesSubplot:title={'center':'BloodPressure'}>],
       [<AxesSubplot:title={'center':'SkinThickness'}>,
        <AxesSubplot:title={'center':'Insulin'}>,
        <AxesSubplot:title={'center':'BMI'}>],
       [<AxesSubplot:title={'center':'DiabetesPedigreeFunction'}>,
        <AxesSubplot:title={'center':'Age'}>,
        <AxesSubplot:title={'center':'Outcome'}>]], dtype=object)
```




```
df.boxplot(figsize=(20, 5))
```

```
<AxesSubplot:>
```




```
df.shape
```

```
(768, 9)
```

```
df.duplicated().sum()
```

```
0
```

```
df = df.drop_duplicates()
```

```
df.isnull().sum()
```

```
Pregnancies                 0
Glucose                     0
BloodPressure               0
SkinThickness               0
Insulin                     0
BMI                         0
DiabetesPedigreeFunction    0
Age                         0
Outcome                     0
dtype: int64
```

```
print('No.of zero values in Pregnancies :',df[df['Pregnancies']==0].shape[0])
```

```
No.of zero values in Pregnancies : 111
```

```
df['Glucose']= df['Glucose'].replace(0,df['Glucose'].mean())
print('No.of zero values in Glucose :',df[df['Glucose']==0].shape[0])
```

```
No.of zero values in Glucose : 0
```

```
df['BloodPressure']= df['BloodPressure'].replace(0,df['BloodPressure'].mean())
df['SkinThickness']= df['SkinThickness'].replace(0,df['SkinThickness'].mean())
df['Insulin']= df['Insulin'].replace(0,df['Insulin'].mean())
df['BMI']=df['BMI'].replace(0,df['BMI'].mean())
```

```
df.describe()
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
count	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000
mean	3.845052	121.681605	72.254807	26.606479	118.660163	32.450805	0.471876	33.240885	0.348958
std	3.369578	30.436016	12.115932	9.631241	93.080358	6.875374	0.331329	11.760232	0.476951
min	0.000000	44.000000	24.000000	7.000000	14.000000	18.200000	0.078000	21.000000	0.000000
25%	1.000000	99.750000	64.000000	20.536458	79.799479	27.500000	0.243750	24.000000	0.000000
50%	3.000000	117.000000	72.000000	23.000000	79.799479	32.000000	0.372500	29.000000	0.000000
75%	6.000000	140.250000	80.000000	32.000000	127.250000	36.600000	0.626250	41.000000	1.000000
max	17.000000	199.000000	122.000000	99.000000	846.000000	67.100000	2.420000	81.000000	1.000000

```
df.std()
```

```
Pregnancies                 3.369578
Glucose                    30.436016
BloodPressure              12.115932
SkinThickness               9.631241
Insulin                    93.080358
BMI                         6.875374
DiabetesPedigreeFunction    0.331329
Age                        11.760232
Outcome                     0.476951
dtype: float64
```

```
df.mode()
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
0	1.0	99.0	70.0	20.536458	79.799479	32.0	0.254	22.0	0.0
1	NaN	100.0	NaN	NaN	NaN	NaN	0.258	NaN	NaN

```
df.skew()
```

```
Pregnancies                 0.901674
Glucose                     0.533225
BloodPressure               0.173050
SkinThickness               1.226670
Insulin                     3.291825
BMI                         0.601103
DiabetesPedigreeFunction    1.919911
Age                         1.129597
Outcome                     0.635017
dtype: float64
```

```
df.kurtosis()
```

```
Pregnancies                 0.159220
Glucose                    -0.258820
BloodPressure               1.079233
SkinThickness               3.904657
Insulin                    14.141704
BMI                         0.921318
DiabetesPedigreeFunction    5.594954
Age                         0.643159
Outcome                    -1.600930
dtype: float64
```

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