IOT AND CLOUD COMPUTING LAB_4

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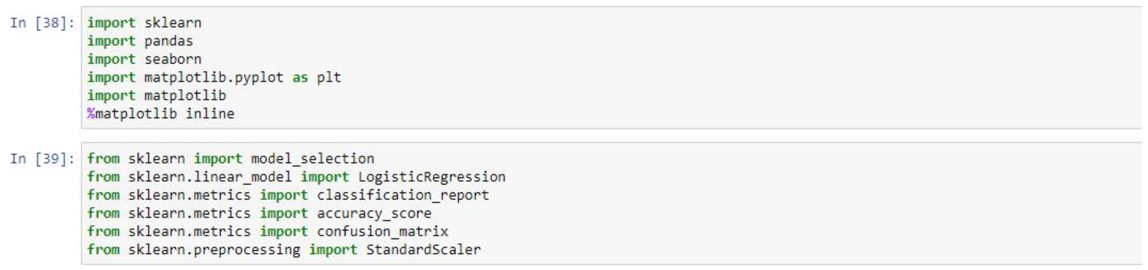
1. Write an ALP to grade(as per 2012 regulation) an array of student marks stored at memory location 5100H. The grade of each student must be stored in location 5200H. assume the last digit of memory address as the roll numbers of students.

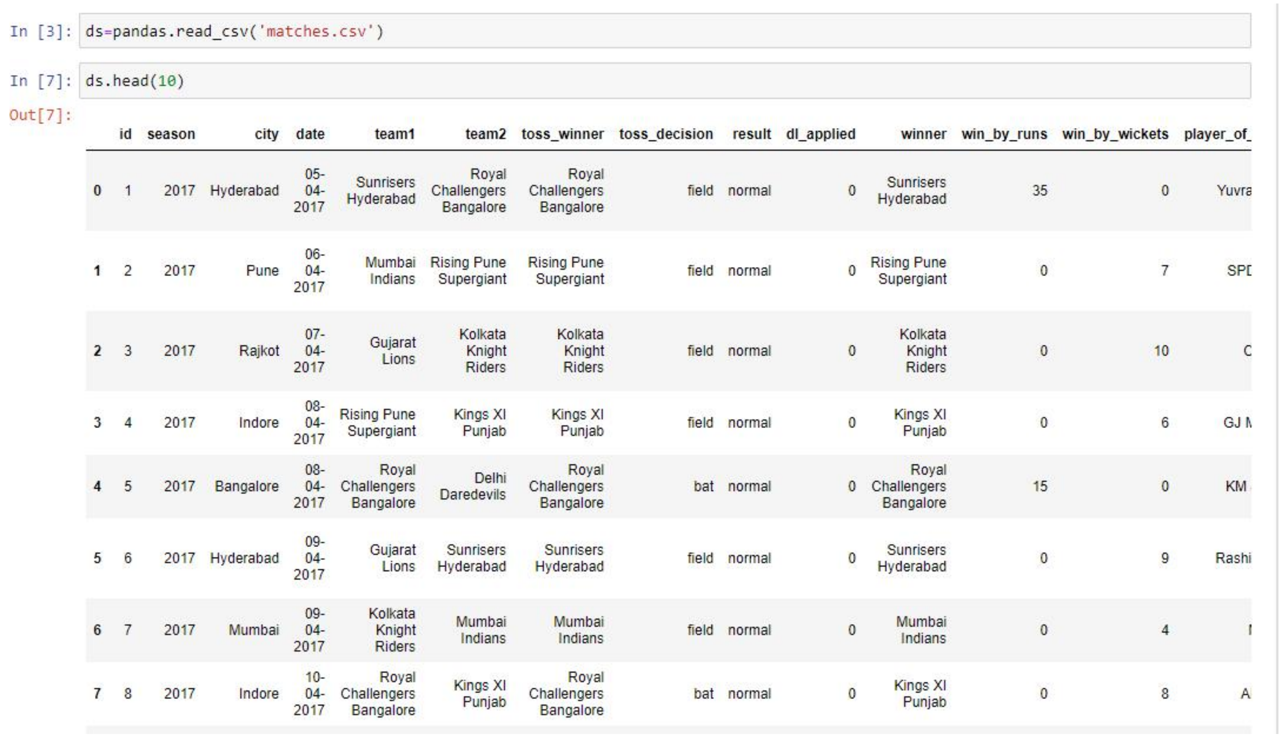
Importing required Modules:



```
In [38]: import sklearn
         import pandas
         import seaborn
         import matplotlib.pyplot as plt
         import matplotlib
         %matplotlib inline
```

```
In [39]: from sklearn import model_selection
         from sklearn.linear_model import LogisticRegression
         from sklearn.metrics import classification_report
         from sklearn.metrics import accuracy_score
         from sklearn.metrics import confusion_matrix
         from sklearn.preprocessing import StandardScaler
```

Reading and Summarizing the SUV Data set:

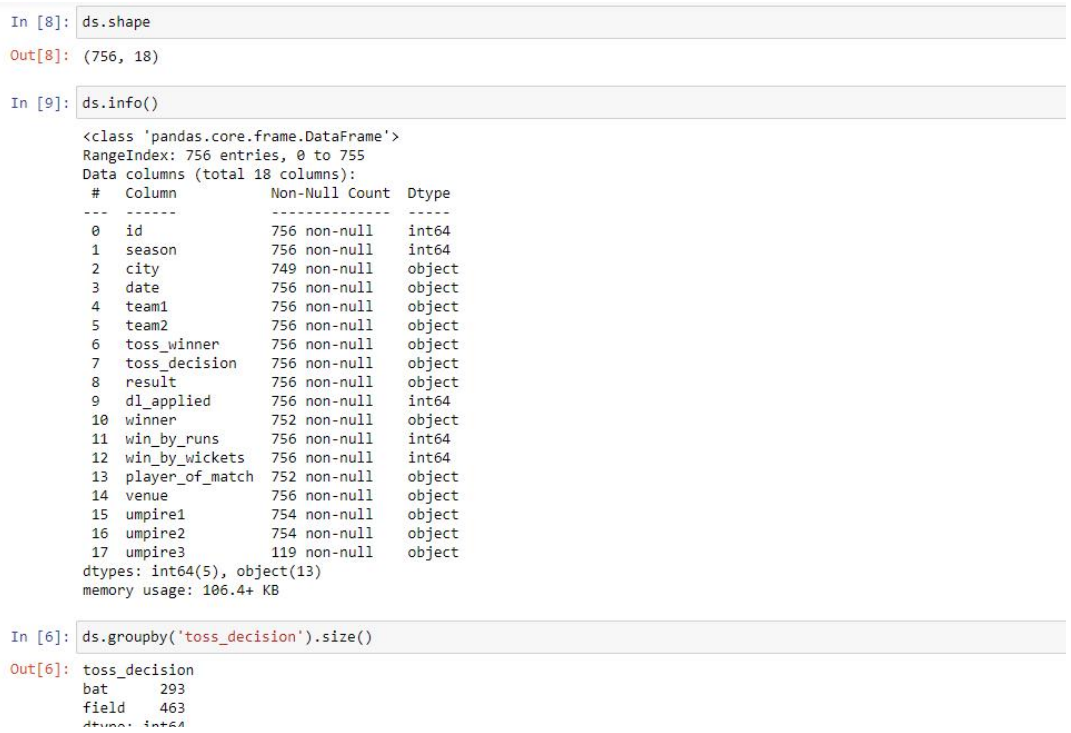


```
In [3]: ds=pandas.read_csv('matches.csv')
```

```
In [7]: ds.head(10)
```

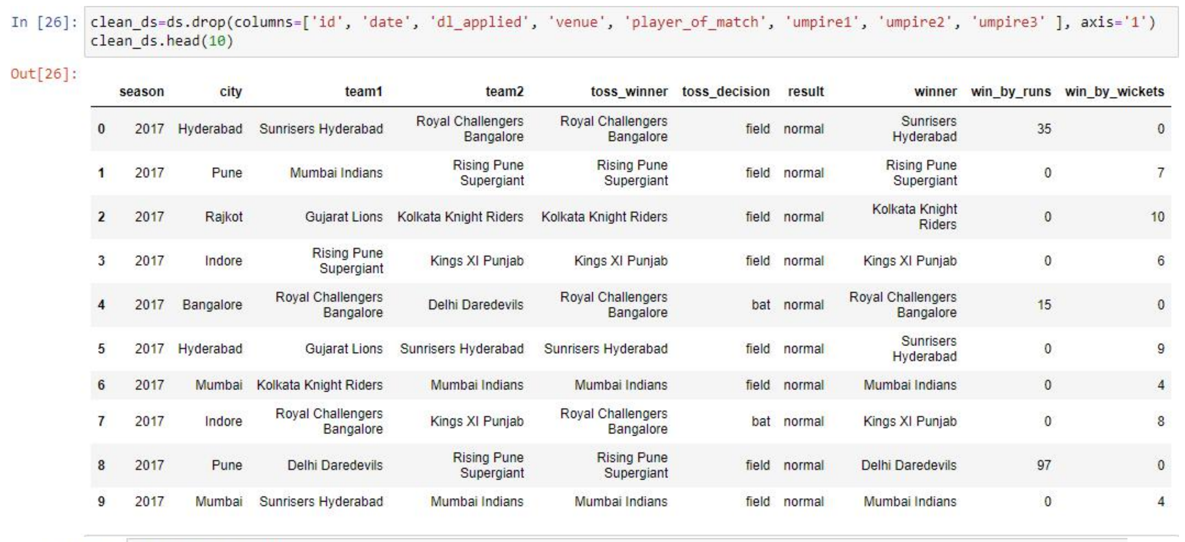
Out[7]:

	id	season	city	date	team1	team2	toss_winner	toss_decision	result	dl_applied	winner	win_by_runs	win_by_wickets	player_of_
0	1	2017	Hyderabad	05-04-2017	Sunrisers Hyderabad	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	0	Sunrisers Hyderabad	35	0	Yuvra
1	2	2017	Pune	06-04-2017	Mumbai Indians	Rising Pune Supergiant	Rising Pune Supergiant	field	normal	0	Rising Pune Supergiant	0	7	SPD
2	3	2017	Rajkot	07-04-2017	Gujarat Lions	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	0	Kolkata Knight Riders	0	10	C
3	4	2017	Indore	08-04-2017	Rising Pune Supergiant	Kings XI Punjab	Kings XI Punjab	field	normal	0	Kings XI Punjab	0	6	GJ M
4	5	2017	Bangalore	08-04-2017	Royal Challengers Bangalore	Delhi Daredevils	Royal Challengers Bangalore	bat	normal	0	Royal Challengers Bangalore	15	0	KM
5	6	2017	Hyderabad	09-04-2017	Gujarat Lions	Sunrisers Hyderabad	Sunrisers Hyderabad	field	normal	0	Sunrisers Hyderabad	0	9	Rashi
6	7	2017	Mumbai	09-04-2017	Kolkata Knight Riders	Mumbai Indians	Mumbai Indians	field	normal	0	Mumbai Indians	0	4	I
7	8	2017	Indore	10-04-2017	Royal Challengers Bangalore	Kings XI Punjab	Royal Challengers Bangalore	bat	normal	0	Kings XI Punjab	0	8	A



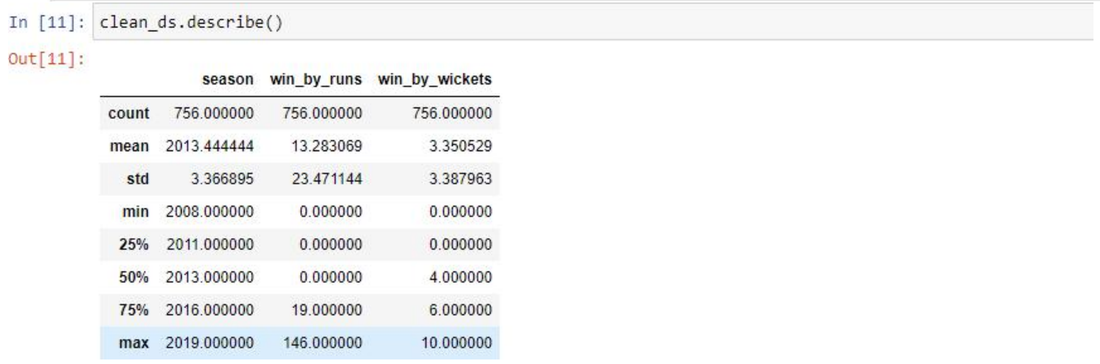
```
In [8]: ds.shape
Out[8]: (756, 18)

In [9]: ds.info()
        <class 'pandas.core.frame.DataFrame'>
        RangeIndex: 756 entries, 0 to 755
        Data columns (total 18 columns):
         #   Column           Non-Null Count  Dtype
        ---  ------           --------------  -----
         0   id               756 non-null    int64
         1   season           756 non-null    int64
         2   city             749 non-null    object
         3   date             756 non-null    object
         4   team1            756 non-null    object
         5   team2            756 non-null    object
         6   toss_winner      756 non-null    object
         7   toss_decision    756 non-null    object
         8   result           756 non-null    object
         9   dl_applied       756 non-null    int64
         10  winner           752 non-null    object
         11  win_by_runs      756 non-null    int64
         12  win_by_wickets   756 non-null    int64
         13  player_of_match  752 non-null    object
         14  venue            756 non-null    object
         15  umpire1          754 non-null    object
         16  umpire2          754 non-null    object
         17  umpire3          119 non-null    object
        dtypes: int64(5), object(13)
        memory usage: 106.4+ KB

In [6]: ds.groupby('toss_decision').size()
Out[6]: toss_decision
        bat      293
        field    463
        dtype: int64
```

Cleaning the dataset:



```
In [26]: clean_ds=ds.drop(columns=['id', 'date', 'dl_applied', 'venue', 'player_of_match', 'umpire1', 'umpire2', 'umpire3' ], axis='1')
         clean_ds.head(10)
Out[26]:
```

	season	city	team1	team2	toss_winner	toss_decision	result	winner	win_by_runs	win_by_wickets
0	2017	Hyderabad	Sunrisers Hyderabad	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	Sunrisers Hyderabad	35	0
1	2017	Pune	Mumbai Indians	Rising Pune Supergiant	Rising Pune Supergiant	field	normal	Rising Pune Supergiant	0	7
2	2017	Rajkot	Gujarat Lions	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	Kolkata Knight Riders	0	10
3	2017	Indore	Rising Pune Supergiant	Kings XI Punjab	Kings XI Punjab	field	normal	Kings XI Punjab	0	6
4	2017	Bangalore	Royal Challengers Bangalore	Delhi Daredevils	Royal Challengers Bangalore	bat	normal	Royal Challengers Bangalore	15	0
5	2017	Hyderabad	Gujarat Lions	Sunrisers Hyderabad	Sunrisers Hyderabad	field	normal	Sunrisers Hyderabad	0	9
6	2017	Mumbai	Kolkata Knight Riders	Mumbai Indians	Mumbai Indians	field	normal	Mumbai Indians	0	4
7	2017	Indore	Royal Challengers Bangalore	Kings XI Punjab	Royal Challengers Bangalore	bat	normal	Kings XI Punjab	0	8
8	2017	Pune	Delhi Daredevils	Rising Pune Supergiant	Rising Pune Supergiant	field	normal	Delhi Daredevils	97	0
9	2017	Mumbai	Sunrisers Hyderabad	Mumbai Indians	Mumbai Indians	field	normal	Mumbai Indians	0	4

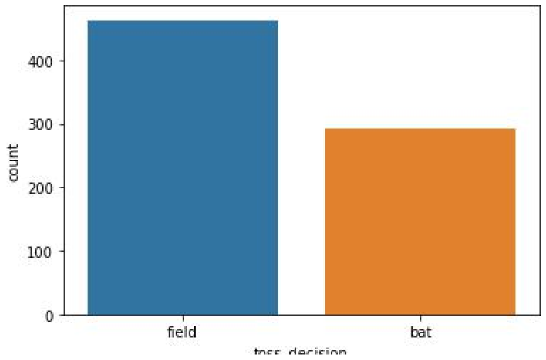


```
In [11]: clean_ds.describe()
Out[11]:
```

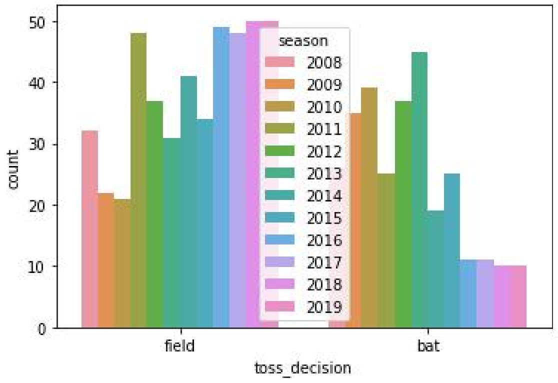
	season	win_by_runs	win_by_wickets
count	756.000000	756.000000	756.000000
mean	2013.444444	13.283069	3.350529
std	3.366895	23.471144	3.387963
min	2008.000000	0.000000	0.000000
25%	2011.000000	0.000000	0.000000
50%	2013.000000	0.000000	4.000000
75%	2016.000000	19.000000	6.000000
max	2019.000000	146.000000	10.000000

Visualizing Data:

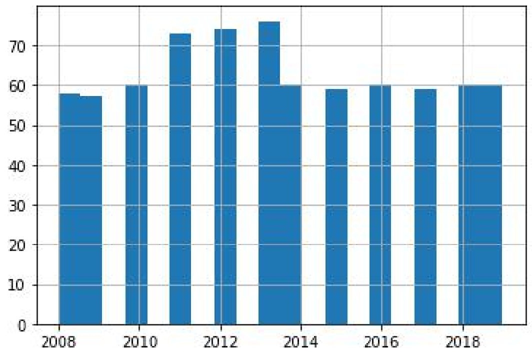
```
In [12]: seaborn.countplot(x='toss_decision', data=clean_ds)
Out[12]: <AxesSubplot:xlabel='toss_decision', ylabel='count'>
```



```
In [16]: seaborn.countplot(x='toss_decision', hue='season', data=clean_ds)
Out[16]: <AxesSubplot:xlabel='toss_decision', ylabel='count'>
```



```
In [19]: clean_ds['season'].hist(bins=20)
Out[19]: <AxesSubplot:>
```



Categorizing and Visualizing the dataset:

In [46]:
```
bin_toss = pandas.get_dummies (clean_ds ['toss_decision'])
bin_toss.head()
```

Out[46]:

	bat	field
0	0	1
1	0	1
2	0	1
3	0	1
4	1	0

In [27]:
```
home_win=[]
for i in range (0, len  (ds ['team1'])):
    if clean_ds ['team1'][i] == clean_ds ['winner'][i]:
        home_win.append (1);
    else:
        home_win.append (0);
home_win_df=pandas.DataFrame (data = home_win, columns = ['home_win'])
aug_ds = pandas.concat([clean_ds, home_win_df], axis = 1)
aug_ds.head()
```

Out[27]:

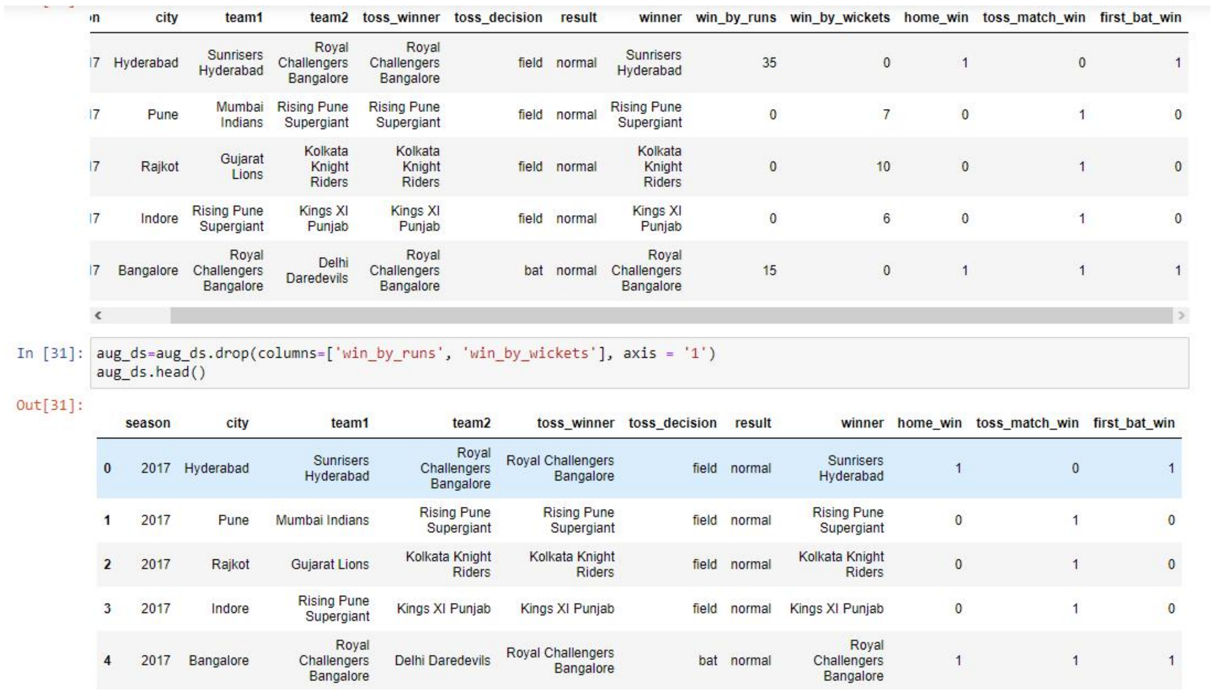
	season	city	team1	team2	toss_winner	toss_decision	result	winner	win_by_runs	win_by_wickets	home_win
0	2017	Hyderabad	Sunrisers Hyderabad	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	Sunrisers Hyderabad	35	0	1
1	2017	Pune	Mumbai Indians	Rising Pune Supergiant	Rising Pune Supergiant	field	normal	Rising Pune Supergiant	0	7	0
2	2017	Rajkot	Gujarat Lions	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	Kolkata Knight Riders	0	10	0
3	2017	Indore	Rising Pune Supergiant	Kings XI Punjab	Kings XI Punjab	field	normal	Kings XI Punjab	0	6	0
4	2017	Bangalore	Royal Challengers Bangalore	Delhi Daredevils	Royal Challengers Bangalore	bat	normal	Royal Challengers Bangalore	15	0	1

In [28]:
```
toss_match_win=[]
for i in range (0, len  (ds ['toss_winner'])):
    if clean_ds ['toss_winner'][i] == clean_ds ['winner'][i]:
        toss_match_win.append (1);
    else:
        toss_match_win.append (0);
toss_match_win_df=pandas.DataFrame (data = toss_match_win, columns = ['toss_match_win'])
aug_ds = pandas.concat([aug_ds, toss_match_win_df], axis = 1)
aug_ds.head()
```

Out[28]:

	season	city	team1	team2	toss_winner	toss_decision	result	winner	win_by_runs	win_by_wickets	home_win	toss_match_win
0	2017	Hyderabad	Sunrisers Hyderabad	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	Sunrisers Hyderabad	35	0	1	0
1	2017	Pune	Mumbai Indians	Rising Pune Supergiant	Rising Pune Supergiant	field	normal	Rising Pune Supergiant	0	7	0	1
2	2017	Rajkot	Gujarat Lions	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	Kolkata Knight Riders	0	10	0	1
3	2017	Indore	Rising Pune Supergiant	Kings XI Punjab	Kings XI Punjab	field	normal	Kings XI Punjab	0	6	0	1
4	2017	Bangalore	Royal Challengers Bangalore	Delhi Daredevils	Royal Challengers Bangalore	bat	normal	Royal Challengers Bangalore	15	0	1	1

In [30]:
```
first_bat_win=[]
for i in range (0, len  (ds ['win_by_runs'])):
    if clean_ds ['win_by_runs'][i] >0:
        first_bat_win.append (1);
    else:
        first_bat_win.append (0);
first_bat_win_df=pandas.DataFrame (data = first_bat_win, columns = ['first_bat_win'])
aug_ds = pandas.concat([aug_ds, first_bat_win_df], axis = 1)
aug_ds.head()
```



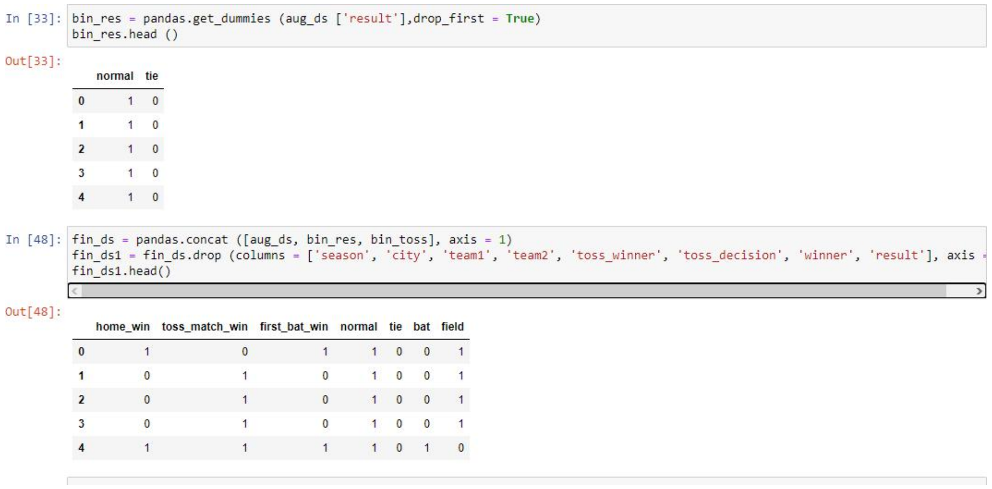
n	city	team1	team2	toss_winner	toss_decision	result	winner	win_by_runs	win_by_wickets	home_win	toss_match_win	first_bat_win
17	Hyderabad	Sunrisers Hyderabad	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	Sunrisers Hyderabad	35	0	1	0	1
17	Pune	Mumbai Indians	Rising Pune Supergiant	Rising Pune Supergiant	field	normal	Rising Pune Supergiant	0	7	0	1	0
17	Rajkot	Gujarat Lions	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	Kolkata Knight Riders	0	10	0	1	0
17	Indore	Rising Pune Supergiant	Kings XI Punjab	Kings XI Punjab	field	normal	Kings XI Punjab	0	6	0	1	0
17	Bangalore	Royal Challengers Bangalore	Delhi Daredevils	Royal Challengers Bangalore	bat	normal	Royal Challengers Bangalore	15	0	1	1	1

```
In [31]: aug_ds=aug_ds.drop(columns=['win_by_runs', 'win_by_wickets'], axis = '1')
         aug_ds.head()
```

Out[31]:

	season	city	team1	team2	toss_winner	toss_decision	result	winner	home_win	toss_match_win	first_bat_win
0	2017	Hyderabad	Sunrisers Hyderabad	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	Sunrisers Hyderabad	1	0	1
1	2017	Pune	Mumbai Indians	Rising Pune Supergiant	Rising Pune Supergiant	field	normal	Rising Pune Supergiant	0	1	0
2	2017	Rajkot	Gujarat Lions	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	Kolkata Knight Riders	0	1	0
3	2017	Indore	Rising Pune Supergiant	Kings XI Punjab	Kings XI Punjab	field	normal	Kings XI Punjab	0	1	0
4	2017	Bangalore	Royal Challengers Bangalore	Delhi Daredevils	Royal Challengers Bangalore	bat	normal	Royal Challengers Bangalore	1	1	1

Final Dataset:



```
In [33]: bin_res = pandas.get_dummies (aug_ds ['result'],drop_first = True)
         bin_res.head ()
```

Out[33]:

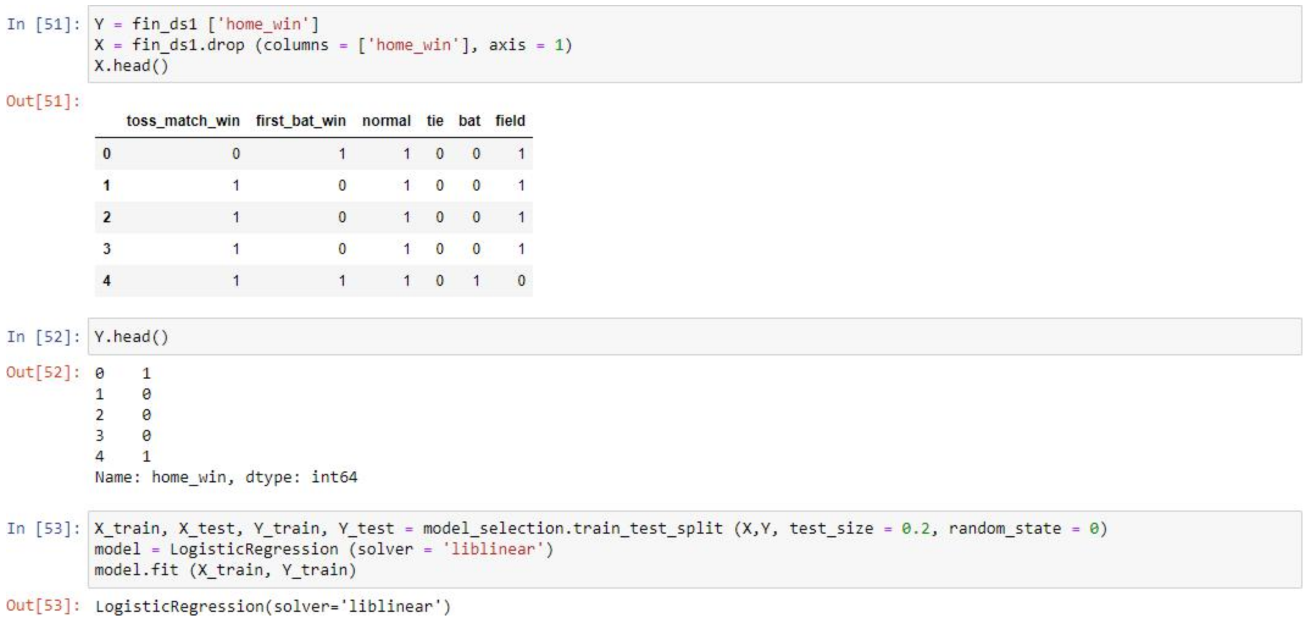
	normal	tie
0	1	0
1	1	0
2	1	0
3	1	0
4	1	0

```
In [48]: fin_ds = pandas.concat ([aug_ds, bin_res, bin_toss], axis = 1)
         fin_ds1 = fin_ds.drop (columns = ['season', 'city', 'team1', 'team2', 'toss_winner', 'toss_decision', 'winner', 'result'], axis =
         fin_ds1.head()
```

Out[48]:

	home_win	toss_match_win	first_bat_win	normal	tie	bat	field
0	1	0	1	1	0	0	1
1	0	1	0	1	0	0	1
2	0	1	0	1	0	0	1
3	0	1	0	1	0	0	1
4	1	1	1	1	0	1	0

Predicting



```
In [51]: Y = fin_ds1 ['home_win']
         X = fin_ds1.drop (columns = ['home_win'], axis = 1)
         X.head()
```

Out[51]:

	toss_match_win	first_bat_win	normal	tie	bat	field
0	0	1	1	0	0	1
1	1	0	1	0	0	1
2	1	0	1	0	0	1
3	1	0	1	0	0	1
4	1	1	1	0	1	0

```
In [52]: Y.head()

Out[52]: 0    1
         1    0
         2    0
         3    0
         4    1
         Name: home_win, dtype: int64
```

```
In [53]: X_train, X_test, Y_train, Y_test = model_selection.train_test_split (X,Y, test_size = 0.2, random_state = 0)
         model = LogisticRegression (solver = 'liblinear')
         model.fit (X_train, Y_train)

Out[53]: LogisticRegression(solver='liblinear')
```

\THANK YOU MAM !!\