LITERACY RATE ANALYSIS

INTRODUCTION

Literacy Rate: Literacy Rate is the number of educated people in a population, over the age of fifteen who can read and write.

import libraries

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from matplotlib import style
import warnings
warnings.filterwarnings('ignore')
```

Read the file

In [3]:
```
lit=pd.read_csv(r"C:\Users\SHEREENA\Downloads\GOI.csv")
lit
```

Out[3]:

	Category	Country/ States/ Union Territories Name	Literacy Rate (Persons) - Total - 2001	Literacy Rate (Persons) - Total - 2011	Literacy Rate (Persons) - Rural - 2001	Literacy Rate (Persons) - Rural - 2011	Literacy Rate (Persons) - Urban - 2001	Literacy Rate (Persons) - Urban - 2011
0	Country	INDIA	64.8	73.0	58.7	67.8	79.9	84.1
1	State	Andhra Pradesh	60.5	67.0	54.5	60.4	76.1	80.1
2	State	Arunachal Pradesh	54.3	65.4	47.8	59.9	78.3	82.9
3	State	Assam	63.3	72.2	59.7	69.3	85.3	88.5
4	State	Bihar	47.0	61.8	43.9	59.8	71.9	76.9
5	State	Chhattisgarh	64.7	70.3	60.5	66.0	80.6	84.0
6	State	Goa	82.0	88.7	79.7	86.6	84.4	90.0
7	State	Gujarat	69.1	78.0	61.3	71.7	81.8	86.3
8	State	Haryana	67.9	75.6	63.2	71.4	79.2	83.1
9	State	Himachal Pradesh	76.5	82.8	75.1	81.9	88.9	91.1
10	State	Jammu & Kashmir	55.5	67.2	49.8	63.2	71.9	77.1
11	State	Jharkhand	53.6	66.4	45.7	61.1	79.1	82.3
12	State	Karnataka	66.6	75.4	59.3	68.7	80.6	85.8
13	State	Kerala	90.9	94.0	90.0	93.0	93.2	95.1
14	State	Madhya Pradesh	63.7	69.3	57.8	63.9	79.4	82.8
15	State	Maharashtra	76.9	82.3	70.4	77.0	85.5	88.7
16	State	Manipur	70.5	76.9	67.3	73.4	79.3	85.4
17	State	Meghalaya	62.6	74.4	56.3	69.9	86.3	90.8
18	State	Mizoram	88.8	91.3	81.3	84.1	96.1	97.6
19	State	Nagaland	66.6	79.6	62.8	75.3	84.7	89.6
20	State	Odisha	63.1	72.9	59.8	70.2	80.8	85.7
21	State	Punjab	69.7	75.8	64.7	71.4	79.1	83.2
22	State	Rajasthan	60.4	66.1	55.3	61.4	76.2	79.7
23	State	Sikkim	68.8	81.4	66.8	78.9	83.9	88.7
24	State	Tamil Nadu	73.5	80.1	66.2	73.5	82.5	87.0
25	State	Tripura	73.2	87.2	69.7	84.9	89.2	93.5
26	State	Uttar Pradesh	56.3	67.7	52.5	65.5	69.8	75.1
27	State	Uttarakhand	71.6	78.8	68.1	76.3	81.4	84.5
28	State	West Bengal	68.6	76.3	63.4	72.1	81.2	84.8

	Category	Country/ States/ Union Territories Name	Literacy Rate (Persons) - Total - 2001	Literacy Rate (Persons) - Total - 2011	Literacy Rate (Persons) - Rural - 2001	Literacy Rate (Persons) - Rural - 2011	Literacy Rate (Persons) - Urban - 2001	Literacy Rate (Persons) - Urban - 2011
29	Union Territory	A & N Islands	81.3	86.6	78.7	84.5	86.6	90.1
30	Union Territory	Chandigarh	81.9	86.0	75.6	80.7	82.6	86.2
31	Union Territory	D & N Haveli	57.6	76.2	49.3	64.1	84.4	89.8
32	Union Territory	Daman & Diu	78.2	87.1	75.8	81.4	82.3	89.0
33	Union Territory	Lakshadweep	86.7	91.8	85.0	91.6	88.6	91.9
34	Union Territory	NCT of Delhi	81.7	86.2	78.1	81.9	81.9	86.3
35	Union Territory	Puducherry	81.2	85.8	74.0	80.1	84.8	88.5

Rename the columns

In [4]:
```
lit.rename(columns={'Country/ States/ Union Territories Name':'Place','Literacy R
```

In [5]:
```
lit.rename(columns={'Literacy Rate (Persons) - Rural - 2001':'LR_rural_2001','Lit
```

In [7]:
```
lit.rename(columns={'Literacy Rate (Persons) - Urban - 2001':'LR_urban_2001','Lit
```

In [10]:
```
lit
```

Out[10]:

	Category	Place	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_
0	Country	INDIA	64.8	73.0	58.7	67.8	
1	State	Andhra Pradesh	60.5	67.0	54.5	60.4	
2	State	Arunachal Pradesh	54.3	65.4	47.8	59.9	
3	State	Assam	63.3	72.2	59.7	69.3	
4	State	Bihar	47.0	61.8	43.9	59.8	
5	State	Chhattisgarh	64.7	70.3	60.5	66.0	
6	State	Goa	82.0	88.7	79.7	86.6	
7	State	Gujarat	69.1	78.0	61.3	71.7	
8	State	Haryana	67.9	75.6	63.2	71.4	
9	State	Himachal Pradesh	76.5	82.8	75.1	81.9	
10	State	Jammu & Kashmir	55.5	67.2	49.8	63.2	
11	State	Jharkhand	53.6	66.4	45.7	61.1	
12	State	Karnataka	66.6	75.4	59.3	68.7	
13	State	Kerala	90.9	94.0	90.0	93.0	
14	State	Madhya Pradesh	63.7	69.3	57.8	63.9	
15	State	Maharashtra	76.9	82.3	70.4	77.0	
16	State	Manipur	70.5	76.9	67.3	73.4	
17	State	Meghalaya	62.6	74.4	56.3	69.9	
18	State	Mizoram	88.8	91.3	81.3	84.1	
19	State	Nagaland	66.6	79.6	62.8	75.3	
20	State	Odisha	63.1	72.9	59.8	70.2	
21	State	Punjab	69.7	75.8	64.7	71.4	
22	State	Rajasthan	60.4	66.1	55.3	61.4	
23	State	Sikkim	68.8	81.4	66.8	78.9	
24	State	Tamil Nadu	73.5	80.1	66.2	73.5	
25	State	Tripura	73.2	87.2	69.7	84.9	
26	State	Uttar Pradesh	56.3	67.7	52.5	65.5	
27	State	Uttarakhand	71.6	78.8	68.1	76.3	
28	State	West Bengal	68.6	76.3	63.4	72.1	
29	Union Territory	A & N Islands	81.3	86.6	78.7	84.5	
30	Union Territory	Chandigarh	81.9	86.0	75.6	80.7	

	Category	Place	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_
31	Union Territory	D & N Haveli	57.6	76.2	49.3	64.1	
32	Union Territory	Daman & Diu	78.2	87.1	75.8	81.4	
33	Union Territory	Lakshadweep	86.7	91.8	85.0	91.6	
34	Union Territory	NCT of Delhi	81.7	86.2	78.1	81.9	
35	Union Territory	Puducherry	81.2	85.8	74.0	80.1	

check how many rows and columns

In [8]:
```
lit.shape
```

Out[8]:
```
(36, 8)
```

check datatypes of attributes

In [9]:
```
lit.dtypes
```

Out[9]:
```
Category          object
Place             object
LR_total_2001    float64
LR_total_2011    float64
LR_rural_2001    float64
LR_rural_2011    float64
LR_urban_2001    float64
LR_urban_2011    float64
dtype: object
```

check indexes

In [10]:
```
lit.index
```

Out[10]:
```
RangeIndex(start=0, stop=36, step=1)
```

check number of dimensions

In [11]:
```
lit.ndim
```

Out[11]:
```
2
```

size of dataset

In [12]:
```
lit.size
```

Out[12]:
```
288
```

check datatype is empty or not

In [13]:
```
lit.empty
```

Out[13]:
```
False
```

print the column names

In [14]:
```
lit.columns
```

Out[14]:
```
Index(['Category', 'Place', 'LR_total_2001', 'LR_total_2011', 'LR_rural_2001',
       'LR_rural_2011', 'LR_urban_2001', 'LR_urban_2011'],
      dtype='object')
```

print top ten rows

In [15]:
```
lit.head(10)
```

Out[15]:

	Category	Place	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_2(
0	Country	INDIA	64.8	73.0	58.7	67.8	7
1	State	Andhra Pradesh	60.5	67.0	54.5	60.4	7
2	State	Arunachal Pradesh	54.3	65.4	47.8	59.9	7
3	State	Assam	63.3	72.2	59.7	69.3	8
4	State	Bihar	47.0	61.8	43.9	59.8	7
5	State	Chhattisgarh	64.7	70.3	60.5	66.0	8
6	State	Goa	82.0	88.7	79.7	86.6	8
7	State	Gujarat	69.1	78.0	61.3	71.7	8
8	State	Haryana	67.9	75.6	63.2	71.4	7
9	State	Himachal Pradesh	76.5	82.8	75.1	81.9	8

print bottom 10rows

In [16]:
```
lit.tail(10)
```

Out[16]:

	Category	Place	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_
26	State	Uttar Pradesh	56.3	67.7	52.5	65.5	
27	State	Uttarakhand	71.6	78.8	68.1	76.3	
28	State	West Bengal	68.6	76.3	63.4	72.1	
29	Union Territory	A & N Islands	81.3	86.6	78.7	84.5	
30	Union Territory	Chandigarh	81.9	86.0	75.6	80.7	
31	Union Territory	D & N Haveli	57.6	76.2	49.3	64.1	
32	Union Territory	Daman & Diu	78.2	87.1	75.8	81.4	
33	Union Territory	Lakshadweep	86.7	91.8	85.0	91.6	
34	Union Territory	NCT of Delhi	81.7	86.2	78.1	81.9	
35	Union Territory	Puducherry	81.2	85.8	74.0	80.1	

print the information of dataset

In [17]:
```
lit.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 36 entries, 0 to 35
Data columns (total 8 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Category       36 non-null     object 
 1   Place          36 non-null     object 
 2   LR_total_2001  36 non-null     float64
 3   LR_total_2011  36 non-null     float64
 4   LR_rural_2001  36 non-null     float64
 5   LR_rural_2011  36 non-null     float64
 6   LR_urban_2001  36 non-null     float64
 7   LR_urban_2011  36 non-null     float64
dtypes: float64(6), object(2)
memory usage: 2.4+ KB
```

print statistical information

In [18]:
```
lit.describe()
```

Out[18]:

	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_2001	LR_urban_2011
count	36.000000	36.000000	36.000000	36.000000	36.000000	36.000000
mean	69.433333	77.711111	64.669444	73.413889	82.161111	86.283333
std	10.647709	8.497723	11.459440	9.190497	5.463138	4.982856
min	47.000000	61.800000	43.900000	59.800000	69.800000	75.100000
25%	62.975000	71.725000	57.425000	65.875000	79.275000	83.175000
50%	68.700000	76.600000	63.300000	71.900000	81.850000	86.250000
75%	77.225000	85.850000	74.275000	80.875000	84.925000	89.650000
max	90.900000	94.000000	90.000000	93.000000	96.100000	97.600000

To check is there any missing values

In [19]:
```
lit.isna()
```

Out[19]:

	Category	Place	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_200
0	False	False	False	False	False	False	Fals
1	False	False	False	False	False	False	Fals
2	False	False	False	False	False	False	Fals
3	False	False	False	False	False	False	Fals
4	False	False	False	False	False	False	Fals
5	False	False	False	False	False	False	Fals
6	False	False	False	False	False	False	Fals
7	False	False	False	False	False	False	Fals
8	False	False	False	False	False	False	Fals
9	False	False	False	False	False	False	Fals
10	False	False	False	False	False	False	Fals
11	False	False	False	False	False	False	Fals
12	False	False	False	False	False	False	Fals
13	False	False	False	False	False	False	Fals
14	False	False	False	False	False	False	Fals
15	False	False	False	False	False	False	Fals
16	False	False	False	False	False	False	Fals
17	False	False	False	False	False	False	Fals
18	False	False	False	False	False	False	Fals
19	False	False	False	False	False	False	Fals
20	False	False	False	False	False	False	Fals
21	False	False	False	False	False	False	Fals
22	False	False	False	False	False	False	Fals
23	False	False	False	False	False	False	Fals
24	False	False	False	False	False	False	Fals
25	False	False	False	False	False	False	Fals
26	False	False	False	False	False	False	Fals
27	False	False	False	False	False	False	Fals
28	False	False	False	False	False	False	Fals
29	False	False	False	False	False	False	Fals
30	False	False	False	False	False	False	Fals
31	False	False	False	False	False	False	Fals
32	False	False	False	False	False	False	Fals
33	False	False	False	False	False	False	Fals

	Category	Place	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_200
34	False	False	False	False	False	False	Fals
35	False	False	False	False	False	False	Fals

sum of missing values

In [20]:
```
lit.isna().sum()
```

Out[20]:
```
Category         0
Place            0
LR_total_2001    0
LR_total_2011    0
LR_rural_2001    0
LR_rural_2011    0
LR_urban_2001    0
LR_urban_2011    0
dtype: int64
```

check the duplicate value

In [22]:
```
lit.duplicated()
```

Out[22]:
```
0     False
1     False
2     False
3     False
4     False
5     False
6     False
7     False
8     False
9     False
10    False
11    False
12    False
13    False
14    False
15    False
16    False
17    False
18    False
19    False
20    False
21    False
22    False
23    False
24    False
25    False
26    False
27    False
28    False
29    False
30    False
31    False
32    False
33    False
34    False
35    False
dtype: bool
```

sum of duplicate values

In [23]:
```
lit.duplicated().sum()
```

Out[23]:
```
0
```

number of unique values in dataset

In [24]:
```
lit.nunique()
```

Out[24]:
```
Category          3
Place            36
LR_total_2001    35
LR_total_2011    36
LR_rural_2001    36
LR_rural_2011    34
LR_urban_2001    32
LR_urban_2011    33
dtype: int64
```

print unique in dataset

In [25]:
```
lit['Category'].unique()
```

Out[25]:
```
array(['Country', 'State', 'Union Territory'], dtype=object)
```

print the count of category in the dataset

In [26]:
```
lit.Category.value_counts()
```

Out[26]:
```
State              28
Union Territory     7
Country             1
Name: Category, dtype: int64
```

to show the literacy rate in rural places(2011) >80

In [27]:
```
lit
```

Out[27]:

	Category	Place	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_
0	Country	INDIA	64.8	73.0	58.7	67.8	
1	State	Andhra Pradesh	60.5	67.0	54.5	60.4	
2	State	Arunachal Pradesh	54.3	65.4	47.8	59.9	
3	State	Assam	63.3	72.2	59.7	69.3	
4	State	Bihar	47.0	61.8	43.9	59.8	
5	State	Chhattisgarh	64.7	70.3	60.5	66.0	
6	State	Goa	82.0	88.7	79.7	86.6	
7	State	Gujarat	69.1	78.0	61.3	71.7	
8	State	Haryana	67.9	75.6	63.2	71.4	
9	State	Himachal Pradesh	76.5	82.8	75.1	81.9	
10	State	Jammu & Kashmir	55.5	67.2	49.8	63.2	
11	State	Jharkhand	53.6	66.4	45.7	61.1	
12	State	Karnataka	66.6	75.4	59.3	68.7	
13	State	Kerala	90.9	94.0	90.0	93.0	
14	State	Madhya Pradesh	63.7	69.3	57.8	63.9	
15	State	Maharashtra	76.9	82.3	70.4	77.0	
16	State	Manipur	70.5	76.9	67.3	73.4	
17	State	Meghalaya	62.6	74.4	56.3	69.9	
18	State	Mizoram	88.8	91.3	81.3	84.1	
19	State	Nagaland	66.6	79.6	62.8	75.3	
20	State	Odisha	63.1	72.9	59.8	70.2	
21	State	Punjab	69.7	75.8	64.7	71.4	
22	State	Rajasthan	60.4	66.1	55.3	61.4	
23	State	Sikkim	68.8	81.4	66.8	78.9	
24	State	Tamil Nadu	73.5	80.1	66.2	73.5	
25	State	Tripura	73.2	87.2	69.7	84.9	
26	State	Uttar Pradesh	56.3	67.7	52.5	65.5	
27	State	Uttarakhand	71.6	78.8	68.1	76.3	
28	State	West Bengal	68.6	76.3	63.4	72.1	
29	Union Territory	A & N Islands	81.3	86.6	78.7	84.5	
30	Union Territory	Chandigarh	81.9	86.0	75.6	80.7	

	Category	Place	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_
31	Union Territory	D & N Haveli	57.6	76.2	49.3	64.1	
32	Union Territory	Daman & Diu	78.2	87.1	75.8	81.4	
33	Union Territory	Lakshadweep	86.7	91.8	85.0	91.6	
34	Union Territory	NCT of Delhi	81.7	86.2	78.1	81.9	
35	Union Territory	Puducherry	81.2	85.8	74.0	80.1	

In [28]:
```
rural=lit[['Category','Place','LR_rural_2011']]
rural
```

Out[28]:

	Category	Place	LR_rural_2011
0	Country	INDIA	67.8
1	State	Andhra Pradesh	60.4
2	State	Arunachal Pradesh	59.9
3	State	Assam	69.3
4	State	Bihar	59.8
5	State	Chhattisgarh	66.0
6	State	Goa	86.6
7	State	Gujarat	71.7
8	State	Haryana	71.4
9	State	Himachal Pradesh	81.9
10	State	Jammu & Kashmir	63.2
11	State	Jharkhand	61.1
12	State	Karnataka	68.7
13	State	Kerala	93.0
14	State	Madhya Pradesh	63.9
15	State	Maharashtra	77.0
16	State	Manipur	73.4
17	State	Meghalaya	69.9
18	State	Mizoram	84.1
19	State	Nagaland	75.3
20	State	Odisha	70.2
21	State	Punjab	71.4
22	State	Rajasthan	61.4
23	State	Sikkim	78.9
24	State	Tamil Nadu	73.5
25	State	Tripura	84.9
26	State	Uttar Pradesh	65.5
27	State	Uttarakhand	76.3
28	State	West Bengal	72.1
29	Union Territory	A & N Islands	84.5
30	Union Territory	Chandigarh	80.7
31	Union Territory	D & N Haveli	64.1
32	Union Territory	Daman & Diu	81.4
33	Union Territory	Lakshadweep	91.6

	Category	Place	LR_rural_2011
34	Union Territory	NCT of Delhi	81.9
35	Union Territory	Puducherry	80.1

In [29]:
```
rural.sort_values('LR_rural_2011').tail(10)
```

Out[29]:

	Category	Place	LR_rural_2011
30	Union Territory	Chandigarh	80.7
32	Union Territory	Daman & Diu	81.4
34	Union Territory	NCT of Delhi	81.9
9	State	Himachal Pradesh	81.9
18	State	Mizoram	84.1
29	Union Territory	A & N Islands	84.5
25	State	Tripura	84.9
6	State	Goa	86.6
33	Union Territory	Lakshadweep	91.6
13	State	Kerala	93.0

to show the literacy rate in urban areas (2011) >90

In [30]:
```
urban=lit[['Category','Place','LR_urban_2011']]
urban
```

Out[30]:

	Category	Place	LR_urban_2011
0	Country	INDIA	84.1
1	State	Andhra Pradesh	80.1
2	State	Arunachal Pradesh	82.9
3	State	Assam	88.5
4	State	Bihar	76.9
5	State	Chhattisgarh	84.0
6	State	Goa	90.0
7	State	Gujarat	86.3
8	State	Haryana	83.1
9	State	Himachal Pradesh	91.1
10	State	Jammu & Kashmir	77.1
11	State	Jharkhand	82.3
12	State	Karnataka	85.8
13	State	Kerala	95.1
14	State	Madhya Pradesh	82.8
15	State	Maharashtra	88.7
16	State	Manipur	85.4
17	State	Meghalaya	90.8
18	State	Mizoram	97.6
19	State	Nagaland	89.6
20	State	Odisha	85.7
21	State	Punjab	83.2
22	State	Rajasthan	79.7
23	State	Sikkim	88.7
24	State	Tamil Nadu	87.0
25	State	Tripura	93.5
26	State	Uttar Pradesh	75.1
27	State	Uttarakhand	84.5
28	State	West Bengal	84.8
29	Union Territory	A & N Islands	90.1
30	Union Territory	Chandigarh	86.2
31	Union Territory	D & N Haveli	89.8
32	Union Territory	Daman & Diu	89.0
33	Union Territory	Lakshadweep	91.9

	Category	Place	LR_urban_2011
34	Union Territory	NCT of Delhi	86.3
35	Union Territory	Puducherry	88.5

In [54]:
```
u=urban.loc[(urban["LR_urban_2011"]>=90)]
u
```

Out[54]:

	Category	Place	LR_urban_2011
6	State	Goa	90.0
9	State	Himachal Pradesh	91.1
13	State	Kerala	95.1
17	State	Meghalaya	90.8
18	State	Mizoram	97.6
25	State	Tripura	93.5
29	Union Territory	A & N Islands	90.1
33	Union Territory	Lakshadweep	91.9

These are the places where the literacy rate is greater than 90%.in case of Urban areas ,mizoram has the top most literacy rate.

grouping total literacy rate in 2001 by category wise

In [59]:
```
lrt=lit.groupby(['Category']).agg({'LR_total_2001':'sum'})
lrt
```

Out[59]:

	LR_total_2001
Category	
Country	64.8
State	1886.2
Union Territory	548.6

grouping total literacy rate in 2011 by category wise

In [33]:
```
lit.groupby(['Category']).agg({'LR_total_2011':'sum'})
```

Out[33]:

Category	LR_total_2011
Country	73.0
State	2124.9
Union Territory	599.7

show the maximum rates

In [34]:
```
lit.max()
```

Out[34]:
```
Category         Union Territory
Place                West Bengal
LR_total_2001               90.9
LR_total_2011               94.0
LR_rural_2001               90.0
LR_rural_2011               93.0
LR_urban_2001               96.1
LR_urban_2011               97.6
dtype: object
```

show the minimum rates

In [35]:
```
lit.min()
```

Out[35]:
```
Category               Country
Place            A & N Islands
LR_total_2001             47.0
LR_total_2011             61.8
LR_rural_2001             43.9
LR_rural_2011             59.8
LR_urban_2001             69.8
LR_urban_2011             75.1
dtype: object
```

correlation

In [36]:
```
lit.corr()
```

Out[36]:

	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_2001	LR_u
LR_total_2001	1.000000	0.952126	0.985199	0.934016	0.760652	
LR_total_2011	0.952126	1.000000	0.944638	0.971140	0.814676	
LR_rural_2001	0.985199	0.944638	1.000000	0.960003	0.736025	
LR_rural_2011	0.934016	0.971140	0.960003	1.000000	0.770266	
LR_urban_2001	0.760652	0.814676	0.736025	0.770266	1.000000	
LR_urban_2011	0.749828	0.839234	0.729318	0.784652	0.981313	

query to extract state wise data

In [37]:
```
lit_state=lit.loc[(lit['Category']=='State')]
lit_state
```

Out[37]:

	Category	Place	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urb
1	State	Andhra Pradesh	60.5	67.0	54.5	60.4	
2	State	Arunachal Pradesh	54.3	65.4	47.8	59.9	
3	State	Assam	63.3	72.2	59.7	69.3	
4	State	Bihar	47.0	61.8	43.9	59.8	
5	State	Chhattisgarh	64.7	70.3	60.5	66.0	
6	State	Goa	82.0	88.7	79.7	86.6	
7	State	Gujarat	69.1	78.0	61.3	71.7	
8	State	Haryana	67.9	75.6	63.2	71.4	
9	State	Himachal Pradesh	76.5	82.8	75.1	81.9	

query to extract the data of union territory

In [38]:
```
lit_union=lit.loc[(lit['Category']=='Union Territory')]
lit_union
```

Out[38]:

	Category	Place	LR_total_2001	LR_total_2011	LR_rural_2001	LR_rural_2011	LR_urban_
29	Union Territory	A & N Islands	81.3	86.6	78.7	84.5	
30	Union Territory	Chandigarh	81.9	86.0	75.6	80.7	
31	Union Territory	D & N Haveli	57.6	76.2	49.3	64.1	
32	Union Territory	Daman & Diu	78.2	87.1	75.8	81.4	
33	Union Territory	Lakshadweep	86.7	91.8	85.0	91.6	
34	Union Territory	NCT of Delhi	81.7	86.2	78.1	81.9	
35	Union Territory	Puducherry	81.2	85.8	74.0	80.1	

Higher literacy rate across union territory-2011

In [39]:
```
union_2011=lit_union[['Place','LR_total_2011','LR_rural_2011','LR_urban_2011']]
union_2011
```

Out[39]:

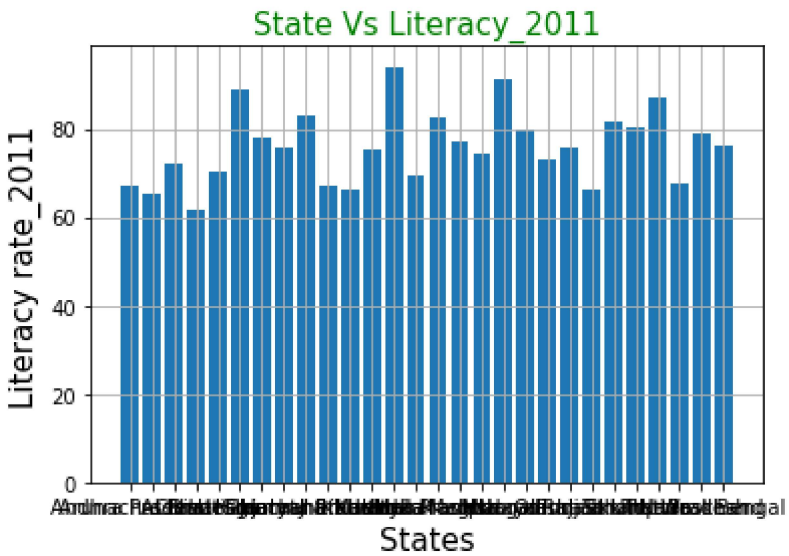
	Place	LR_total_2011	LR_rural_2011	LR_urban_2011
29	A & N Islands	86.6	84.5	90.1
30	Chandigarh	86.0	80.7	86.2
31	D & N Haveli	76.2	64.1	89.8
32	Daman & Diu	87.1	81.4	89.0
33	Lakshadweep	91.8	91.6	91.9
34	NCT of Delhi	86.2	81.9	86.3
35	Puducherry	85.8	80.1	88.5

Among the Union territories Lakshadweep has the highest rate in literacy.

DATA VISUALISATION

Literacy Rate across states

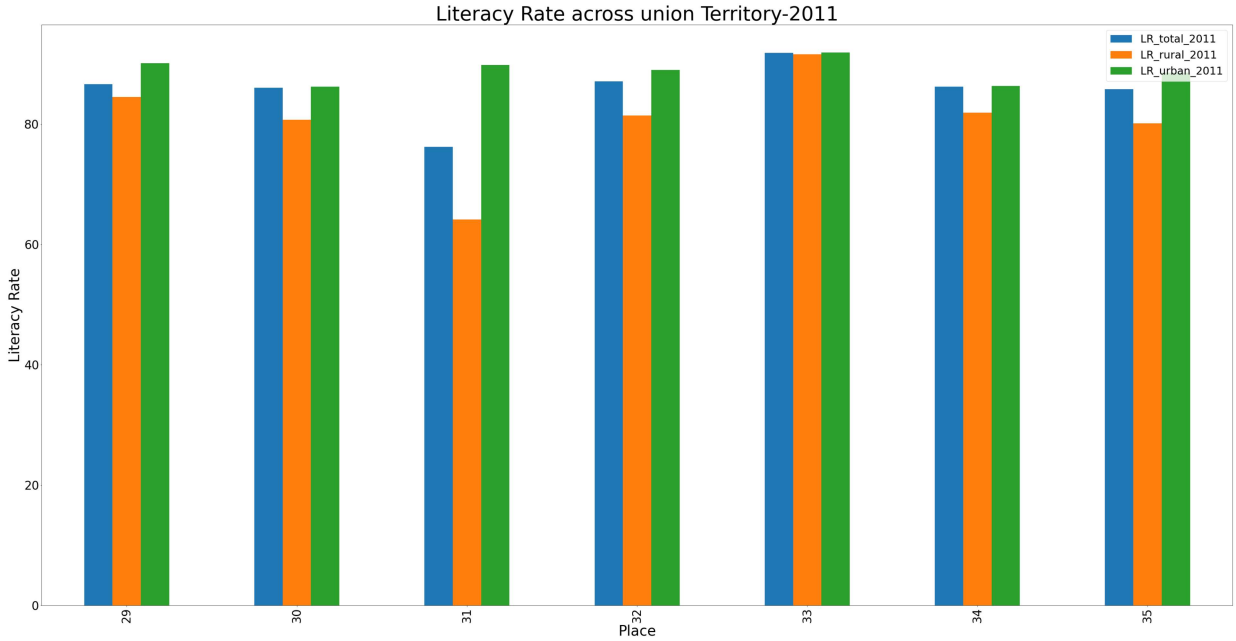
In [52]:
```
plt.bar(lit_state['Place'],lit_state['LR_total_2011'])
plt.title('State Vs Literacy_2011',fontsize=15,color='green')
plt.xlabel('States',fontsize=15)
plt.ylabel('Literacy rate_2011',fontsize=15)
plt.grid(True)
plt.show()
```



Literacy Rate across union Territory-2011

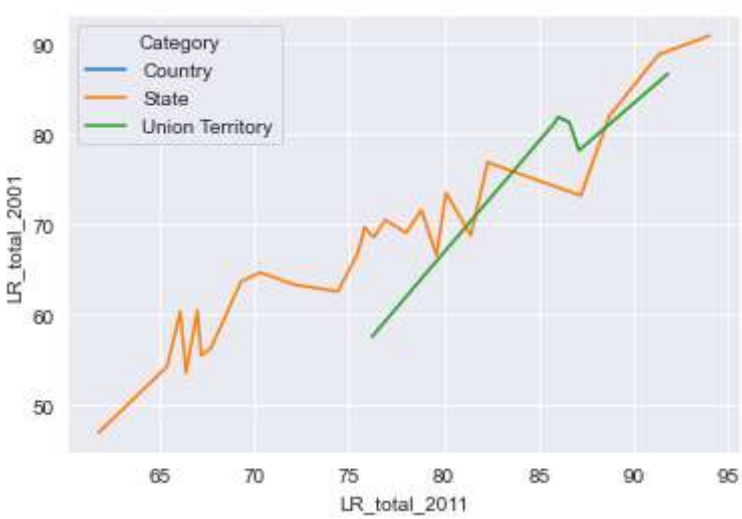
In [45]:
```
union_2011.plot(kind='bar',figsize=(60,30))
plt.tick_params(axis='y',labelsize=33)
plt.tick_params(axis='x',labelsize=33)
plt.xlabel("Place",fontsize=40)
plt.ylabel("Literacy Rate",fontsize=40)
plt.title("Literacy Rate across union Territory-2011",fontsize=55)
plt.legend(["LR_total_2011","LR_rural_2011","LR_urban_2011"],prop={"size":30})
plt.show
```

Out[45]:
```
<function matplotlib.pyplot.show(close=None, block=None)>
```



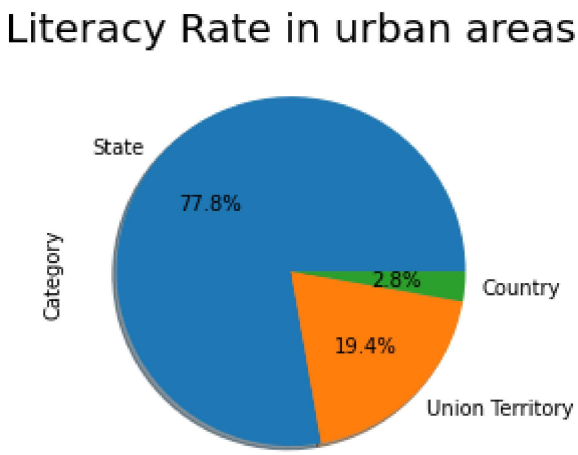
Line plot

In [55]:
```
sns.lineplot(x="LR_total_2011",y="LR_total_2001",hue="Category",data=lit)
plt.show()
```



Pie chart

In [58]:
```
plt.title("Literacy Rate in urban areas",fontsize=20)
urban['Category'].value_counts().plot.pie(autopct="%1.1f%%",shadow=True)
plt.show()
```

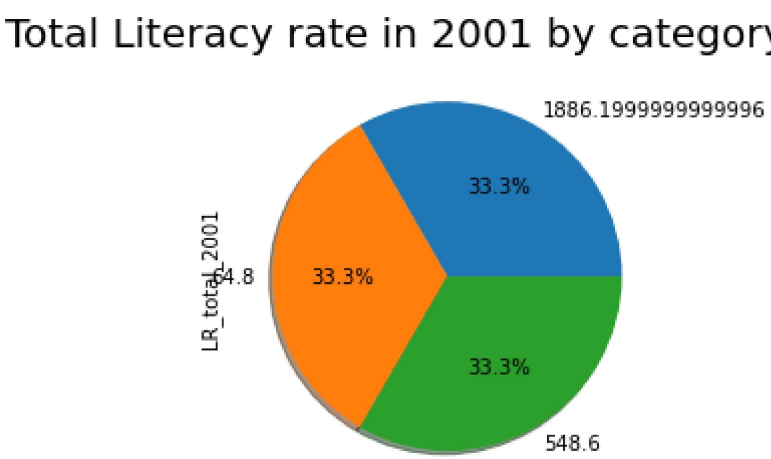


In [60]:
```
lrt
```

Out[60]:

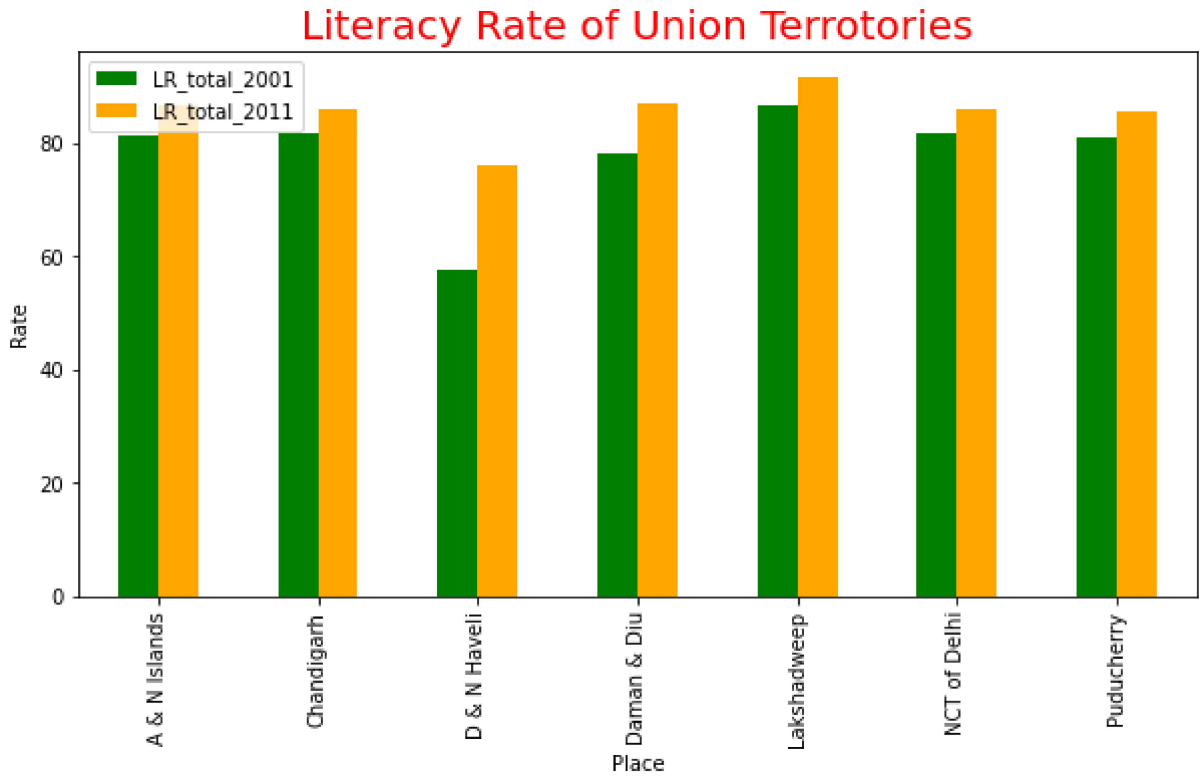
Category	LR_total_2001
Country	64.8
State	1886.2
Union Territory	548.6

In [62]:
```
plt.title("Total Literacy rate in 2001 by category wise",fontsize=20)
lrt['LR_total_2001'].value_counts().plot.pie(autopct="%1.1f%%",shadow=True)
plt.show()
```



Total literacy rate of Union Terrotories in 2001 and 2011

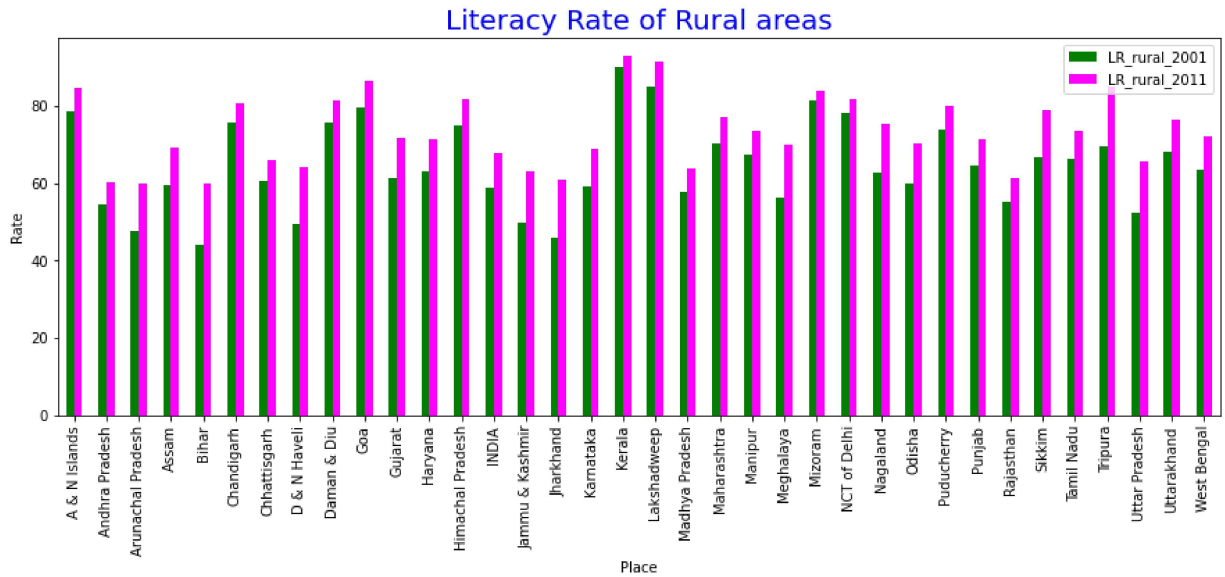
In [72]:
```
lit_union.groupby('Place')[['LR_total_2001','LR_total_2011',]].sum().plot.bar(col

plt.title("Literacy Rate of Union Terrotories",fontsize=20,color="red")
plt.ylabel('Rate')
plt.show()
```



The above graph shows the literacy rate of Union Territories.From this, we can realize that Lekshadweep has the highest rate in literacy from 2001 to 2011.

Literacy rate of rural places in the year 2001 and 2011

In [74]:
```
lit.groupby('Place')[['LR_rural_2001','LR_rural_2011',]].sum().plot.bar(color=
                                                                        ['green','mager
plt.title("Literacy Rate of Rural areas",fontsize=20,color="blue")
plt.ylabel('Rate')
plt.show()
```

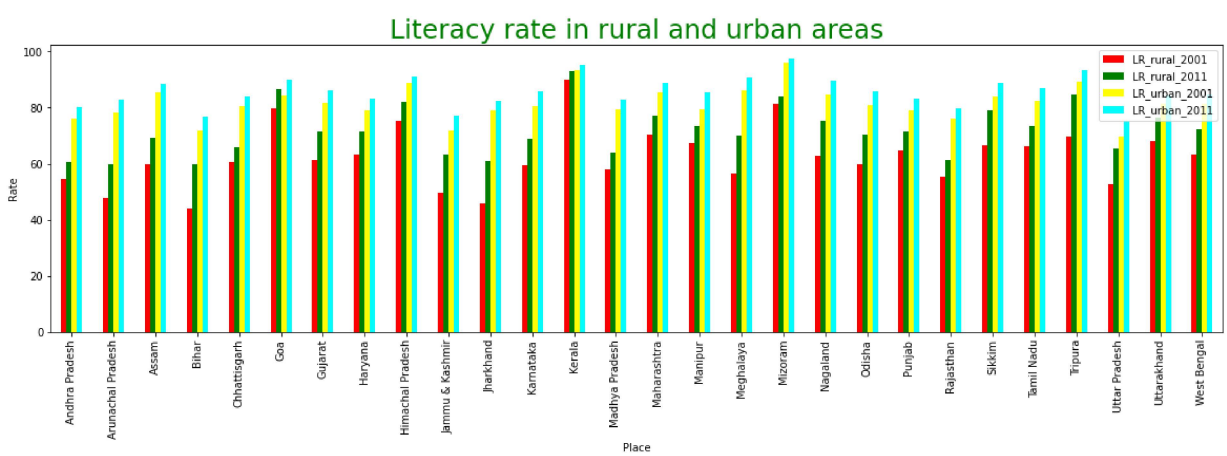


The above graph shows literacy rate of rural areas.Kerala has the highest literacy rate from 2001 to 2011.

Literacy rate in rural and urban areas

In [76]:
```
lit_state.groupby('Place')[['LR_rural_2001','LR_rural_2011','LR_urban_2001','LR_u
                                                                        =['red','gree
plt.title("Literacy rate in rural and urban areas",color="Green",fontsize=25)
plt.ylabel('Rate')
```

Out[76]: Text(0, 0.5, 'Rate')



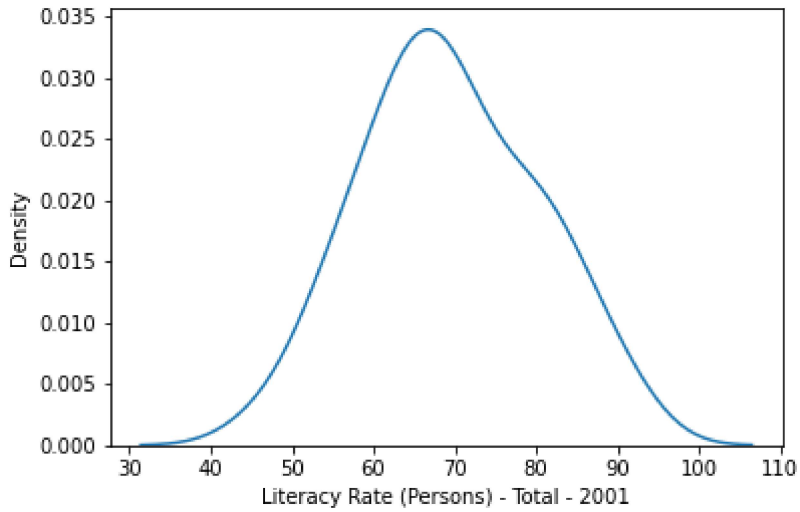
The above graph shows literacy rate is increases linearly from 2001 to 2011.in case of each place it shows higher rate in the year 2011.

strip plot

In [ ]:
```
sns.set_style("darkgrid")
sns.stripplot(x="Place",y="LR_total_2001",hue="LR_total_2011",data=lit_state)
plt.show()
```

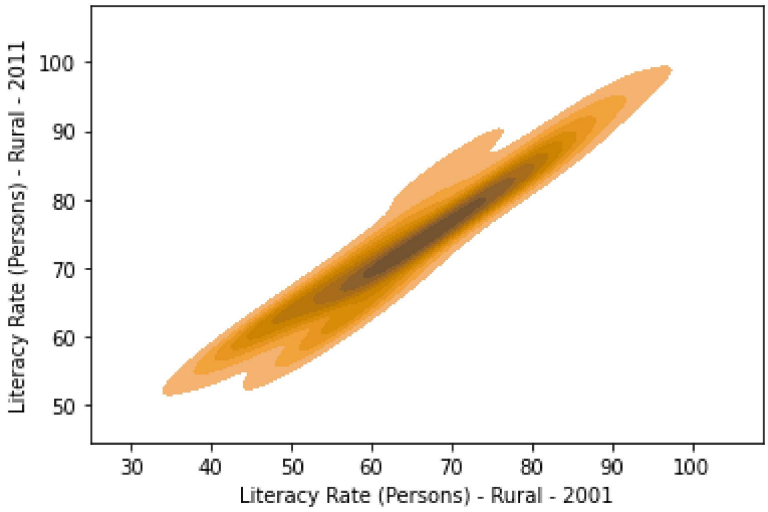
Total literacy rate in 2001(kde plot)

In [29]:
```
sns.kdeplot(lit['Literacy Rate (Persons) - Total - 2001'])
plt.show()
```



Literacy rate in rural places - 2001 and 2011

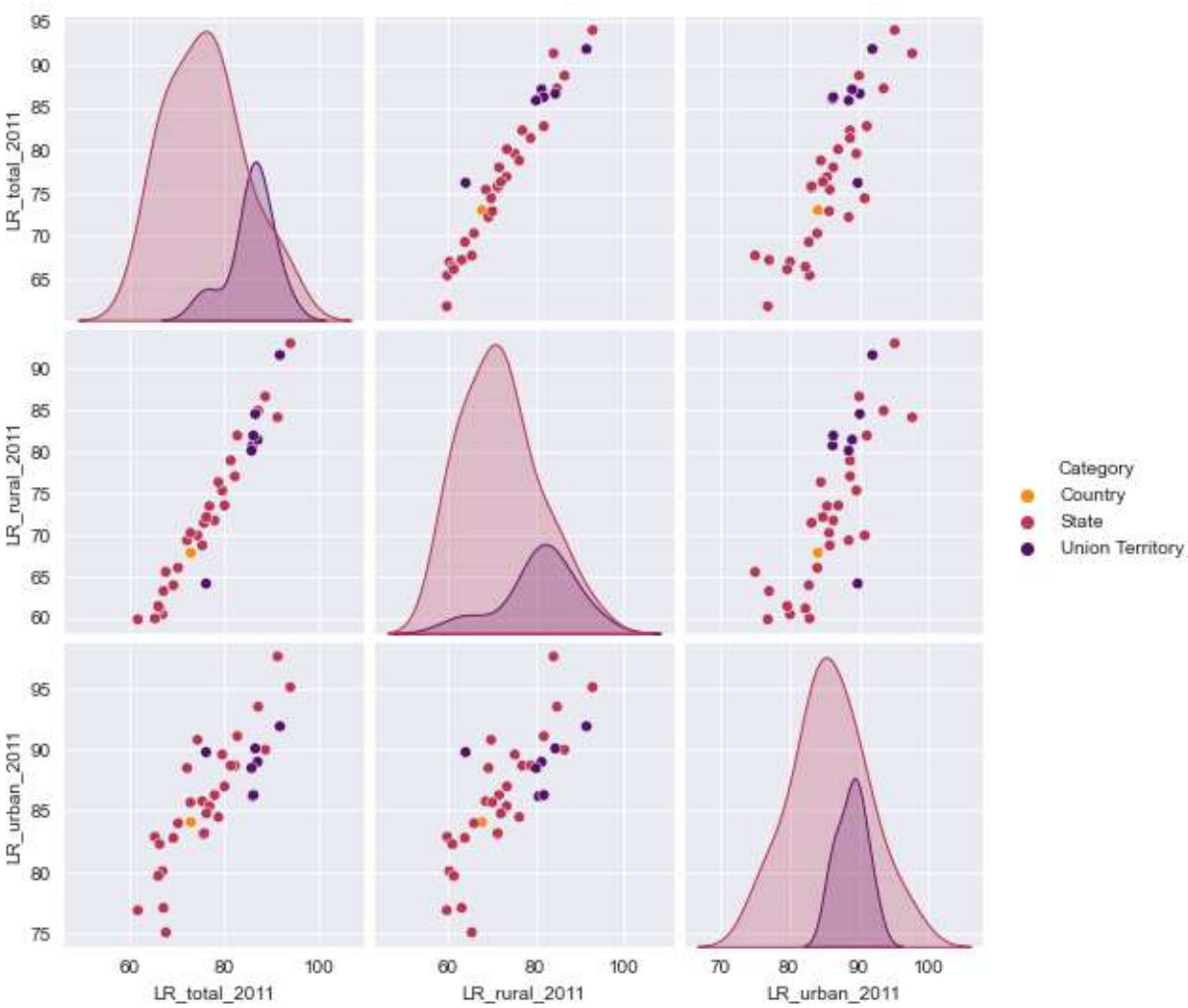
In [32]:
```
sns.kdeplot(lit['Literacy Rate (Persons) - Rural - 2001'],lit['Literacy Rate (Per
plt.show()
```



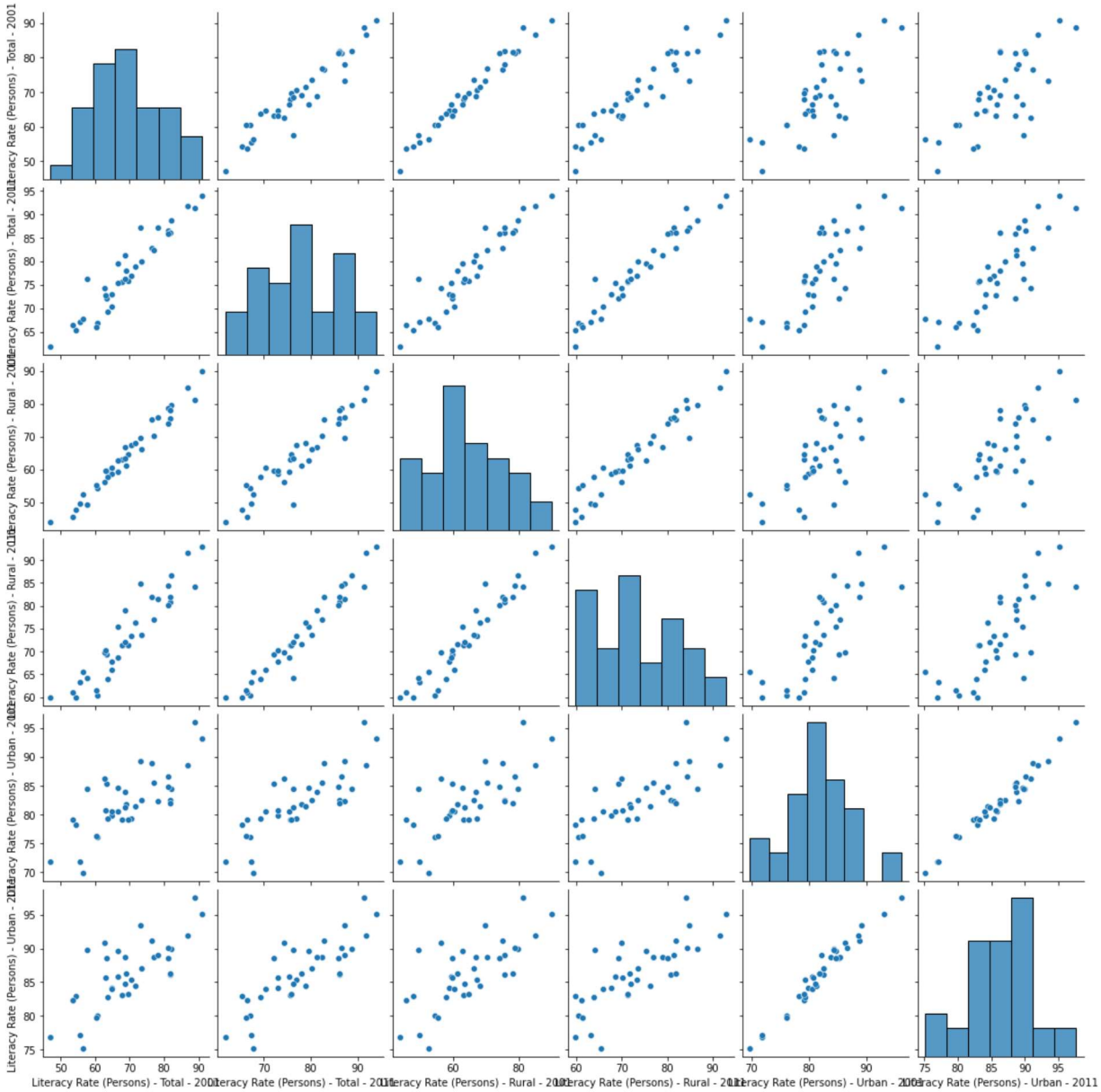
Literacy rate Rural vs Urban in 2011

pairplot

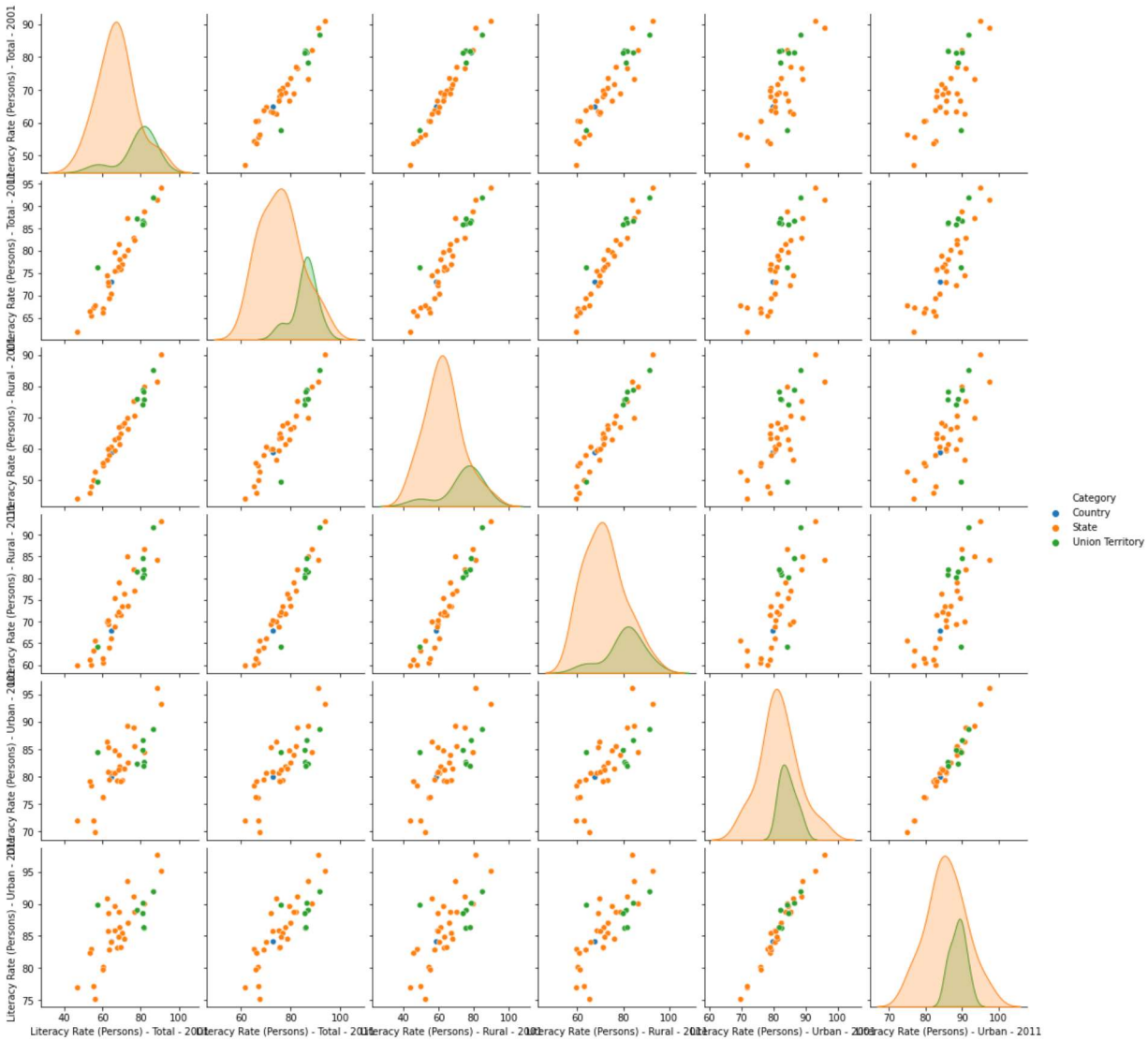
In [53]:
```
sns.pairplot(lit[lit.Category.isin(['Country','State','Union Territory'])],
             hue='Category',
             vars=['LR_total_2011','LR_rural_2011','LR_urban_2011'],
             palette='inferno_r')
plt.show()
```



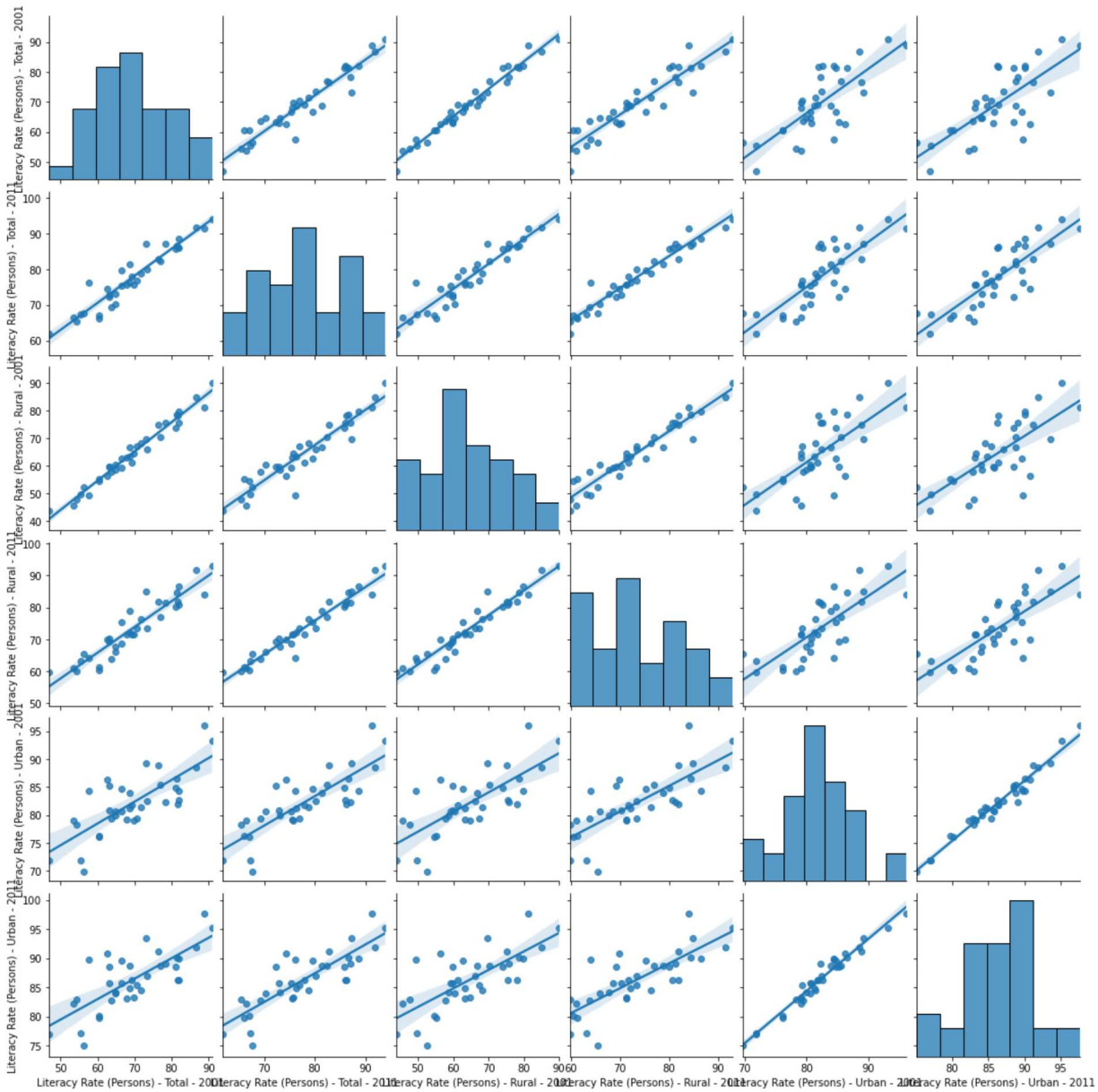
In [33]:
```
sns.pairplot(lit)
plt.show()
```



In [34]:
```
sns.pairplot(lit,diag_kind='kde',hue='Category')
plt.show()
```



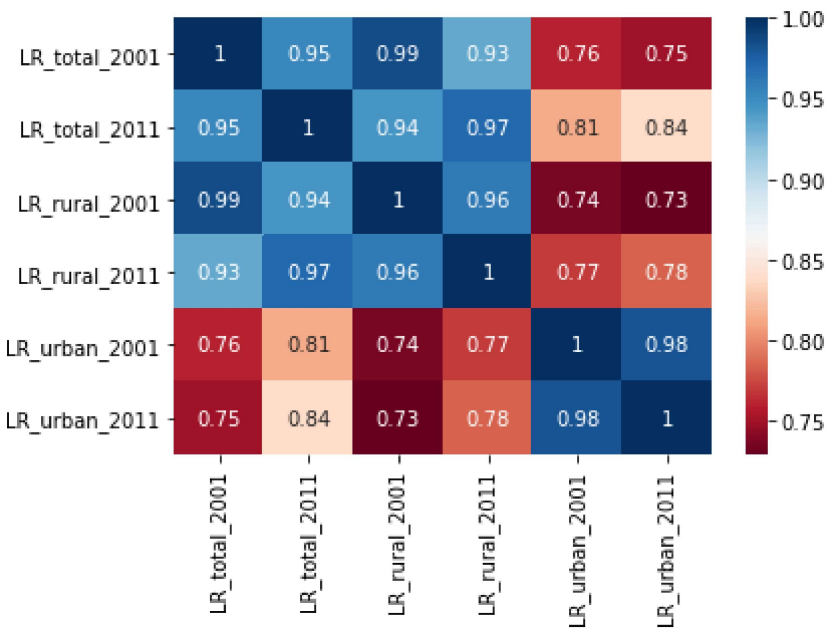
In [35]:
```
sns.pairplot(lit,diag_kind='hist',kind='reg')
plt.show()
```



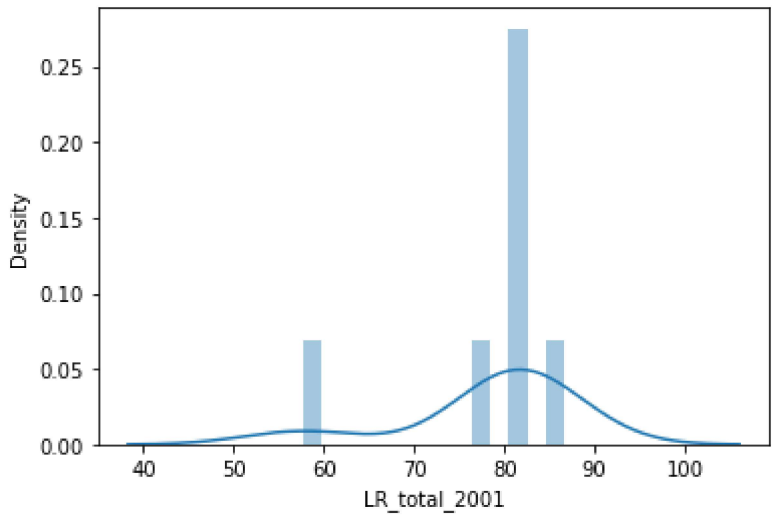
heat map

In [45]:
```
sns.heatmap(lit.corr())
plt.show()
```

In [20]:
```
sns.heatmap(lit.corr(), cmap='RdBu',annot=True)
plt.show()
```



In [25]:
```
sns.distplot(lit_union.LR_total_2001)
plt.show()
```



CONCLUSION

As per the results of 2011 census reveal that there has been an increase in literacy in the country. The literacy rate in the country is 74.04 per cent, 82.14 for males and 65.46 for females. Kerala retained its position by being on top with a 93.91 per cent literacy rate, closely followed by Lakshadweep (92.28 per cent) and Mizoram (91.58 per cent).Literacy in India is a key for socio-economic progress. Despite government programmes, India's literacy rate increased only "sluggishly". The 2011 census, indicated a 2001–2011 decadal literacy growth of 9.2%, which is slower than the growth seen during the previous decade. An old analytical 1990 study estimated that it would take until 2060 for India to achieve universal literacy at then-current rate of progress.

THANKYOU