```
import pandas as pd
import seaborn as sns
import numpy as np
import matplotlib.pyplot as plt
from sklearn.impute import SimpleImputer
```

Read or Upload our CSV Files.

```
df = pd.read_csv("T20DATA.csv")
```

How many entries are present in the data set

```
df.shape
```

```
(9814, 44)
```

Taking Information about the Data set.

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9814 entries, 0 to 9813
Data columns (total 44 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   comment_id         9814 non-null   int64
 1   match_id           9814 non-null   int64
 2   match_name         9814 non-null   object
 3   home_team          9814 non-null   object
 4   away_team          9814 non-null   object
 5   current_innings    9814 non-null   object
 6   innings_id         9814 non-null   int64
 7   over               9814 non-null   int64
 8   ball               9814 non-null   int64
 9   runs               9814 non-null   int64
 10  shortText          9814 non-null   object
 11  isBoundary         9814 non-null   bool
 12  isWide             9814 non-null   bool
 13  isNoball           9814 non-null   bool
 14  batsman1_id        9814 non-null   int64
 15  batsman1_name      9814 non-null   object
 16  batsman1_runs      9814 non-null   int64
 17  batsman1_balls     9814 non-null   int64
 18  bowler1_id         9814 non-null   int64
 19  bowler1_name       9814 non-null   object
 20  bowler1_overs      9814 non-null   float64
 21  bowler1_maidens    9814 non-null   int64
 22  bowler1_runs       9814 non-null   int64
 23  bowler1_wkts       9814 non-null   int64
 24  batsman2_id        9814 non-null   int64
 25  batsman2_name      9814 non-null   object
 26  batsman2_runs      9814 non-null   int64
 27  batsman2_balls     9814 non-null   int64
 28  bowler2_id         9288 non-null   float64
 29  bowler2_name       9288 non-null   object
 30  bowler2_overs      9288 non-null   float64
 31  bowler2_maidens    9288 non-null   float64
 32  bowler2_runs       9288 non-null   float64
 33  bowler2_wkts       9288 non-null   float64
 34  wicket_id          551 non-null    float64
 35  wkt_batsman_name   551 non-null    object
 36  wkt_bowler_name    551 non-null    object
 37  wkt_batsman_runs   551 non-null    float64
 38  wkt_batsman_balls  551 non-null    float64
 39  wkt_text           551 non-null    object
 40  isRetiredHurt      9814 non-null   bool
 41  text               9786 non-null   object
 42  preText            1861 non-null   object
 43  postText           1088 non-null   object
dtypes: bool(4), float64(9), int64(16), object(15)
memory usage: 3.0+ MB
```

```
df.head()
```

	comment_id	match_id	match_name	home_team	away_team	current_innings	innings_i
0	130	1298179	ENG v PAK	PAK	ENG	PAK	
1	120	1298179	ENG v PAK	PAK	ENG	PAK	
2	110	1298179	ENG v PAK	PAK	ENG	PAK	
3	140	1298179	ENG v PAK	PAK	ENG	PAK	
4	150	1298179	ENG v PAK	PAK	ENG	PAK	

5 rows × 44 columns

Checking is their any NULL value present in the Data Set if yes then how much

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

```
comment_id              0
match_id                0
match_name              0
home_team               0
away_team               0
current_innings         0
innings_id              0
over                    0
ball                    0
runs                    0
shortText               0
isBoundary              0
isWide                  0
isNoball                0
batsman1_id             0
batsman1_name           0
batsman1_runs           0
batsman1_balls          0
bowler1_id              0
bowler1_name            0
bowler1_overs           0
bowler1_maidens         0
bowler1_runs            0
bowler1_wkts            0
batsman2_id             0
batsman2_name           0
batsman2_runs           0
batsman2_balls          0
bowler2_id            526
bowler2_name          526
bowler2_overs         526
bowler2_maidens       526
bowler2_runs          526
bowler2_wkts          526
wicket_id            9263
wkt_batsman_name     9263
wkt_bowler_name      9263
wkt_batsman_runs     9263
wkt_batsman_balls    9263
wkt_text             9263
isRetiredHurt           0
text                   28
preText              7953
postText             8726
dtype: int64
```

Removing Unnecessary Column from the Data Set

```
df.drop(["isRetiredHurt","text","preText","postText","wkt_text"],axis = 1,inplace = True)
```

```
df.sample(5)
```

	comment_id	match_id	match_name	home_team	away_team	current_innings	inning
7437	17050	1298144	NAM v UAE	UAE	NAM	UAE	
154	24060	1298179	ENG v PAK	PAK	ENG	ENG	
6539	114030	1298148	AFG v ENG	AFG	ENG	AFG	
322	113010	1298178	ENG v INDIA	INDIA	ENG	INDIA	
7011	115010	1298146	SCOT v ZIM	SCOT	ZIM	SCOT	

5 rows × 39 columns

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9814 entries, 0 to 9813
Data columns (total 39 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   comment_id         9814 non-null   int64  
 1   match_id           9814 non-null   int64  
 2   match_name         9814 non-null   object 
 3   home_team          9814 non-null   object 
 4   away_team          9814 non-null   object 
 5   current_innings    9814 non-null   object 
 6   innings_id         9814 non-null   int64  
 7   over               9814 non-null   int64  
 8   ball               9814 non-null   int64  
 9   runs               9814 non-null   int64  
 10  shortText          9814 non-null   object 
 11  isBoundary         9814 non-null   bool   
 12  isWide             9814 non-null   bool   
 13  isNoball           9814 non-null   bool   
 14  batsman1_id        9814 non-null   int64  
 15  batsman1_name      9814 non-null   object 
 16  batsman1_runs      9814 non-null   int64  
 17  batsman1_balls     9814 non-null   int64  
 18  bowler1_id         9814 non-null   int64  
 19  bowler1_name       9814 non-null   object 
 20  bowler1_overs      9814 non-null   float64
 21  bowler1_maidens    9814 non-null   int64  
 22  bowler1_runs       9814 non-null   int64  
 23  bowler1_wkts       9814 non-null   int64  
 24  batsman2_id        9814 non-null   int64  
 25  batsman2_name      9814 non-null   object 
 26  batsman2_runs      9814 non-null   int64  
 27  batsman2_balls     9814 non-null   int64  
 28  bowler2_id         9288 non-null   float64
 29  bowler2_name       9288 non-null   object 
 30  bowler2_overs      9288 non-null   float64
 31  bowler2_maidens    9288 non-null   float64
 32  bowler2_runs       9288 non-null   float64
 33  bowler2_wkts       9288 non-null   float64
 34  wicket_id          551 non-null    float64
 35  wkt_batsman_name   551 non-null    object
 36  wkt_bowler_name    551 non-null    object
 37  wkt_batsman_runs   551 non-null    float64
 38  wkt_batsman_balls  551 non-null    float64
dtypes: bool(3), float64(9), int64(16), object(11)
memory usage: 2.7+ MB
```

```
Num_col =["bowler2_overs","bowler2_maidens","bowler2_runs","bowler2_wkts","wkt_batsman_runs"
Cat_col=["bowler2_id","wicket_id"]
name_col=["bowler2_name","wkt_batsman_name","wkt_bowler_name"]
```

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

```
comment_id              0
match_id                0
match_name              0
home_team               0
away_team               0
current_innings         0
innings_id              0
over                    0
ball                    0
runs                    0
shortText               0
isBoundary              0
isWide                  0
isNoball                0
batsman1_id             0
batsman1_name           0
batsman1_runs           0
batsman1_balls          0
bowler1_id              0
bowler1_name            0
bowler1_overs           0
bowler1_maidens         0
bowler1_runs            0
bowler1_wkts            0
batsman2_id             0
batsman2_name           0
batsman2_runs           0
batsman2_balls          0
bowler2_id            526
bowler2_name          526
bowler2_overs         526
bowler2_maidens       526
bowler2_runs          526
bowler2_wkts          526
wicket_id            9263
wkt_batsman_name     9263
wkt_bowler_name      9263
wkt_batsman_runs     9263
wkt_batsman_balls    9263
dtype: int64
```

Filling Missing Value or Null Values using Pandas Lib or Sklearn library

```
si_int = SimpleImputer()
imputer = SimpleImputer(strategy="most_frequent")
si_obj= SimpleImputer(missing_values="EMPTY",strategy="most_frequent")
```

```
for i in Num_col:
  df[i]=si_int.fit_transform(df[[i]])
```

```
for j in Cat_col:
  df[j]=imputer.fit_transform(df[[j]])
```

```
df["bowler2_name"].fillna("Paul van Meekeren",inplace = True)
df['wkt_batsman_name'].fillna("Max O'Dowd",inplace = True)
df['wkt_bowler_name'].fillna("Wanindu Hasaranga de Silva",inplace=True)
```

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

```
comment_id          0
match_id            0
match_name          0
home_team           0
away_team           0
current_innings     0
innings_id          0
over                0
ball                0
runs                0
shortText           0
isBoundary          0
isWide              0
isNoball            0
batsman1_id         0
batsman1_name       0
batsman1_runs       0
batsman1_balls      0
bowler1_id          0
bowler1_name        0
bowler1_overs       0
bowler1_maidens     0
bowler1_runs        0
bowler1_wkts        0
batsman2_id         0
batsman2_name       0
batsman2_runs       0
batsman2_balls      0
bowler2_id          0
bowler2_name        0
bowler2_overs       0
bowler2_maidens     0
bowler2_runs        0
bowler2_wkts        0
wicket_id           0
wkt_batsman_name    0
```

```
wkt_bowler_name      0
wkt_batsman_runs     0
wkt_batsman_balls    0
dtype: int64
```

Getting Every mathematical counts calculation over the Data.

```
df.describe()
```

	comment_id	match_id	innings_id	over	ball	runs
count	9814.000000	9.814000e+03	9814.000000	9814.000000	9814.000000	9814.000000
mean	85399.661708	1.298157e+06	1.477787	10.082841	3.486856	1.202262
std	78951.670137	1.355630e+01	0.499532	5.623045	1.707484	1.476730
min	110.000000	1.298135e+06	1.000000	1.000000	1.000000	0.000000
25%	18030.000000	1.298145e+06	1.000000	5.000000	2.000000	0.000000
50%	29010.000000	1.298157e+06	1.000000	10.000000	3.000000	1.000000
75%	118040.000000	1.298169e+06	2.000000	15.000000	5.000000	1.000000
max	219090.000000	1.298179e+06	2.000000	20.000000	6.000000	7.000000

8 rows × 25 columns

Count Every Seperate value in the Data set.

```
df.columns.tolist
```

```
pandas.core.base.IndexOpsMixin.tolist
def tolist()

list

See Also
--------
numpy.ndarray.tolist : Return the array as an a.ndim-levels deep
    nested list of Python scalars.
```

```
for i in df.columns:
  print(df[i].value_counts())
  print('.....................')
```

```
comment_id
130       42
17040     42
18050     42
18040     42
18030     42
          ..
112080     1
```

```
27080      1
19080      1
113080     1
119080     1
Name: count, Length: 316, dtype: int64
.....................
match_id
1298144    250
1298151    250
1298158    250
1298150    250
1298138    249
1298162    248
1298161    247
1298174    247
1298157    247
1298171    246
1298143    246
1298167    246
1298136    245
1298139    244
1298141    244
1298172    244
1298173    244
1298179    243
1298137    241
1298135    241
1298164    240
1298142    240
1298166    240
1298165    239
1298177    238
1298146    238
1298148    237
1298168    236
1298176    236
1298175    234
1298145    232
1298147    230
1298153    229
1298156    228
1298140    227
1298178    222
1298169    222
1298154    217
1298149    214
1298170    211
1298163    205
1298152     77
Name: count, dtype: int64
```

```
listnew = Num_col + Cat_col
```

Finding Out The Correlation Between the numeric column in the data set.

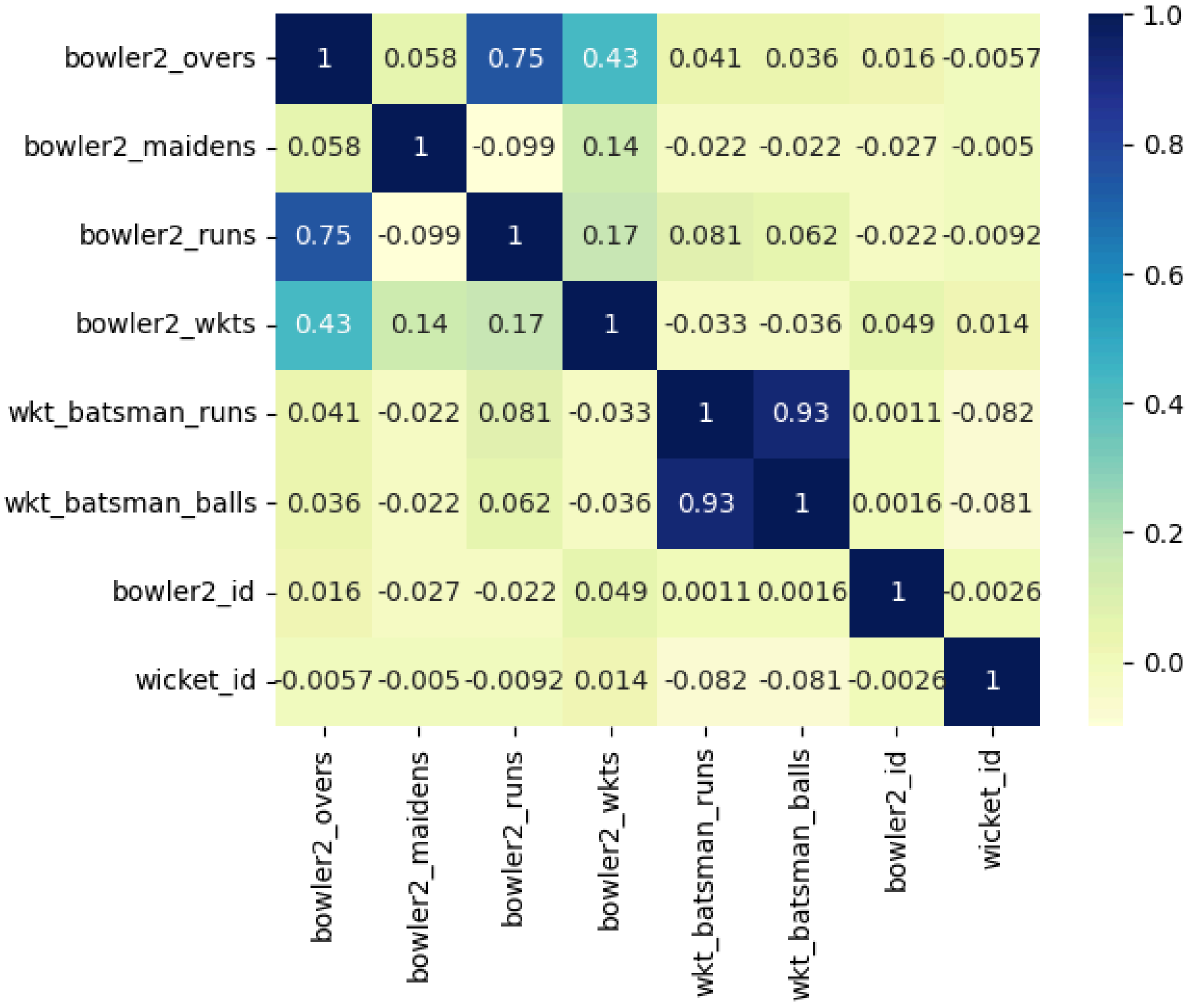
```
df[listnew].corr()
```

	bowler2_overs	bowler2_maidens	bowler2_runs	bowler2_wkts	wkt_ba
bowler2_overs	1.000000	0.057585	0.754637	0.433456	
bowler2_maidens	0.057585	1.000000	-0.098512	0.140042	
bowler2_runs	0.754637	-0.098512	1.000000	0.165457	
bowler2_wkts	0.433456	0.140042	0.165457	1.000000	
wkt_batsman_runs	0.041375	-0.022171	0.081130	-0.032714	
wkt_batsman_balls	0.036283	-0.022280	0.062240	-0.035873	
bowler2_id	0.016441	-0.027369	-0.021615	0.049139	
wicket_id	-0.005696	-0.004998	-0.009244	0.014026	

Visualization Part

Heap Map

```
dataplot = sns.heatmap(df[listnew].corr(), cmap="YlGnBu", annot=True)
```



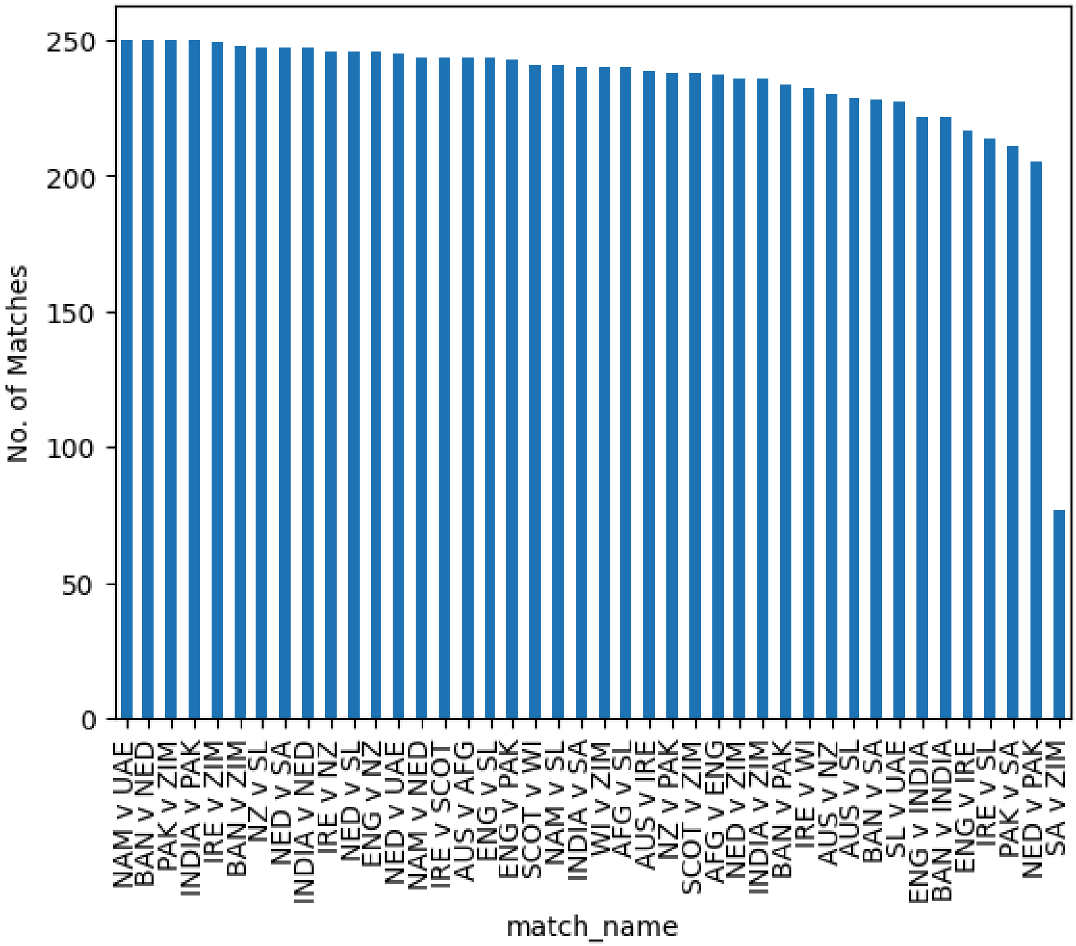
```
df.head()
```

runs	...	bowler2_name	bowler2_overs	bowler2_maidens	bowler2_runs	bowler2_wkts	w
0	...	Paul van Meekeren	2.172265	0.031654	14.684755	0.641042	
1	...	Paul van Meekeren	2.172265	0.031654	14.684755	0.641042	
1	...	Paul van Meekeren	2.172265	0.031654	14.684755	0.641042	
2	...	Paul van Meekeren	2.172265	0.031654	14.684755	0.641042	
0	...	Paul van Meekeren	2.172265	0.031654	14.684755	0.641042	

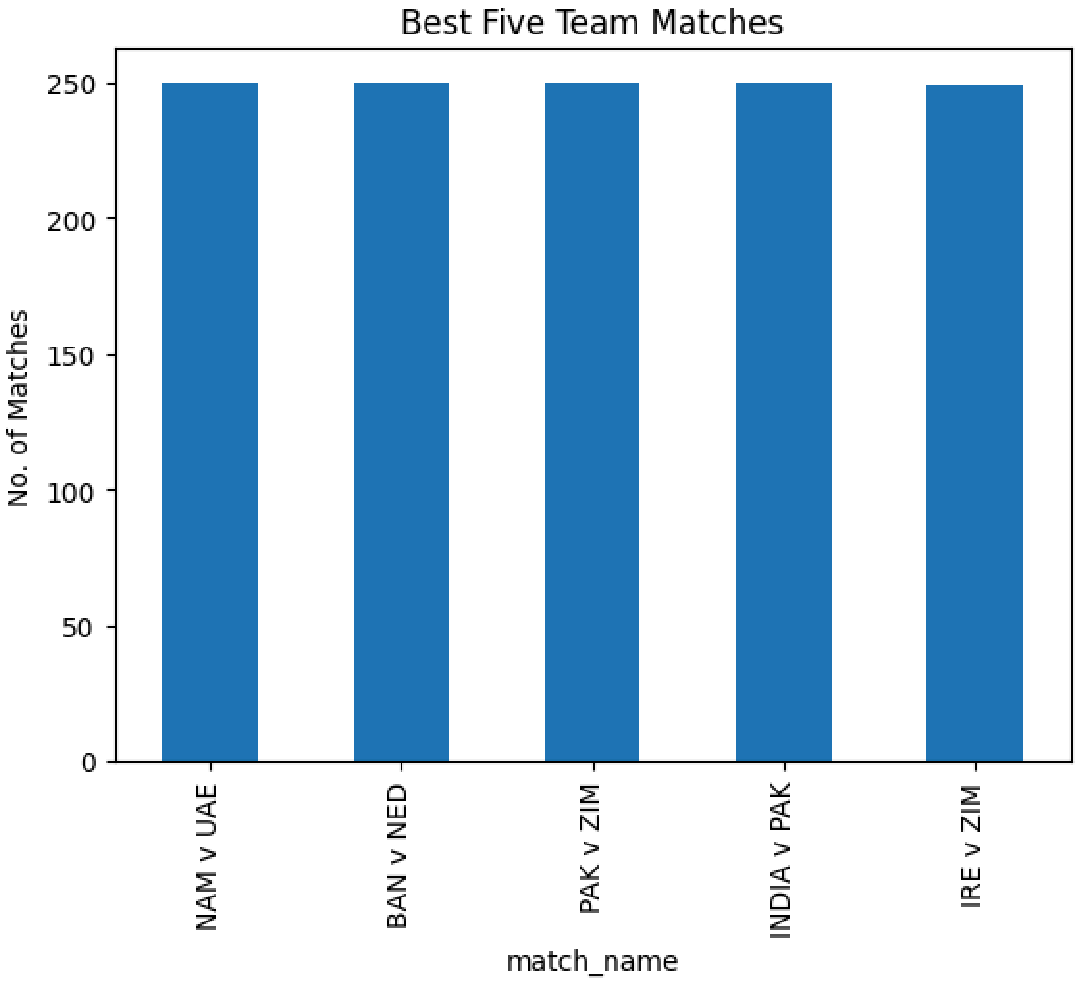
Bar Graph

```
df["match_name"].value_counts().plot(kind="bar",ylabel = "No. of Matches")
```

```
<Axes: xlabel='match_name', ylabel='No. of Matches'>
```



```
df["match_name"].value_counts().head().plot(kind="bar",ylabel = "No. of Matches",title="Best
<Axes: title={'center': 'Best Five Team Matches'}, xlabel='match_name', ylabel='No.
of Matches'>
```



```
df.drop(["comment_id","match_id","bowler1_id","batsman1_id","batsman2_id","bowler2_id","wick
```

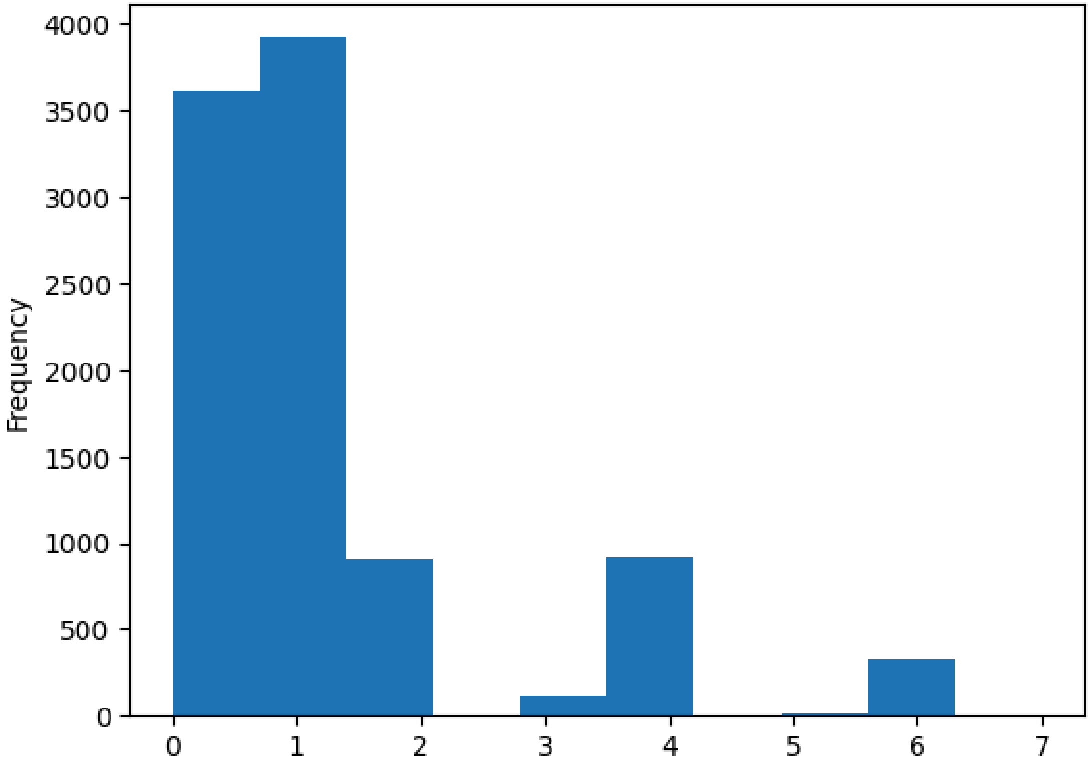
```
df["current_innings"].value_counts()
```

```
current_innings
NED      971
SL       936
ZIM      893
IRE      826
PAK      814
INDIA    742
ENG      674
NZ       619
BAN      570
SA       475
AUS      455
SCOT     375
NAM      374
AFG      369
WI       366
UAE      355
Name: count, dtype: int64
```

Histrogram

```
df["runs"].plot(kind="hist")
```

```
<Axes: ylabel='Frequency'>
```



```
run=df.groupby("batsman1_name")
```

```
<pandas.core.groupby.generic.DataFrameGroupBy object at 0x7e6885782f80>
```

Maximum Run Made by Players with their names

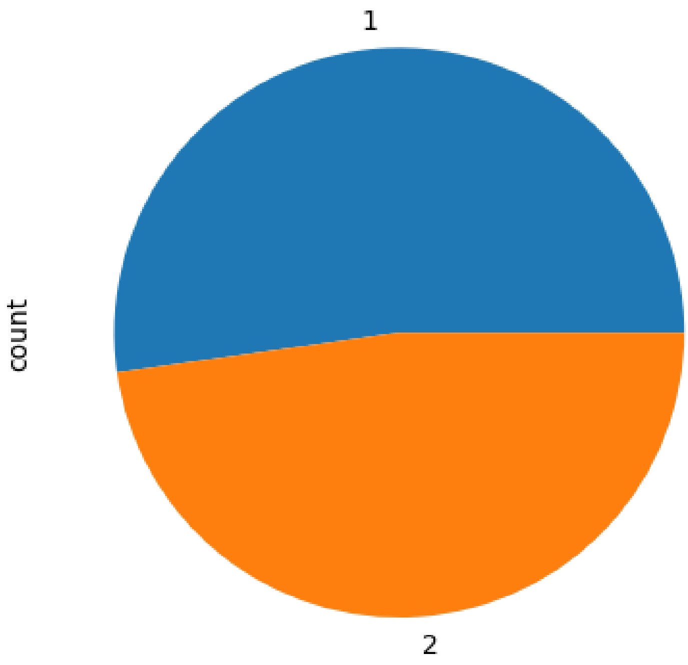
```
run.size()
```

```
batsman1_name
Aaron Finch          107
Aayan Afzal Khan      29
Adam Zampa             3
Afif Hossain          81
Aiden Markram         80
                    ...
Wessly Madhevere      89
Yasir Ali              9
Zahoor Khan            1
Zane Green             3
Zawar Farid            4
Length: 197, dtype: int64
```

Pie Chart

```
df["innings_id"].value_counts().plot(kind = "pie")
```

```
<Axes: ylabel='count'>
```



```
death_over=df[df["bowler1_overs"]<5]
death_over.groupby("bowler1_name")["bowler1_runs"].count()
```

```
bowler1_name
Aayan Afzal Khan        48
Adam Zampa              73
Adil Rashid            145
Afif Hossain             6
Ahmed Raza               6
                      ...
Wayne Parnell           98
Wellington Masakadza    13
Wessly Madhevere        18
Zahoor Khan             76
Zawar Farid             17
Name: bowler1_runs, Length: 132, dtype: int64
```

```
mask=df['batsman1_runs']==6
new_delivery = df[mask]
```

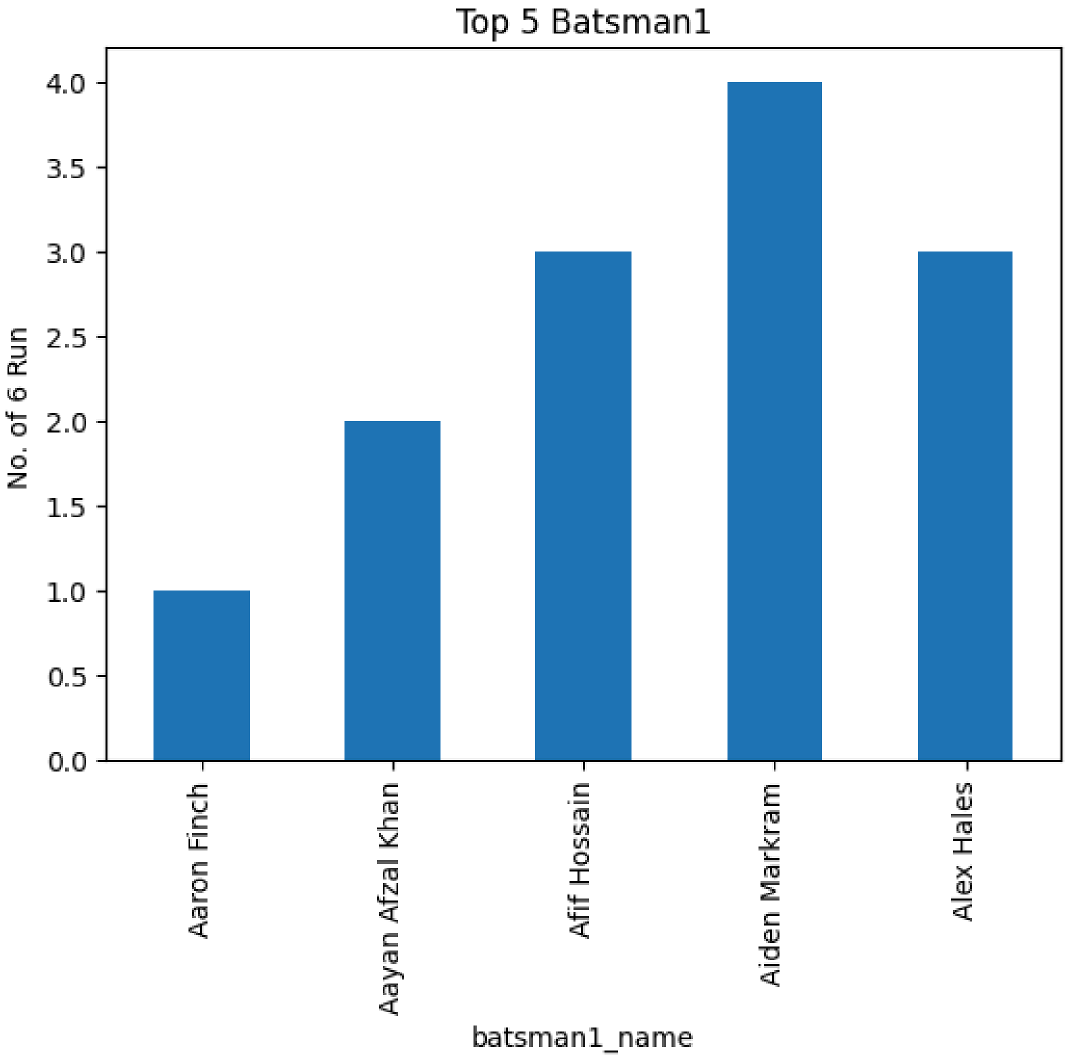
```
new_delivery.groupby("batsman1_name")["batsman1_runs"].count()
```

```
batsman1_name
Aaron Finch         1
Aayan Afzal Khan    2
Afif Hossain        3
Aiden Markram       4
Alex Hales          3
                   ..
Usman Ghani         3
Vikramjit Singh     1
Virat Kohli         4
Vriitya Aravind     7
```

```
Wessly Madhevere    3
Name: batsman1_runs, Length: 127, dtype: int64
```

```
new_delivery.groupby("batsman1_name")["batsman1_runs"].count().head().plot(kind="bar",ylabel
```

```
<Axes: title={'center': 'Top 5 Batsman1'}, xlabel='batsman1_name', ylabel='No. of 6
Run'>
```



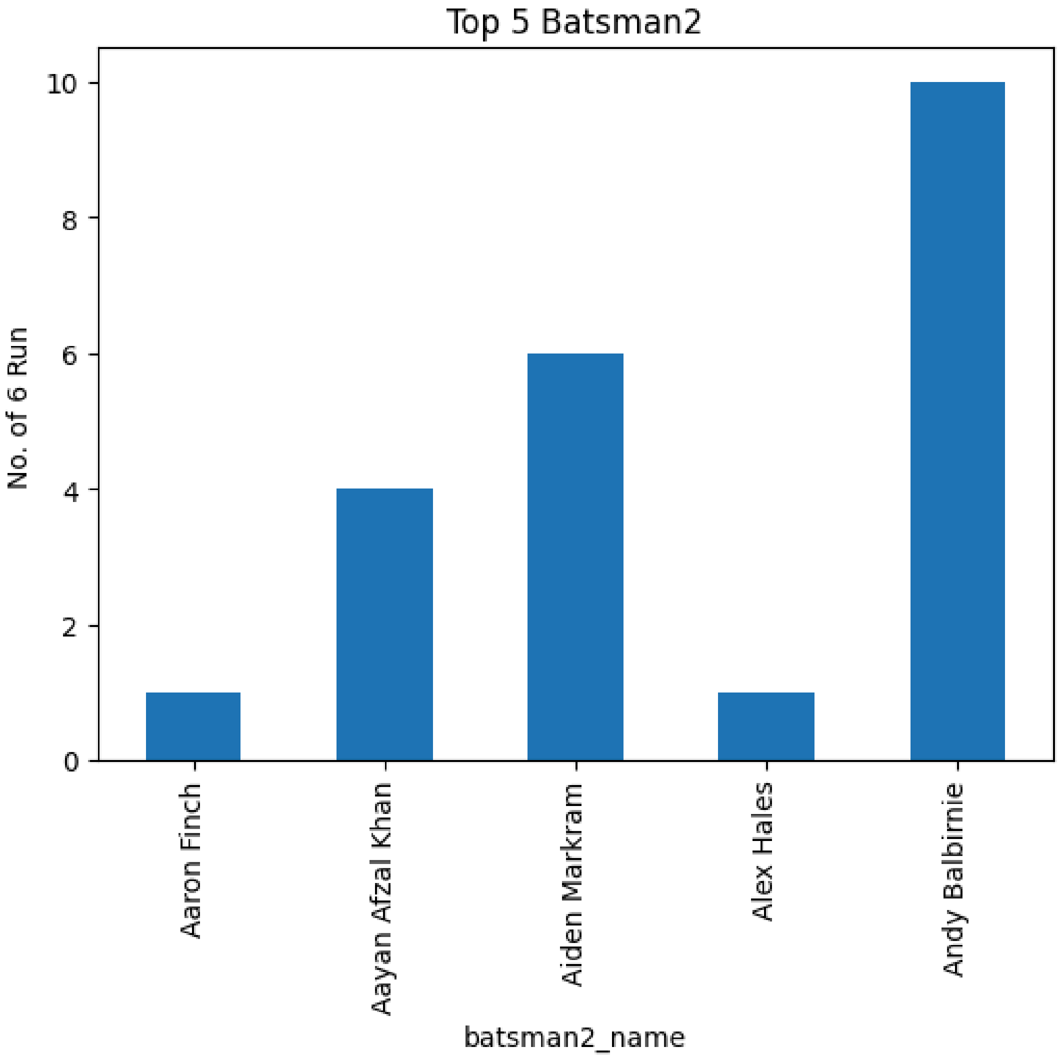
```
mask1=df['batsman2_runs']==6
new_delivery1 = df[mask1]
```

```
new_delivery1.groupby("batsman2_name")["batsman2_runs"].count()
```

```
batsman2_name
Aaron Finch          1
Aayan Afzal Khan     4
Aiden Markram        6
Alex Hales           1
Andy Balbirnie      10
                    ..
Tristan Stubbs       5
Usman Ghani         13
Virat Kohli          8
Vriitya Aravind     10
Wessly Madhevere     2
Name: batsman2_runs, Length: 91, dtype: int64
```

```
new_delivery1.groupby("batsman2_name")["batsman2_runs"].count().head().plot(kind="bar",ylabe
```

```
<Axes: title={'center': 'Top 5 Batsman2'}, xlabel='batsman2_name', ylabel='No. of 6
Run'>
```

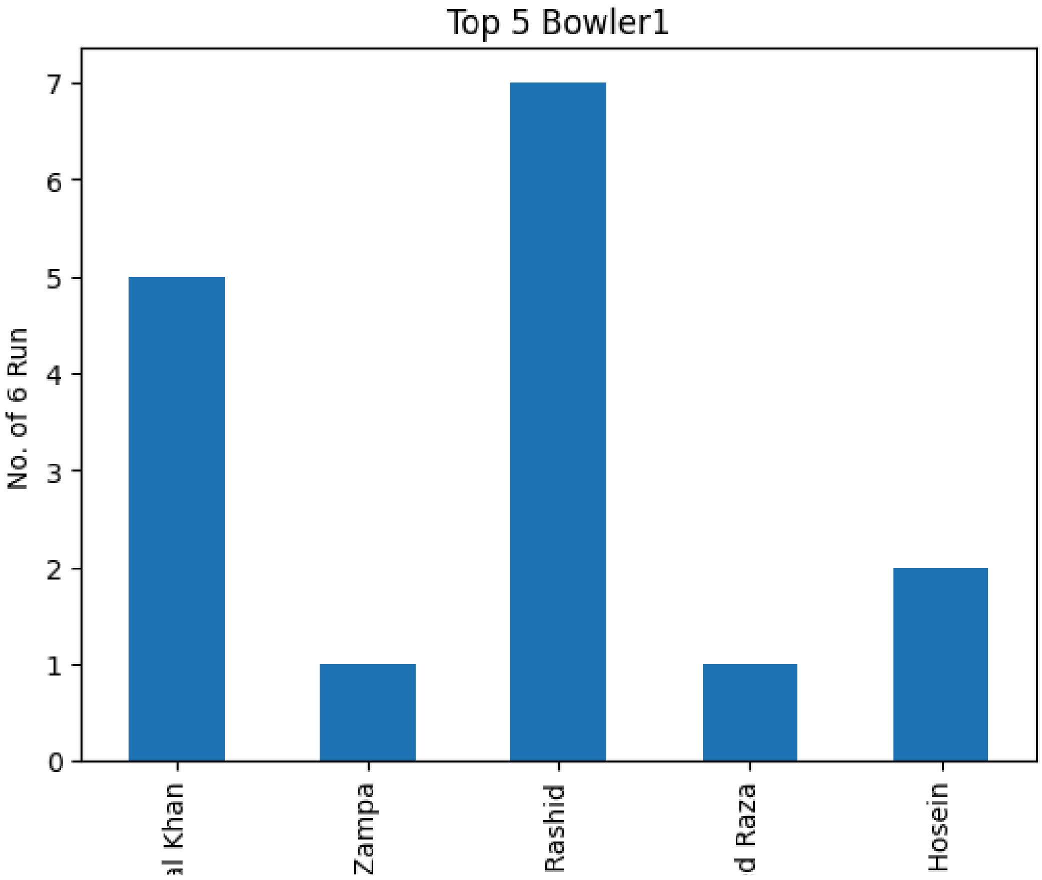


```
mask2=df['bowler1_runs']==6
new_delivery2 = df[mask2]
```

```
new_delivery2.groupby("bowler1_name")["bowler1_runs"].count()
```

```
bowler1_name
Aayan Afzal Khan             5
Adam Zampa                   1
Adil Rashid                  7
Ahmed Raza                   1
Akeal Hosein                 2
                            ..
Wanindu Hasaranga de Silva  13
Wayne Parnell                8
Wellington Masakadza         1
Wessly Madhevere             1
Zahoor Khan                  5
Name: bowler1_runs, Length: 112, dtype: int64
```

```
new_delivery2.groupby("bowler1_name")["bowler1_runs"].count().head().plot(kind="bar",ylabel=
<Axes: title={'center': 'Top 5 Bowler1'}, xlabel='bowler1_name', ylabel='No. of 6
Run'>
```


Top 5 Bowler1
No. of 6 Run
al Khan
Zampa
Rashid
d Raza
Hosein