CRICKET PLAYER PERFORMANCE PREDICTION USING MACHINE LEARNING

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
df = pd.read_csv('cricket_player.csv')
df.head()
```

Out[2]:

	ID	Player_ID	Player	Country	Opposition	Bat1	Runs	BF	SR	4s	6s	Ground	Start Date	Match_ID	Team Runs	Target	Overs	RPO	I
0	6	49619	Oshane Thomas	WestIndies	v India	0*	0	8	0.00	0	0	Dhaka	10 Jan 2010	ODI # 2941	NaN	NaN	NaN	NaN	I
1	10	49619	Oshane Thomas	WestIndies	v England	1*	1	3	33.33	0	0	Nottingham	6 Jul 2011	ODI # 3169	NaN	NaN	NaN	NaN	I
2	11	49619	Oshane Thomas	WestIndies	v Australia	0*	0	2	0.00	0	0	Pallekele	10 Aug 2011	ODI # 3175	NaN	NaN	NaN	NaN	I
3	12	49619	Oshane Thomas	WestIndies	v Pakistan	0	0	2	0.00	0	0	Dubai (DSC)	11 Nov 2011	ODI # 3212	NaN	NaN	NaN	NaN	I
4	14	49619	Oshane Thomas	WestIndies	v Pakistan	0	0	4	0.00	0	0	Dhaka	15 Mar 2012	ODI # 3260	NaN	NaN	NaN	NaN	I

In [3]:
```
df.shape
```

Out[3]:
```
(8818, 20)
```

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8818 entries, 0 to 8817
Data columns (total 20 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   ID          8818 non-null   int64  
 1   Player_ID   8818 non-null   int64  
 2   Player      8818 non-null   object 
 3   Country     8818 non-null   object 
 4   Opposition  8818 non-null   object 
 5   Bat1        8818 non-null   object 
 6   Runs        8818 non-null   int64  
 7   BF          8818 non-null   int64  
 8   SR          8818 non-null   float64
 9   4s          8818 non-null   int64  
 10  6s          8818 non-null   int64  
 11  Ground      8818 non-null   object 
 12  Start Date  8818 non-null   object 
 13  Match_ID    8818 non-null   object 
 14  Team Runs   6192 non-null   object 
 15  Target      3086 non-null   float64
 16  Overs       6192 non-null   float64
 17  RPO         6192 non-null   object 
 18  Inns        6192 non-null   float64
 19  Result      6192 non-null   object 
dtypes: float64(4), int64(6), object(10)
memory usage: 1.3+ MB
```

In [5]:
```
null = df.isnull().sum()
null_perect = (null/len(df))*100
null_perect
```

Out[5]:
```
ID             0.000000
Player_ID      0.000000
Player         0.000000
Country        0.000000
Opposition     0.000000
Bat1           0.000000
Runs           0.000000
BF             0.000000
SR             0.000000
4s             0.000000
6s             0.000000
Ground         0.000000
Start Date     0.000000
Match_ID       0.000000
Team Runs     29.779995
Target        65.003402
Overs         29.779995
RPO           29.779995
Inns          29.779995
Result        29.779995
dtype: float64
```

In [6]:
```
df.dropna(inplace=True)
```

In [7]:
```
df.isnull().sum()
```

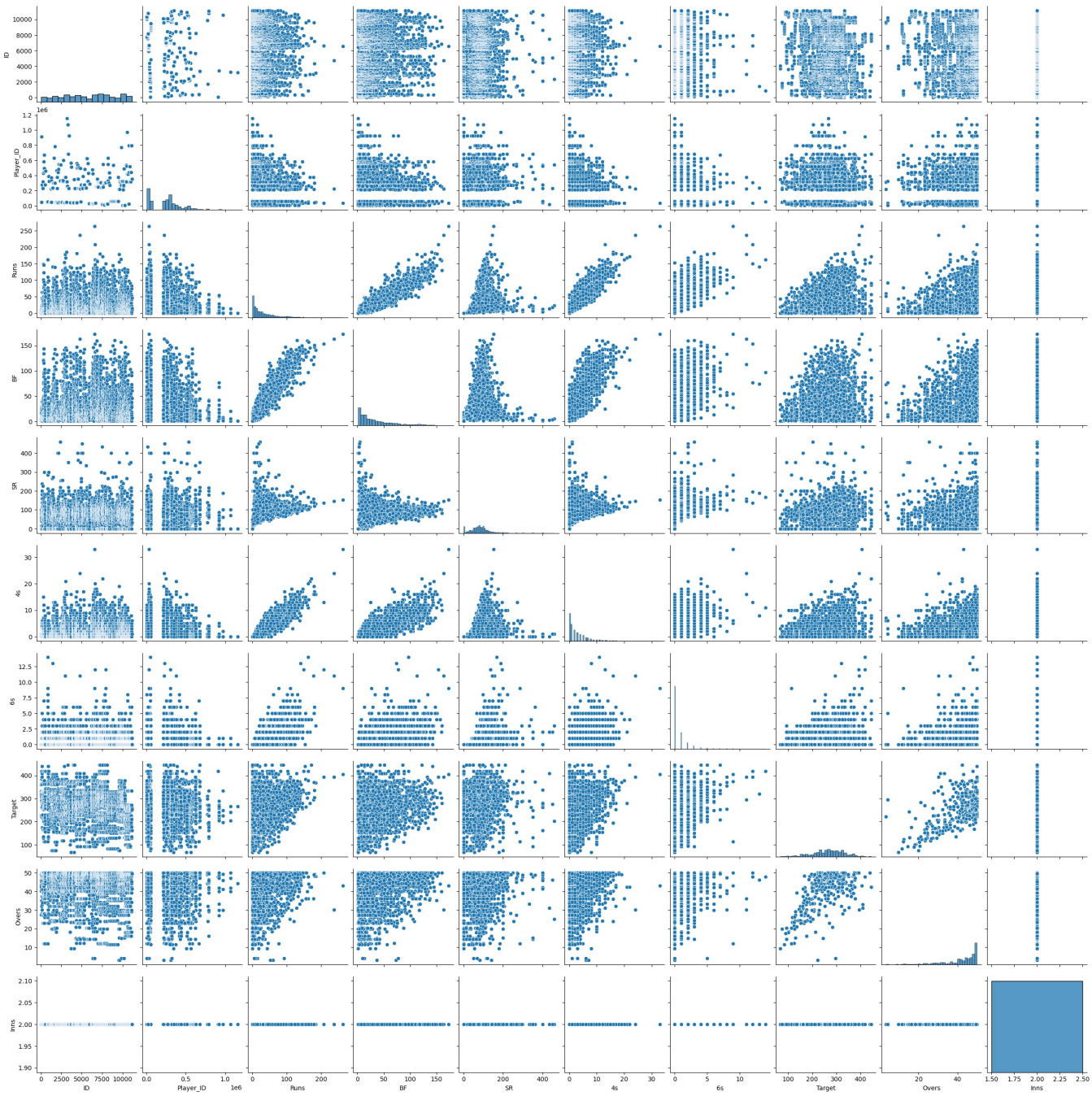
Out[7]:
```
ID            0
Player_ID     0
Player        0
Country       0
Opposition    0
Bat1          0
Runs          0
BF            0
SR            0
4s            0
6s            0
Ground        0
Start Date    0
Match_ID      0
Team Runs     0
Target        0
Overs         0
RPO           0
Inns          0
Result        0
dtype: int64
```

In [8]:
```
df.describe()
```

Out[8]:

	ID	Player_ID	Runs	BF	SR	4s	6s	Target	Overs	Inns
count	3086.000000	3.086000e+03	3086.000000	3086.000000	3086.000000	3086.000000	3086.000000	3086.000000	3086.000000	3086.0
mean	5813.602074	2.539303e+05	30.366818	33.863253	82.964332	2.786455	0.604990	266.442320	42.007323	2.0
std	3153.114936	1.889530e+05	33.430199	32.897672	51.638874	3.384409	1.261252	66.641748	8.760664	0.0
min	18.000000	5.334000e+03	0.000000	1.000000	0.000000	0.000000	0.000000	68.000000	3.200000	2.0
25%	3113.250000	4.975800e+04	6.000000	9.000000	53.330000	0.000000	0.000000	227.000000	39.100000	2.0
50%	5961.500000	2.707495e+05	19.000000	23.000000	80.000000	2.000000	0.000000	270.000000	44.500000	2.0
75%	8329.750000	3.481440e+05	44.000000	49.000000	104.812500	4.000000	1.000000	311.000000	48.500000	2.0
max	11145.000000	1.158100e+06	264.000000	173.000000	460.000000	33.000000	14.000000	445.000000	50.000000	2.0

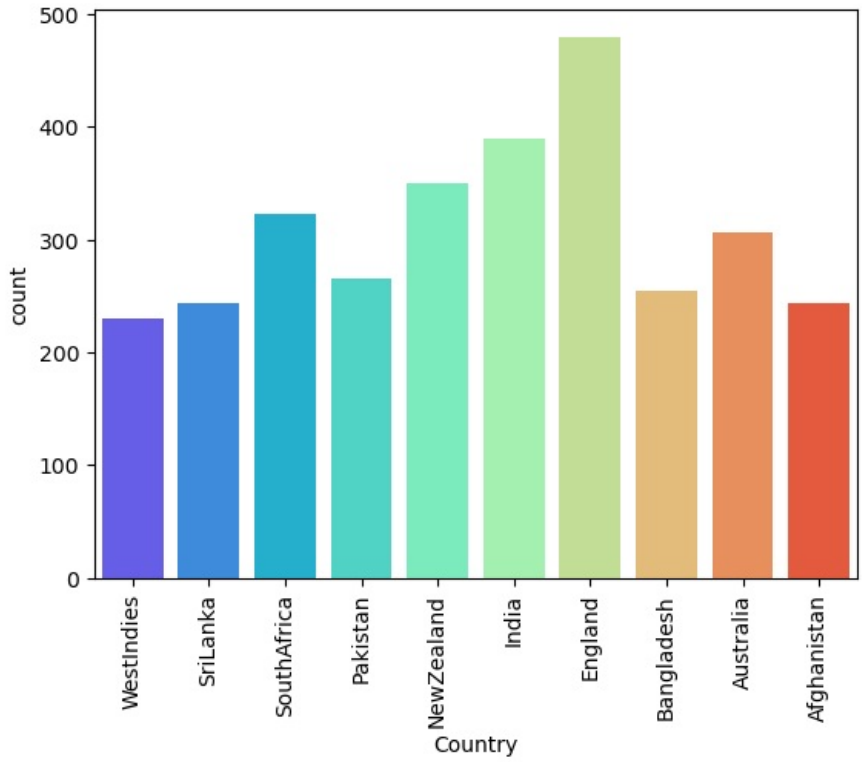
In [9]:
```
sns.pairplot(df)
plt.show()
```



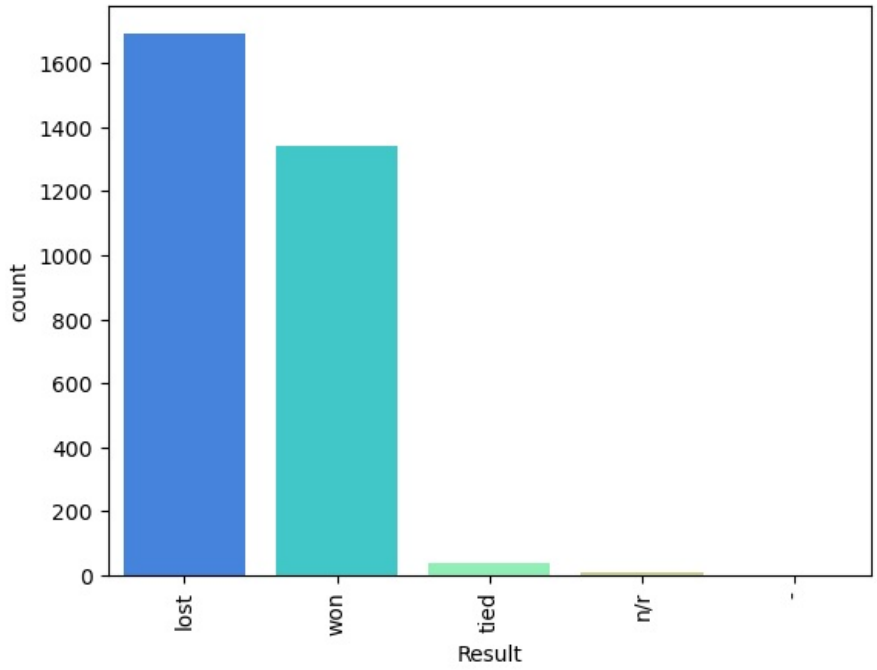
In [10]:
```
df['Country'].value_counts()
```

Out[10]:
```
England         480
India           390
NewZealand      350
SouthAfrica     323
Australia       306
Pakistan        265
Bangladesh      254
SriLanka        244
Afghanistan     244
WestIndies      230
Name: Country, dtype: int64
```

In [11]:
```
sns.countplot(x='Country', data=df, palette='rainbow')
plt.xticks(rotation=90)
plt.show()
```



In [12]:
```
sns.countplot(x='Result', data=df, palette='rainbow')
plt.xticks(rotation=90)
plt.show()
```

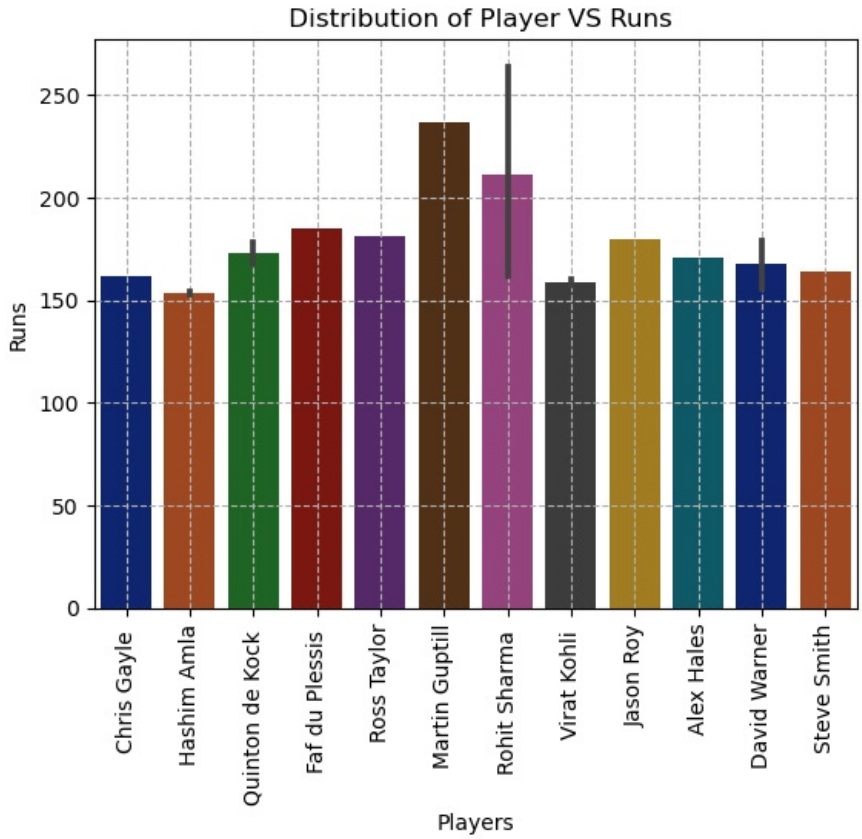


In [13]:
```
x = df.loc[df['Runs']>150]
arr = x['Player'].values
```

In [14]:
```
player  = x['Player'].values
runs = x['Runs'].values
print(player,runs)
```

```
['Chris Gayle ' 'Hashim Amla' 'Hashim Amla' 'Quinton de Kock '
 'Quinton de Kock ' 'Faf du Plessis ' 'Ross Taylor' 'Martin Guptill'
 'Rohit Sharma ' 'Rohit Sharma ' 'Rohit Sharma ' 'Virat Kohli '
 'Virat Kohli ' 'Jason Roy' 'Alex Hales' 'David Warner' 'David Warner'
 'Steve Smith'] [162 153 154 178 168 185 181 237 264 208 162 160 157 180 171 156 179 164]
```

In [15]:
```
sns.barplot(x=player,y=runs, palette='dark')
plt.xticks(rotation=90)
plt.title(' Distribution of Player VS Runs')
plt.xlabel('Players')
plt.ylabel('Runs')
plt.grid(linestyle='--')
plt.show()
```

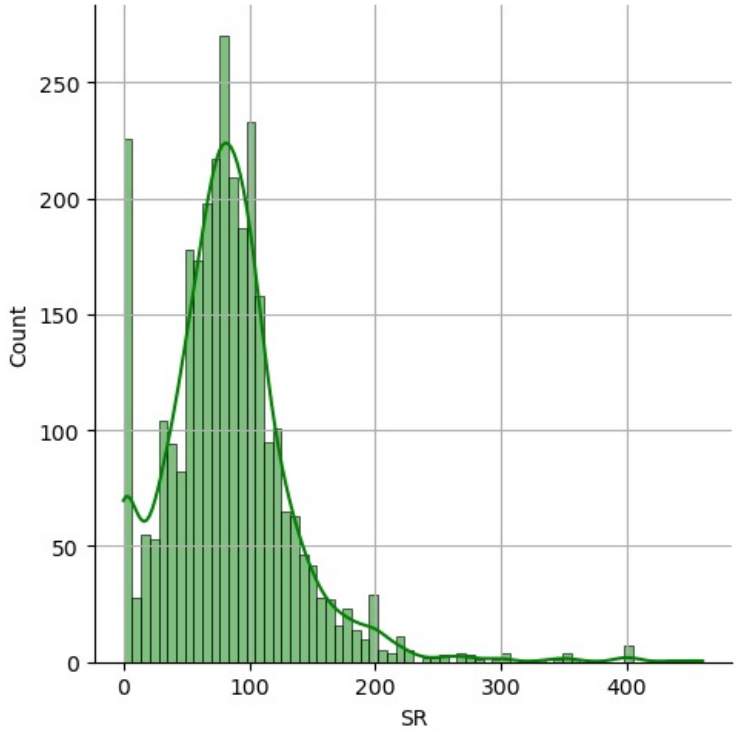


In [16]:
```
df.columns
```

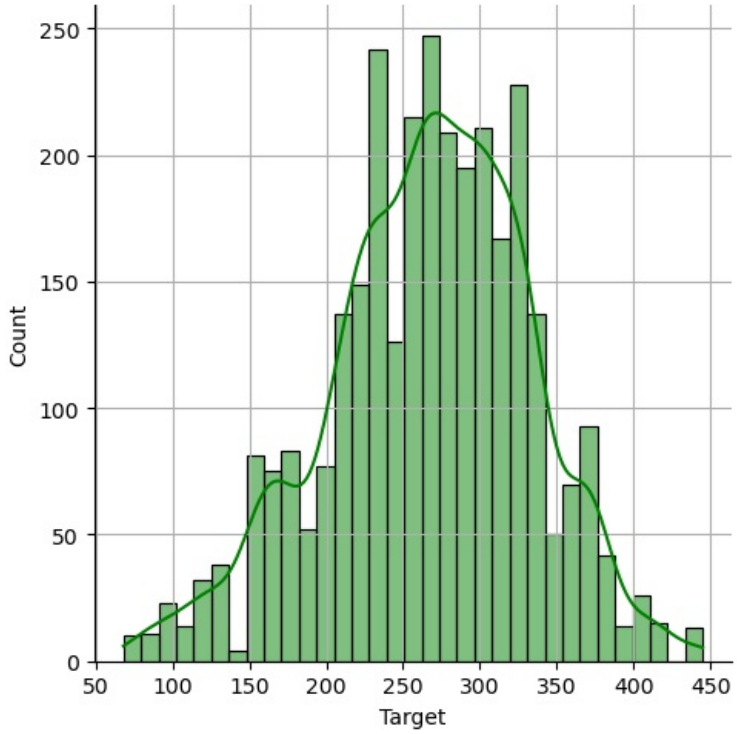
Out[16]:
```
Index(['ID', 'Player_ID', 'Player', 'Country', 'Opposition', 'Bat1', 'Runs',
       'BF', 'SR', '4s', '6s', 'Ground', 'Start Date', 'Match_ID', 'Team Runs',
       'Target', 'Overs', 'RPO', 'Inns', 'Result'],
      dtype='object')
```

https://github.com/varshithgitub/Cricket-Player-Performance-Prediction-Using-Machine-Learning/blob/main/Cricket%20Player%20Prediction.ipynb

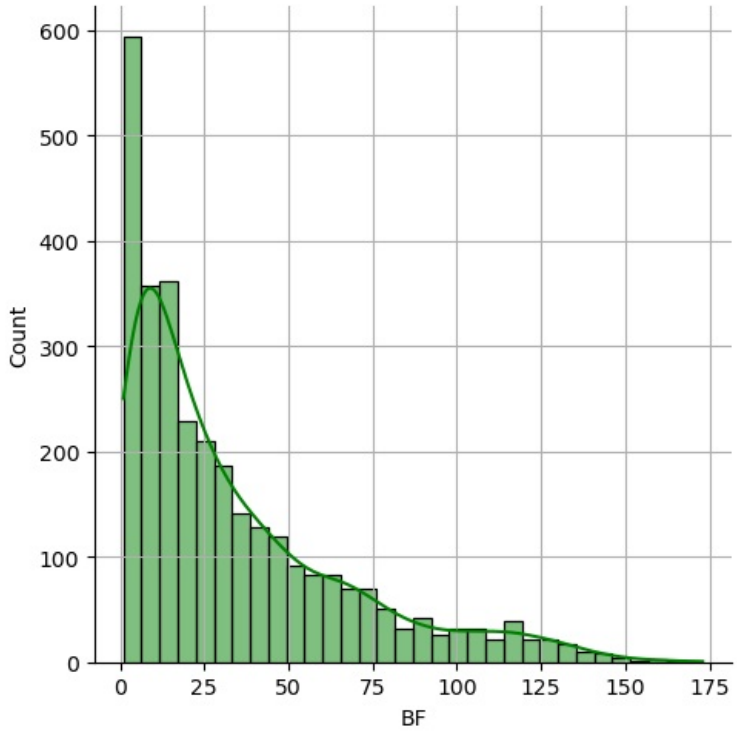
In [17]:
```
sns.displot(df['SR'], kde=True, color='green')
plt.grid()
plt.show()
```



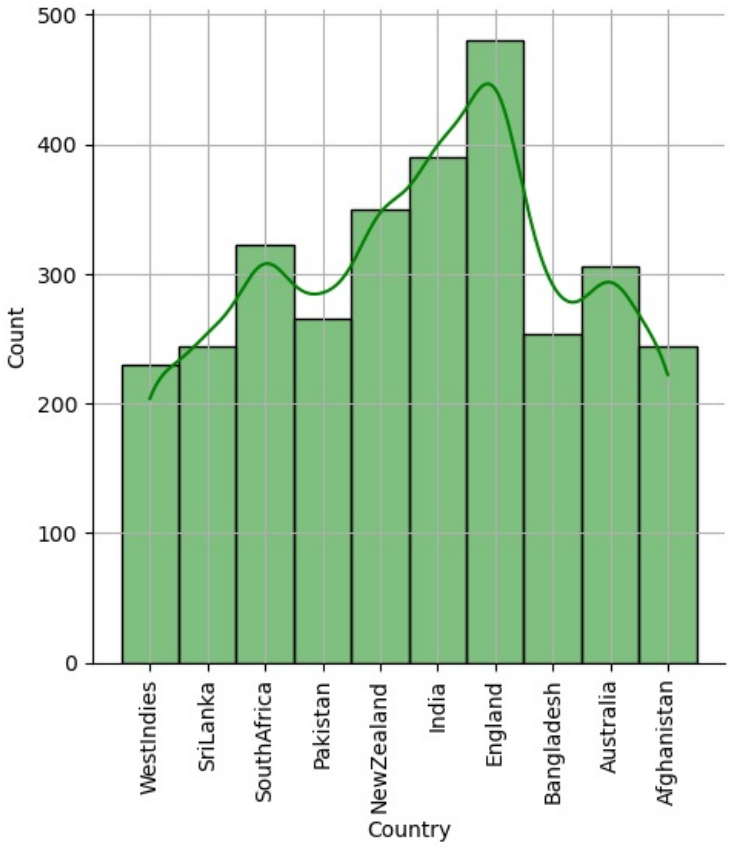
In [18]:
```
sns.displot(df['Target'],kde=True, color='green')
plt.grid()
plt.show()
```



In [19]:
```
sns.displot(df['BF'], kde=True, color='green')
plt.grid()
plt.show()
```



In [20]:
```
sns.displot(df['Country'], kde=True, color='green')
plt.grid()
plt.xticks(rotation =90)
plt.show()
```



In [21]:
```
df = pd.get_dummies(df)
```

In [22]:
```
df
```

Out[22]:

	ID	Player_ID	Runs	BF	SR	4s	6s	Target	Overs	Inns	...	RPO_8.11	RPO_8.19	RPO_8.32	RPO_8.67	RPO_9.45	Result_-
7	18	49619	1	1	100.00	0	0	323.0	49.4	2.0	...	0	0	0	0	0	0
9	27	49619	4	5	80.00	0	0	226.0	27.5	2.0	...	0	0	0	0	0	0
10	30	49619	0	3	0.00	0	0	361.0	43.4	2.0	...	0	0	0	0	0	0
11	31	49619	3	5	60.00	0	0	316.0	40.3	2.0	...	0	0	0	0	0	0
12	32	49619	7	17	41.17	0	0	332.0	46.1	2.0	...	0	0	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8810	11140	352048	4	5	80.00	0	0	250.0	41.2	2.0	...	0	0	0	0	0	0
8811	11141	352048	42	38	110.52	5	0	256.0	42.1	2.0	...	0	0	0	0	0	0
8812	11142	352048	10	7	142.85	1	0	258.0	49.3	2.0	...	0	0	0	0	0	0
8814	11144	352048	15	46	32.60	1	0	253.0	49.5	2.0	...	0	0	0	0	0	0
8815	11145	352048	46	61	75.40	6	1	162.0	41.5	2.0	...	0	0	0	0	0	0

3086 rows × 1750 columns

In [23]:
```
df.columns.tolist()
```

Out[23]:
```
['ID',
 'Player_ID',
 'Runs',
 'BF',
 'SR',
 '4s',
 '6s',
 'Target',
 'Overs',
 'Inns',
 'Player_Aaron Finch ',
 'Player_Abid Ali',
 'Player_Adam Zampa',
 'Player_Adil Rashid',
 'Player_Aftab Alam',
 'Player_Aiden Markram',
 'Player_Alex Carey ',
 'Player_Alex Hales',
 'Player_Andile Phehlukwayo',
 'Player_Andre Russell',
 'Player_Angelo Mathews',
 'Player_Anrich Nortje',
```

```
'Player_Asghar Afghan',
'Player_Ashley Nurse',
'Player_Avishka Fernando',
'Player_Babar Azam ',
'Player_Ben Stokes',
'Player_Bhuvneshwar Kumar',
'Player_Carlos Brathwaite',
'Player_Chris Gayle ',
'Player_Chris Morris',
'Player_Chris Woakes',
'Player_Colin Munro',
'Player_Colin de Grandhomme',
'Player_Dale Steyn',
'Player_Darren Bravo',
'Player_David Miller',
'Player_David Warner',
'Player_David Willey',
'Player_Dawlat Zadran',
'Player_Dhananjaya de Silva ',
'Player_Dimuth Karunaratne ',
'Player_Dinesh Karthik',
'Player_Dwaine Pretorius',
'Player_Eoin Morgan ',
'Player_Evin Lewis',
'Player_Fabian Allen',
'Player_Faf du Plessis ',
'Player_Faheem Ashraf',
'Player_Fakhar Zaman',
'Player_Glenn Maxwell',
'Player_Gulbadin Naib ',
'Player_Hamid Hassan',
'Player_Hardik Pandya',
'Player_Haris Sohail',
'Player_Hasan Ali',
'Player_Hashim Amla',
'Player_Hashmatullah Shahidi',
'Player_Hazratullah Zazai',
'Player_Henry Nicholls',
'Player_Imad Wasim',
'Player_Imam-ul-Haq',
'Player_Imran Tahir',
'Player_Ish Sodhi',
'Player_Isuru Udana',
'Player_JP Duminy',
'Player_James Neesham',
'Player_Jason Behrendorff',
'Player_Jason Holder ',
'Player_Jason Roy',
'Player_Jasprit Bumrah',
'Player_Jeevan Mendis',
'Player_Jeffrey Vandersay',
'Player_Jhye Richardson',
'Player_Joe Denly',
'Player_Joe Root',
'Player_Jonny Bairstow',
'Player_Jos Buttler ',
'Player_Junaid Khan',
'Player_K. L. Rahul',
'Player_Kagiso Rabada',
'Player_Kane Richardson',
'Player_Kane Williamson ',
'Player_Kedar Jadhav',
'Player_Kemar Roach',
'Player_Kuldeep Yadav',
'Player_Kusal Mendis',
'Player_Kusal Perera ',
'Player_Lahiru Thirimanne',
'Player_Lasith Malinga',
'Player_Liam Plunkett',
'Player_Liton Das',
'Player_Lockie Ferguson',
'Player_Lungi Ngidi',
'Player_MS Dhoni ',
'Player_Mahmudullah',
'Player_Marcus Stoinis',
'Player_Mark Wood',
'Player_Martin Guptill',
'Player_Mashrafe Mortaza ',
'Player_Matt Henry',
'Player_Milinda Siriwardana',
'Player_Mitchell Santner',
'Player_Mitchell Starc',
'Player_Moeen Ali',
'Player_Mohammad Hafeez',
'Player_Mohammad Hasnain',
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'Player_Mohammad Saifuddin',
'Player_Mohammad Shahzad ',
```

```
'Player_Mohammed Shami',
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'Player_Mushfiqur Rahim ',
'Player_Mustafizur Rahman',
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'Player_Noor Ali Zadran',
'Player_Nuwan Pradeep',
'Player_Oshane Thomas',
'Player_Pat Cummins ',
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'Player_Rahmat Shah',
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'Player_Rassie van der Dussen',
'Player_Ravindra Jadeja',
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'Opposition_v Afghanistan',
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```

In [24]:
```
x = df.drop('Runs', axis=1)
y = df['Runs']
```

In [25]:
```
x
```

Out[25]:

	ID	Player_ID	BF	SR	4s	6s	Target	Overs	Inns	Player_Aaron Finch	...	RPO_8.11	RPO_8.19	RPO_8.32	RPO_8.67	RPO_9.45	R
7	18	49619	1	100.00	0	0	323.0	49.4	2.0	0	...	0	0	0	0	0	
9	27	49619	5	80.00	0	0	226.0	27.5	2.0	0	...	0	0	0	0	0	
10	30	49619	3	0.00	0	0	361.0	43.4	2.0	0	...	0	0	0	0	0	
11	31	49619	5	60.00	0	0	316.0	40.3	2.0	0	...	0	0	0	0	0	
12	32	49619	17	41.17	0	0	332.0	46.1	2.0	0	...	0	0	0	0	0	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
8810	11140	352048	5	80.00	0	0	250.0	41.2	2.0	0	...	0	0	0	0	0	
8811	11141	352048	38	110.52	5	0	256.0	42.1	2.0	0	...	0	0	0	0	0	
8812	11142	352048	7	142.85	1	0	258.0	49.3	2.0	0	...	0	0	0	0	0	
8814	11144	352048	46	32.60	1	0	253.0	49.5	2.0	0	...	0	0	0	0	0	
8815	11145	352048	61	75.40	6	1	162.0	41.5	2.0	0	...	0	0	0	0	0	

3086 rows × 1749 columns

In [26]:
```
y
```

Out[26]:
```
7        1
9        4
10       0
11       3
12       7
        ..
8810     4
8811    42
8812    10
8814    15
8815    46
Name: Runs, Length: 3086, dtype: int64
```

In [27]:
```
from sklearn.model_selection import train_test_split
xtrain , xtest, ytrain, ytest = train_test_split(x,y, test_size=0.2, random_state=101)
```

In [28]:
```
print('xtrain',xtrain.shape)
print('xtest',xtest.shape)
print('ytrain',ytrain.shape)
print('ytest',ytest.shape)
```

```
xtrain (2468, 1749)
xtest (618, 1749)
ytrain (2468,)
ytest (618,)
```

In [29]:
```
from sklearn.tree import DecisionTreeRegressor
from sklearn.metrics import mean_squared_error
from sklearn.tree import plot_tree

tree = DecisionTreeRegressor()
tree
```

Out[29]:
```
DecisionTreeRegressor()
```

In [30]:
```
tree.fit(xtrain,ytrain)
```

Out[30]:
```
DecisionTreeRegressor()
```

In [31]:
```
pred1 = tree.predict(xtest)
pred1
```

Out[31]:
```
array([ 56.,  77.,  72.,  29.,  20.,  30., 130.,  11., 100.,  80.,  22.,
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         0.,   0.,  37.,  13.,   1.,   0.,   8.,   5.,  47.,   0.,  57.,
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        72.,   4.,   8.,  22.,  15.,   3.,   4.,  13.,   0.,  39.,  88.,
         1.,  15.,  13., 109.,  31.,   0.,  12.,  34.,  11.,   4.,  11.,
       100.,  32.,  51.,  53.,   0.,   7.,  63.,  36.,  28.,  21.,  36.,
         5.,  44.,  33.,  16.,  11.,   0.,   4.,  17.,  40.,   3.,  22.,
         8.,  46.,  63., 100.,   6.,  11.,  12.,  51.,  44.,   0.,   1.,
        13.,  95.,   6.,  12.,   7.,   4.,   4.,   2.,  71.,  81.,  11.,
        62.,  20., 113., 135.,   0.,  33.,  98.,  33.,   0.,  18.,  74.,
        34.,  44.,  33.,  22.,  87.,  22.,   1.,   0.,  35.,  24.,  59.,
         1.,  16.,   1.,  32.,  30.,  55.,  26.,   9.,  65.,  36.,   2.,
        28.,   1.,  27.,   2.,   6.,   9.,  10.,  90.,  44., 102.,  13.,
        71.,  68.,  32.,   0.,  47.,   5.,   1.,  14.,  59.,  22.,   4.,
         3.,  14.,  17., 100., 179.,   1.,  58.,  16.,  60.,   9.,   0.,
         0.,  82.,  11.,  21., 116.,  38.,  10.,  10.,   3.,  59.,  47.,
        35.,   8.,   0.,  18.,   5.,  19.,  53.,   7.,   5.,   1.,  18.,
        11.,   3.,  64.,  22.,  16.,  11.,   8.,   6.,   1.,   1.,   1.,
        10.,  10.,   0.,  19., 100.,  22.,   3.,  51.,  71.,  27.,  12.,
         1.,  24.,  36.,  54.,  45.,  12.,  22.,   6.,  50.,   6.,  28.,
        25.,   3.,  32.,   1.,  34.,  48.,  49.,  53.,  60.,  43.,   8.,
        38.,  35.,   8.,   0.,  35.,   0.,  56.,  53.,  31.,   0.,  43.,
        87.,   8.,  15.,   3.,   2.,  58.,  33.,   1.,  25.,   2.,  22.,
       100.,  20.,  18.,  10.,  25.,   4.,  17.,  19.,  26.,  30.,  63.,
        13.,  30.,   1.,  10.,   8.,  67.,   7.,  32.,   0.,  55.,  32.,
         7., 125.,  12., 105.,   6.,  54.,   1.,  26.,   2.,  15., 118.,
        22.,   1.,  11.,   1.,   2.,  51.,   2.,   2.,   9.,   0.,  40.,
        13.,   5.,  20.,  32.,  19.,   8.,  14.,   7.,  13.,  41.,  23.,
        12.,   4.,   4.,   7.,   0.,  85.,   9.,  14.,  14.,  17., 125.,
        53.,  20.,  18.,  44.,  12.,   2.,  39.,  46.,   0.,  16.,  12.,
        29.,  87.,  11.,  12.,  22.,  81.,   7.,  40.,   1.,  81.,   4.,
         9.,  39.,   2.,  99.,  21.,  87.,  20.,  10.,   8.,  23.,  15.,
         9.,  44.,  14.,  12.,   2.,  56., 156.,  14.,   7.,  77.,  36.,
        90.,   2.,  97.,  14.,  13.,  14.,  57.,   5.,  39.,  34.,   9.,
         3.,   2.,  83.,   0.,  42.,  10.,  15.,  14.,  51.,  31.,  71.,
        14.,   9.,  75.,  13.,  25.,   2.,   2.,   3.,  87.,  14.,  84.,
         0., 118.,   9.,   0.,  56.,  36.,   6.,  41.,  14.,  15.,  85.,
         4.,  32.])
```
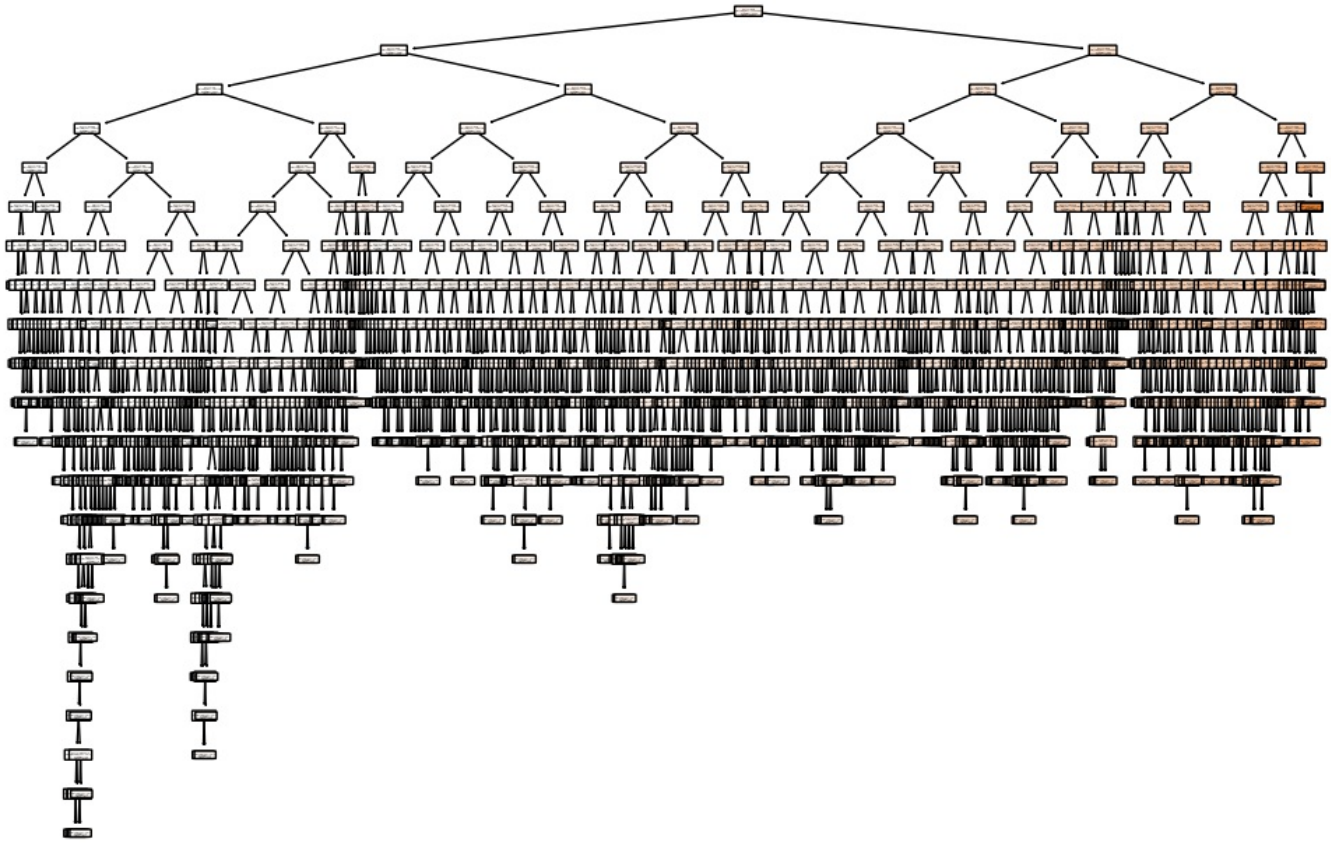

In [32]:
```
mse = mean_squared_error(ytest, pred1)
print('MEAN_SQUARE_ERROR of DECISIONTREEREGRESSOR:', mse)
```

```
MEAN_SQUARE_ERROR of DECISIONTREEREGRESSOR: 27.432038834951456
```

In [33]:
```
# Visualize the decision tree
plt.figure(figsize=(12, 8))
plot_tree(tree, filled=True, rounded=True)
plt.show()
```



In [34]:
```
from sklearn.neighbors import KNeighborsRegressor
from sklearn.ensemble import RandomForestClassifier
from sklearn.linear_model import LinearRegression
from sklearn.svm import SVR
from xgboost import XGBRegressor
from sklearn import metrics
```

In [35]:
```
knn = KNeighborsRegressor()
knn.fit(xtrain,ytrain)

rf = RandomForestClassifier()
rf.fit(xtrain,ytrain)

lr = LinearRegression()
lr.fit(xtrain,ytrain)

svm = SVR()
svm.fit(xtrain,ytrain)

xgb = XGBRegressor()
xgb.fit(xtrain,ytrain)
print( knn,'\n',rf,'\n',lr,'\n',svm,'\n',xgb)
```

```
KNeighborsRegressor()
 RandomForestClassifier()
 LinearRegression()
 SVR()
 XGBRegressor(base_score=None, booster=None, callbacks=None,
              colsample_bylevel=None, colsample_bynode=None,
              colsample_bytree=None, device=None, early_stopping_rounds=None,
              enable_categorical=False, eval_metric=None, feature_types=None,
              gamma=None, grow_policy=None, importance_type=None,
              interaction_constraints=None, learning_rate=None, max_bin=None,
              max_cat_threshold=None, max_cat_to_onehot=None,
              max_delta_step=None, max_depth=None, max_leaves=None,
              min_child_weight=None, missing=nan, monotone_constraints=None,
              multi_strategy=None, n_estimators=None, n_jobs=None,
              num_parallel_tree=None, random_state=None, ...)
```

In [36]:
```
pred1 = knn.predict(xtest)
pred2 = rf.predict(xtest)
pred3 = lr.predict(xtest)
pred4 = svm.predict(xtest)
pred5 = xgb.predict(xtest)
```

In [37]:
```
knn_score = metrics.r2_score(ytest,pred1)
rf_score = metrics.r2_score(ytest,pred2)
lr_score = metrics.r2_score(ytest,pred3)
xgb_score = metrics.r2_score(ytest,pred5)
```

In [38]:
```
print('KNeighborsRegressor: ',knn score)
```

```
print('RandomForestClassifier: ',rf_score)
print('LinearRegression: ',lr_score)
print('SVR: ',svm_score)
print('XGBRegressor: ',xgb_score)
```

```
KNeighborsRegressor:  0.6511594431761305
RandomForestClassifier:  0.9290952668673655
LinearRegression:  0.8985349976007593
SVR:  -0.07099628912959544
XGBRegressor:  0.993137777721142
```

In [39]:
```
final_data = pd.DataFrame({'Models':['KNN','RF','LR','SVR','XGB'],
                           'R2_SCORE':[knn_score,rf_score,lr_score,svm_score,xgb_score]})
```

In [40]:
```
final_data
```

Out[40]:

	Models	R2_SCORE
0	KNN	0.651159
1	RF	0.929095
2	LR	0.898535
3	SVR	-0.070996
4	XGB	0.993138

In [41]:
```
sns.barplot(x=final_data['Models'], y = final_data['R2_SCORE'])
plt.xlabel('Models')
plt.ylabel('R2 Score')
plt.title('R2 Score for Different Models')

plt.show()
```