In [2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import MinMaxScaler
from sklearn.preprocessing import StandardScaler
from sklearn.preprocessing import LabelEncoder
from sklearn.metrics import precision_score,recall_score,accuracy_score,confusion_matrix
from sklearn.svm import SVC
from sklearn.linear_model import LogisticRegression
from sklearn.neighbors import KNeighborsClassifier
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import BaggingClassifier,AdaBoostClassifier,RandomForestClassifier,GradientBoostingClassifier
```

In [3]:
```
df=pd.read_csv("C:/Users/hp/Downloads/loan_data.csv")
```

In [4]:
```
df.head()
```

Out[4]:

	Loan_ID	Gender	Married	Dependents	Education	Self_Employed	ApplicantIncome	CoapplicantIncome	LoanAmount	Loan_Amount_Term	Credit_Hist
0	LP001003	Male	Yes	1	Graduate	No	4583	1508.0	128.0	360.0	
1	LP001005	Male	Yes	0	Graduate	Yes	3000	0.0	66.0	360.0	
2	LP001006	Male	Yes	0	Not Graduate	No	2583	2358.0	120.0	360.0	
3	LP001008	Male	No	0	Graduate	No	6000	0.0	141.0	360.0	
4	LP001013	Male	Yes	0	Not Graduate	No	2333	1516.0	95.0	360.0	

In [5]:
```
df.columns
```

Out[5]:
```
Index(['Loan_ID', 'Gender', 'Married', 'Dependents', 'Education',
       'Self_Employed', 'ApplicantIncome', 'CoapplicantIncome', 'LoanAmount',
       'Loan_Amount_Term', 'Credit_History', 'Property_Area', 'Loan_Status'],
      dtype='object')
```

In [6]:
```
df.info()          # information of dataset
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 381 entries, 0 to 380
Data columns (total 13 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   Loan_ID            381 non-null    object 
 1   Gender             376 non-null    object 
 2   Married            381 non-null    object 
 3   Dependents         373 non-null    object 
 4   Education          381 non-null    object 
 5   Self_Employed      360 non-null    object 
 6   ApplicantIncome    381 non-null    int64  
 7   CoapplicantIncome  381 non-null    float64
 8   LoanAmount         381 non-null    float64
 9   Loan_Amount_Term   370 non-null    float64
 10  Credit_History     351 non-null    float64
 11  Property_Area      381 non-null    object 
 12  Loan_Status        381 non-null    object 
dtypes: float64(4), int64(1), object(8)
memory usage: 38.8+ KB
```

In [7]:
```
df.dtypes           # Types of DataTypes present in DataSet
```

Out[7]:
```
Loan_ID               object
Gender                object
Married               object
Dependents            object
Education             object
Self_Employed         object
ApplicantIncome        int64
CoapplicantIncome    float64
LoanAmount           float64
Loan_Amount_Term     float64
Credit_History       float64
Property_Area         object
Loan_Status           object
dtype: object
```

In [8]:
```
df.shape            # Shape of Dataset i.e Number of Rows and Columns Present in Dataset
```

Out[8]:
```
(381, 13)
```

In [9]:
```
df.size             # Size of DataSet i.e Total number of Elements Present in Dataset
```

Out[9]:
```
4953
```

In [10]:
```
df.isnull().sum()       # Checking Null Values present in dataset
```

Out[10]:
```
Loan_ID               0
Gender                5
Married               0
Dependents            8
Education             0
Self_Employed        21
ApplicantIncome       0
CoapplicantIncome     0
LoanAmount            0
Loan_Amount_Term     11
Credit_History       30
Property_Area         0
Loan_Status           0
dtype: int64
```

In [11]:
```
df1=df.dropna()        # Dropping Null Values present in Dataset
```

In [12]:
```
df1.isnull().sum()
```

Out[12]:
```
Loan_ID              0
Gender               0
Married              0
Dependents           0
Education            0
Self_Employed        0
ApplicantIncome      0
CoapplicantIncome    0
LoanAmount           0
Loan_Amount_Term     0
Credit_History       0
Property_Area        0
Loan_Status          0
dtype: int64
```

In [13]:
```
df1.dtypes
```

Out[13]:
```
Loan_ID               object
Gender                object
Married               object
Dependents            object
Education             object
Self_Employed         object
ApplicantIncome        int64
CoapplicantIncome    float64
LoanAmount           float64
Loan_Amount_Term     float64
Credit_History       float64
Property_Area         object
Loan_Status           object
dtype: object
```

Performing LabelEncoding On DataSet

In [14]:
```
le=LabelEncoder()          # To convert categorical data into numerical data for model building
```

In [15]:
```
df1["Loan_ID"]=le.fit_transform(df1["Loan_ID"])
df1["Gender"]=le.fit_transform(df1["Gender"])
df1["Married"]=le.fit_transform(df1["Married"])
df1["Dependents"]=le.fit_transform(df1["Dependents"])
df1["Education"]=le.fit_transform(df1["Education"])
df1["Self_Employed"]=le.fit_transform(df1["Self_Employed"])
df1["Property_Area"]=le.fit_transform(df1["Property_Area"])
df1["Loan_Status"]=le.fit_transform(df1["Loan_Status"])
```

```
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\4008765204.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["Loan_ID"]=le.fit_transform(df1["Loan_ID"])
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\4008765204.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["Gender"]=le.fit_transform(df1["Gender"])
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\4008765204.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["Married"]=le.fit_transform(df1["Married"])
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\4008765204.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["Dependents"]=le.fit_transform(df1["Dependents"])
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\4008765204.py:5: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["Education"]=le.fit_transform(df1["Education"])
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\4008765204.py:6: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["Self_Employed"]=le.fit_transform(df1["Self_Employed"])
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\4008765204.py:7: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["Property_Area"]=le.fit_transform(df1["Property_Area"])
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\4008765204.py:8: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["Loan_Status"]=le.fit_transform(df1["Loan_Status"])
```

In [16]:
```
df1.head()
```

Out[16]:

	Loan_ID	Gender	Married	Dependents	Education	Self_Employed	ApplicantIncome	CoapplicantIncome	LoanAmount	Loan_Amount_Term	Credit_Histc
0	0	1	1	1	0	0	4583	1508.0	128.0	360.0	
1	1	1	1	0	0	1	3000	0.0	66.0	360.0	
2	2	1	1	0	1	0	2583	2358.0	120.0	360.0	
3	3	1	0	0	0	0	6000	0.0	141.0	360.0	
4	4	1	1	0	1	0	2333	1516.0	95.0	360.0	

In [17]:

```
df1.describe().T       # Statistical Summary Of Dataset
```

Out[17]:

	count	mean	std	min	25%	50%	75%	max
Loan_ID	308.0	153.500000	89.056162	0.0	76.75	153.5	230.25	307.0
Gender	308.0	0.795455	0.404025	0.0	1.00	1.0	1.00	1.0
Married	308.0	0.600649	0.490562	0.0	0.00	1.0	1.00	1.0
Dependents	308.0	0.678571	0.997029	0.0	0.00	0.0	1.00	3.0
Education	308.0	0.256494	0.437408	0.0	0.00	0.0	1.00	1.0
Self_Employed	308.0	0.090909	0.287948	0.0	0.00	0.0	0.00	1.0
ApplicantIncome	308.0	3599.126623	1462.359612	150.0	2568.75	3329.5	4291.00	9703.0
CoapplicantIncome	308.0	1278.434805	2520.961308	0.0	0.00	871.5	1953.50	33837.0
LoanAmount	308.0	104.623377	29.382256	9.0	89.75	110.0	128.00	150.0
Loan_Amount_Term	308.0	341.181818	68.246006	36.0	360.00	360.0	360.00	480.0
Credit_History	308.0	0.853896	0.353785	0.0	1.00	1.0	1.00	1.0
Property_Area	308.0	1.042208	0.775125	0.0	0.00	1.0	2.00	2.0
Loan_Status	308.0	0.711039	0.454017	0.0	0.00	1.0	1.00	1.0

Changing DataTypes of Data in Dataset

In [18]:

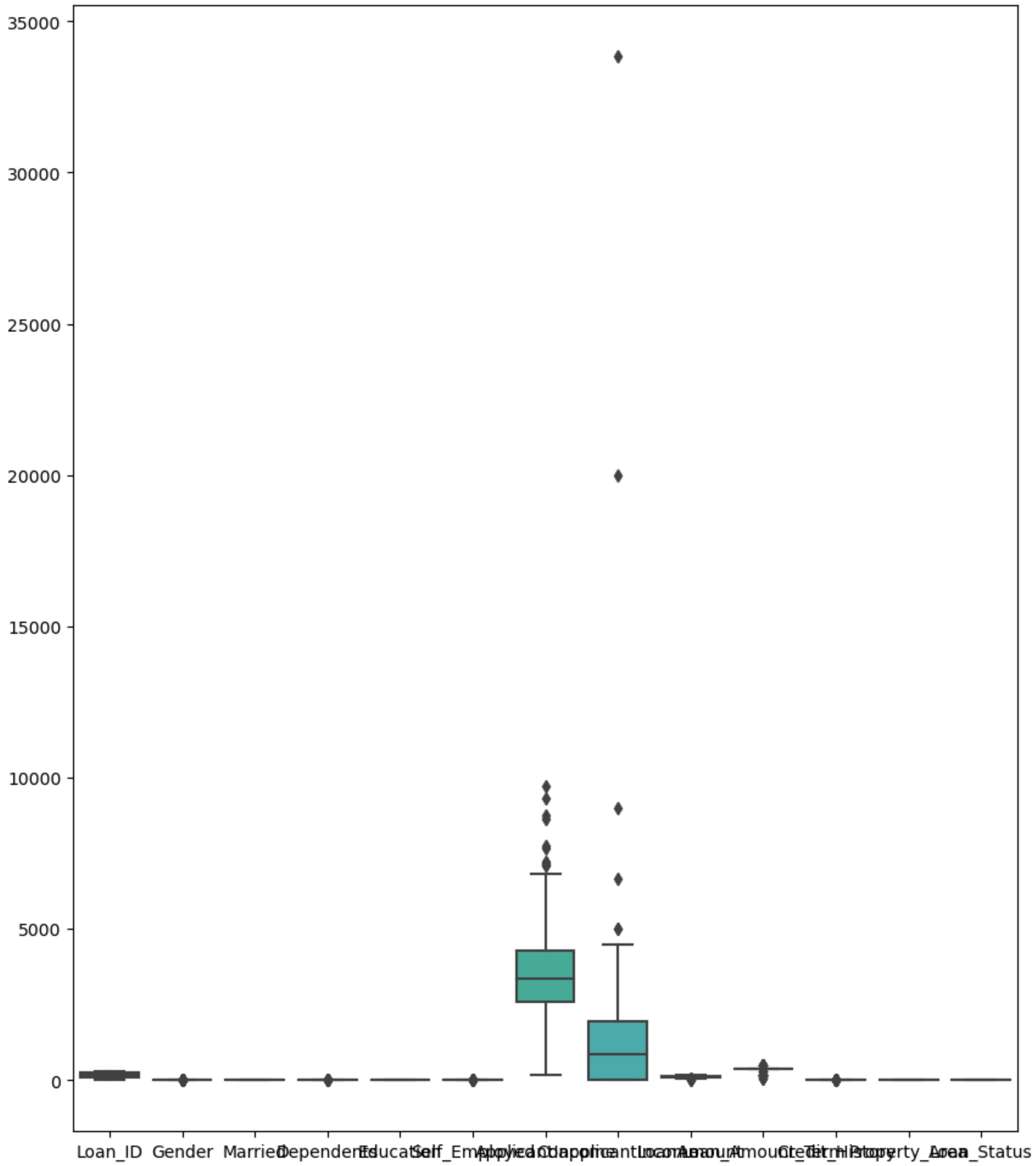
```
df1["CoapplicantIncome"]=df1["CoapplicantIncome"].astype("int")
df1["LoanAmount"]=df1["LoanAmount"].astype("int")
df1["Loan_Amount_Term"]=df1["Loan_Amount_Term"].astype("int")
df1["Credit_History"]=df1["Credit_History"].astype("int")
```

```
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\1689938164.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["CoapplicantIncome"]=df1["CoapplicantIncome"].astype("int")
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\1689938164.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["LoanAmount"]=df1["LoanAmount"].astype("int")
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\1689938164.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["Loan_Amount_Term"]=df1["Loan_Amount_Term"].astype("int")
C:\Users\hp\AppData\Local\Temp\ipykernel_12844\1689938164.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-vie
w-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df1["Credit_History"]=df1["Credit_History"].astype("int")
```

Removing Outliers present in Dataset

```
In [19]: plt.figure(figsize=(10,12))        # Ploting Boxplot to detect outliers
         sns.boxplot(data=df1)
```

```
Out[19]: <Axes: >
```



Steps to Remove Outliers

```
In [20]: Q1=df1.quantile(q=0.25)           # finding Q1 value
         Q3=df1.quantile(q=0.75)           # Finding Q3 value
         IQR=Q3-Q1                         # Finding IQR Value i.e(InterQuantileRange)
         upper=Q3+(1.5*IQR)                # to detect upper outliers
         lower=Q1-(1.5*IQR)                # to detect Lower outliers
```

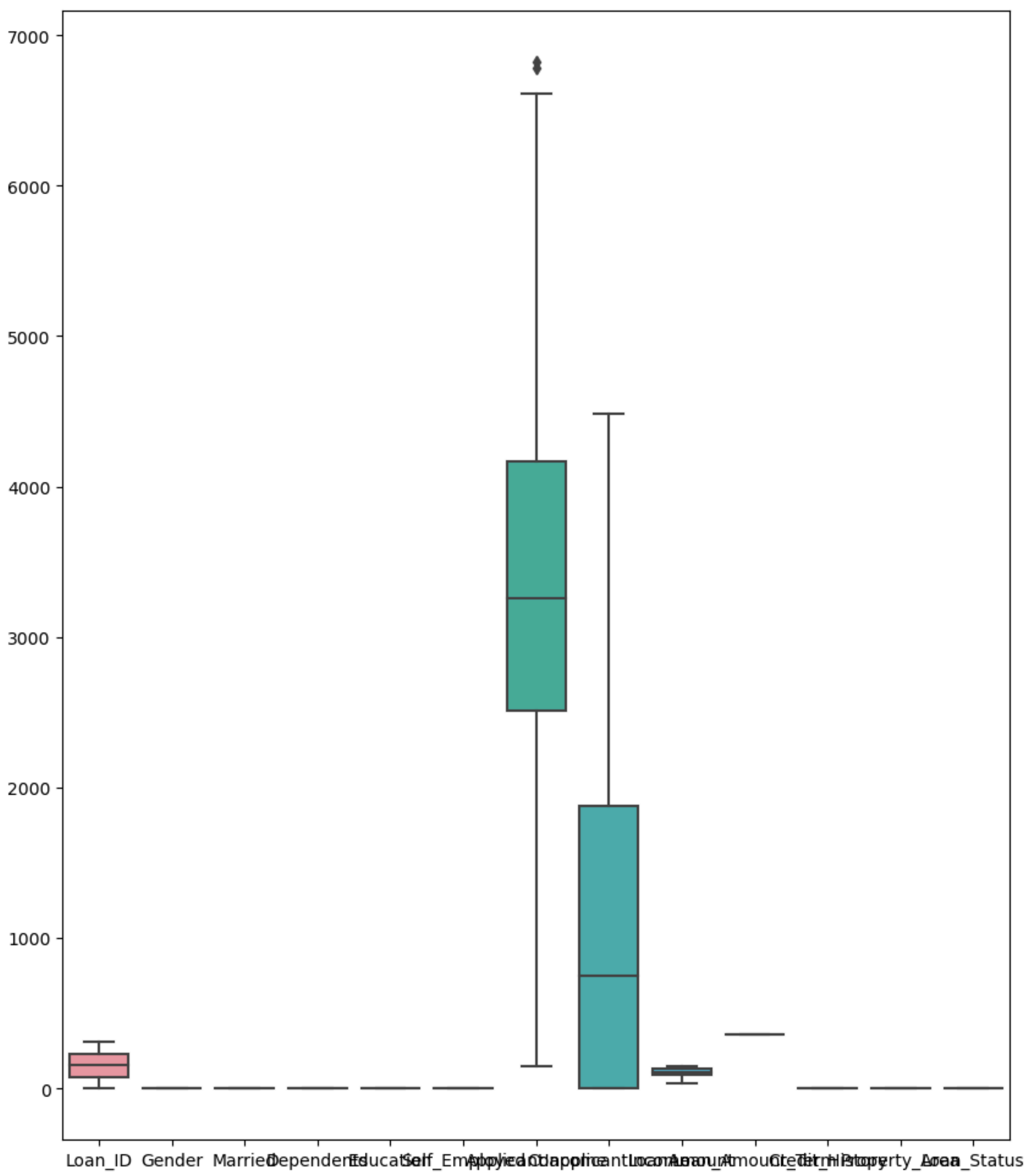
```
In [21]: df2=df1[~((df1>upper)|(df1<lower))]
```

In [22]:

```
plt.figure(figsize=(10,12))        # Boxplot after removing Outliers
sns.boxplot(df2)
```

Out[22]:

```
<Axes: >
```



In [23]:

```
df2.isnull().sum()       # After removing outlier we get some nan values
```

Out[23]:

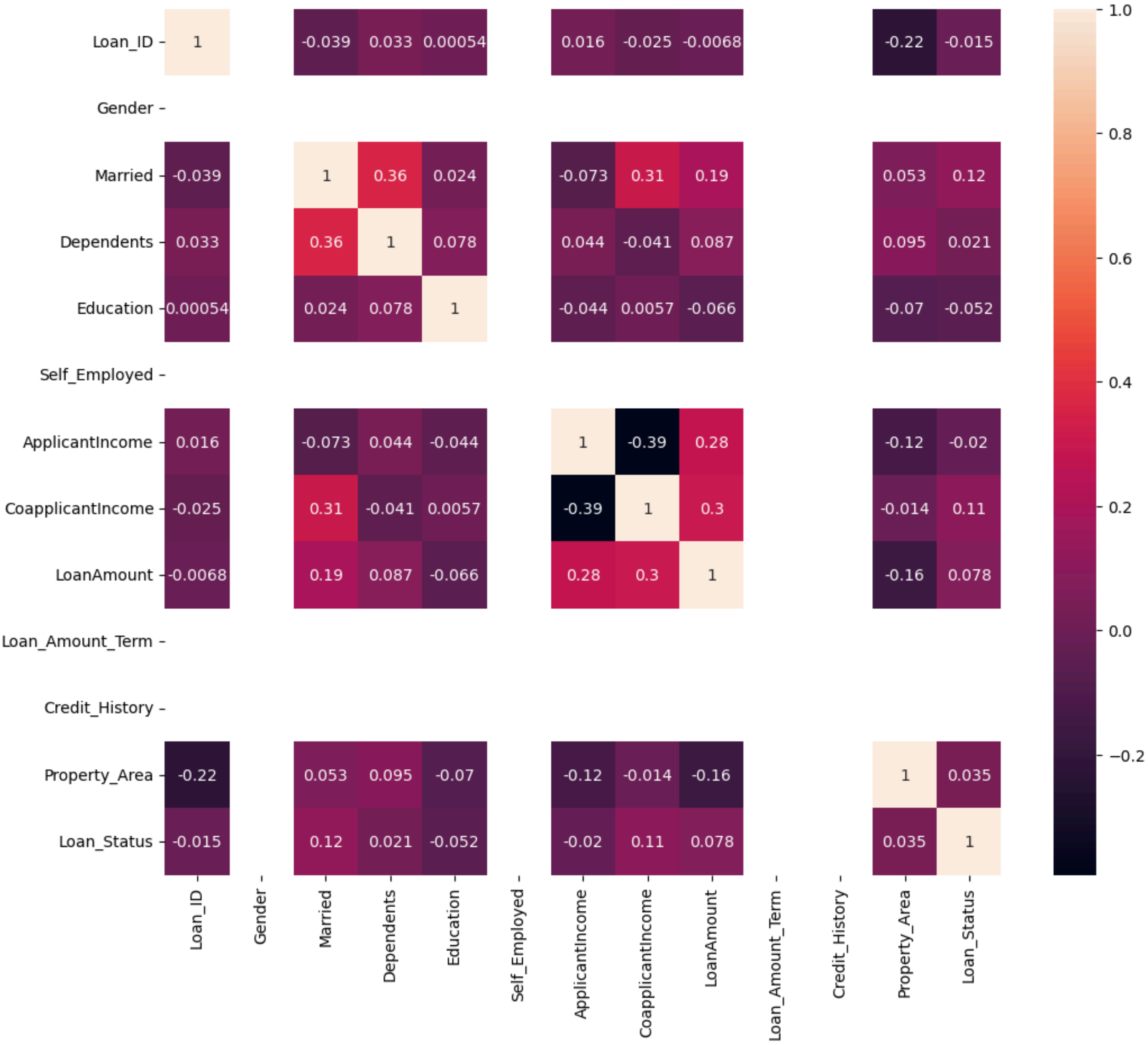
```
Loan_ID               0
Gender               63
Married               0
Dependents           24
Education             0
Self_Employed        28
ApplicantIncome      11
CoapplicantIncome     6
LoanAmount            7
Loan_Amount_Term     49
Credit_History       45
Property_Area         0
Loan_Status           0
dtype: int64
```

In [24]:

```
df3=df2.dropna()     # removing that nan values
```

HeatMap To Show Corelation between Data

In [25]:
```
plt.figure(figsize=(12,10))
sns.heatmap(df2.corr(),annot=True)
plt.show()
```

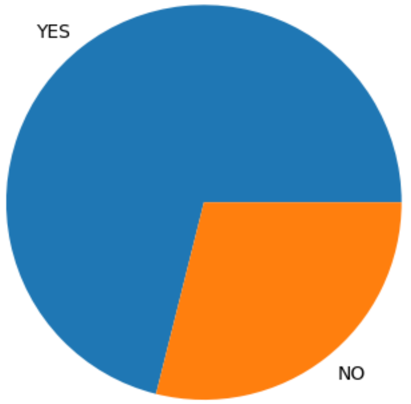


In [26]:
```
print(df1["Loan_Status"].unique())
print(df1["Loan_Status"].value_counts(normalize=True)*100)
```

```
[0 1]
Loan_Status
1    71.103896
0    28.896104
Name: proportion, dtype: float64
```

```
In [27]: plt.pie(df2["Loan_Status"].value_counts(normalize=True)*100,labels=["YES","NO"])
```

```
Out[27]: ([<matplotlib.patches.Wedge at 0x294fad145d0>,
           <matplotlib.patches.Wedge at 0x294fad2e7d0>],
          [Text(-0.6770310906241628, 0.866965340903693, 'YES'),
           Text(0.6770310906241627, -0.8669653409036931, 'NO')])
```



Model Building for DataSet

```
In [28]: x=df3.drop(["Loan_Status"],axis=1)
         y=df3["Loan_Status"]
```

```
In [29]: x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.3,random_state=1)     # splliting data into x and y
```

```
In [30]: print(x_train.shape)
         print(x_test.shape)
         print(y_train.shape)
         print(y_test.shape)
```

```
(99, 12)
(43, 12)
(99,)
(43,)
```

LOGISTIC REGRESSION ALGORITHM

```
In [31]: le=LogisticRegression()
         le.fit(x_train,y_train)
```

```
Out[31]: LogisticRegression()
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

```
In [32]: y_true,y_pred=y_test,le.predict(x_test)
         print(le.score(x_train,y_train)*100)
         print(le.score(x_test,y_test)*100)
```

```
86.86868686868688
88.37209302325581
```

```
In [33]: print(precision_score(y_true,y_pred)*100)
         print(recall_score(y_true,y_pred)*100)
         print(accuracy_score(y_true,y_pred)*100)
```

```
88.37209302325581
100.0
88.37209302325581
```

RANDOM FOREST CLASSIFIER ALGORITHM

```
In [34]: rf=RandomForestClassifier(n_estimators=6,random_state=1)
         rf.fit(x_train,y_train)
```

```
Out[34]: RandomForestClassifier(n_estimators=6, random_state=1)
```

In a Jupyter environment, please rerun this cell to show the HTML representation or tr
On GitHub, the HTML representation is unable to render, please try loading this page

```
In [35]: y_true,y_pred=y_test,rf.predict(x_test)
         print(rf.score(x_train,y_train)*100)
         print(rf.score(x_test,y_test)*100)
```

```
95.95959595959596
83.72093023255815
```

```
In [36]: print(precision_score(y_true,y_pred)*100)
         print(recall_score(y_true,y_pred)*100)
         print(accuracy_score(y_true,y_pred)*100)
```

```
87.8048780487805
94.73684210526315
83.72093023255815
```

DECISION TREE CLASSIFIER ALGORITHM

```
In [37]: dt=DecisionTreeClassifier(criterion="gini",max_depth=4,random_state=1)
         dt.fit(x_train,y_train)
```

```
Out[37]: DecisionTreeClassifier(max_depth=4, random_state=1)
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

```
In [38]: y_true,y_pred=y_test,dt.predict(x_test)
         print(dt.score(x_train,y_train)*100)
         print(dt.score(x_test,y_test)*100)
```

```
94.94949494949495
88.37209302325581
```

```
In [39]: print(precision_score(y_true,y_pred)*100)
         print(recall_score(y_true,y_pred)*100)
         print(accuracy_score(y_true,y_pred)*100)
```

```
90.2439024390244
97.36842105263158
88.37209302325581
```

GRADIENT BOOSTING CLASSIFIER ALGORITHM

```
In [40]: gb=GradientBoostingClassifier(n_estimators=20)
         gb.fit(x_train,y_train)
```

```
Out[40]: GradientBoostingClassifier(n_estimators=20)
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

```
In [41]: y_true,y_pred=y_test,gb.predict(x_test)
         print(dt.score(x_train,y_train)*100)
         print(dt.score(x_test,y_test)*100)
```

```
94.94949494949495
88.37209302325581
```

```
In [42]: print(precision_score(y_true,y_pred)*100)
         print(recall_score(y_true,y_pred)*100)
         print(accuracy_score(y_true,y_pred).*100)
```

```
90.47619047619048
100.0
90.69767441860465
```

BAGGING CLASSIFIER ALGORITHM

```
In [43]: bg=BaggingClassifier(n_estimators=20)
         bg.fit(x_train,y_train)
```

```
Out[43]: BaggingClassifier(n_estimators=20)
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

```
In [44]: y_true,y_pred=y_test,bg.predict(x_test)
         print(dt.score(x_train,y_train)*100)
         print(dt.score(x_test,y_test)*100)
```

```
94.94949494949495
88.37209302325581
```

In [45]:

```
print(precision_score(y_true,y_pred)*100)
print(recall_score(y_true,y_pred)*100)
print(accuracy_score(y_true,y_pred)*100)
```

```
90.47619047619048
100.0
90.69767441860465
```

ADABOOST CLASSIFIER ALGORITHM

In [46]:

```
ad=AdaBoostClassifier(n_estimators=20,estimator=dt,random_state=1)
ad.fit(x_train,y_train)
```

Out[46]:

```
AdaBoostClassifier(estimator=DecisionTreeClassifier(max_depth=4,
                                                    random_state=1),
                   n_estimators=20, random_state=1)
```

**In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.**

In [47]:

```
y_true,y_pred=y_test,ad.predict(x_test)
print(dt.score(x_train,y_train)*100)
print(dt.score(x_test,y_test)*100)
```

```
94.94949494949495
88.37209302325581
```

In [48]:

```
print(precision_score(y_true,y_pred)*100)
print(recall_score(y_true,y_pred)*100)
print(accuracy_score(y_true,y_pred)*100)
```

```
90.47619047619048
100.0
90.69767441860465
```

KNeighbors CLASSIFIER ALGORITHM

In [49]:

```
kn=KNeighborsClassifier(weights="distance")
kn.fit(x_train,y_train)
```

Out[49]:

```
KNeighborsClassifier(weights='distance')
```

**In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.**

In [50]:

```
y_true,y_pred=y_test,kn.predict(x_test)
print(dt.score(x_train,y_train)*100)
print(dt.score(x_test,y_test)*100)
```

```
94.94949494949495
88.37209302325581
```

In [51]:

```
print(precision_score(y_true,y_pred)*100)
print(recall_score(y_true,y_pred)*100)
print(accuracy_score(y_true,y_pred)*100)
```

```
87.5
92.10526315789474
81.3953488372093
```

SVC (SUPPORT VECTOR CLASSIFIER) ALGORITHM

In [52]:

```
svc=SVC(C=1.0,kernel="linear")
svc.fit(x_train,y_train)
```

Out[52]:

```
SVC(kernel='linear')
```

**In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.**

In [53]:

```
y_true,y_pred=y_test,svc.predict(x_test)
print(dt.score(x_train,y_train)*100)
print(dt.score(x_test,y_test)*100)
```

```
94.94949494949495
88.37209302325581
```

In [54]:

```
print(precision_score(y_true,y_pred)*100)
print(recall_score(y_true,y_pred)*100)
print(accuracy_score(y_true,y_pred)*100)
```

```
88.37209302325581
100.0
88.37209302325581
```

In [ ]:

```
#The best fit model for this bank loan data set are Gradient boosting algorithm, bagging classifier algorithm, adaboost clas
```

In [ ]:

```
```