

cluster-analysis-cricket-data-dks

June 16, 2024

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

```
[54]: import warnings
warnings.filterwarnings("ignore")
```

```
[55]: from warnings import filterwarnings
filterwarnings('ignore')
```

```
[56]: pd.options.display.max_columns = None
pd.options.display.max_rows = None
np.set_printoptions(suppress=True)
```

```
[57]: data = pd.read_csv(r'C:\DKS\Machine_Learning\KNN_MLA\cricket_data.
↪csv',index_col=0)
data
```

```
[57]:
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	Mat.x	Inns.x	NO	Runs.x	HS	Avg.x	BF	SR.x	X100	\
PLAYER										
Aaron Finch	10	9	1	134	46	16.75	100	134.00	0	
AB de Villiers	12	11	2	480	90	53.33	275	174.54	0	
Abhishek Sharma	3	3	2	63	46	63	33	190.90	0	
Ajinkya Rahane	15	14	1	370	65	28.46	313	118.21	0	
Alex Hales	6	6	0	148	45	24.66	118	125.42	0	
Ambati Rayudu	16	16	2	602	100	43	402	149.75	1	
Andre Russell	16	14	3	316	88	28.72	171	184.79	0	
Andrew Tye	14	8	2	32	14	5.33	38	84.21	0	
Axar Patel	9	8	2	80	19	13.33	69	115.94	0	
Ben Cutting	9	6	2	96	37	24	58	165.51	0	
Ben Stokes	13	13	1	196	45	16.33	161	121.73	0	
Bhuvneshwar Kumar	12	4	2	13	7	6.5	16	81.25	0	
Brendon McCullum	6	6	0	127	43	21.16	88	144.31	0	
Carlos Brathwaite	4	4	1	75	43	25	48	156.25	0	
Chris Gayle	11	11	2	368	104	40.88	252	146.03	1	

Chris Lynn	16	16	1	491	74	32.73	377	130.23	0
Chris Morris	4	4	3	46	27	46	26	176.92	0
Chris Woakes	5	4	2	17	11	8.5	19	89.47	0
Colin de Grandhomme	9	8	3	131	40	26.2	84	155.95	0
Colin Munro	5	5	0	63	33	12.6	41	153.65	0
Corey Anderson	3	3	0	17	15	5.66	22	77.27	0
D'Arcy Short	7	7	0	115	44	16.42	99	116.16	0
Dan Christian	4	3	1	26	13	13	33	78.78	0
David Miller	3	3	1	74	26	37	64	115.62	0
Deepak Chahar	12	4	1	50	39	16.66	29	172.41	0
Deepak Hooda	9	8	4	87	32	21.75	81	107.40	0
Dinesh Karthik	16	16	6	498	52	49.8	337	147.77	0
Dwayne Bravo	16	10	6	141	68	35.25	91	154.94	0
Evin Lewis	13	13	0	382	65	29.38	276	138.40	0
Faf du Plessis	6	6	1	162	67	32.4	129	125.58	0
Gautam Gambhir	6	5	0	85	55	17	88	96.59	0
Glenn Maxwell	12	12	0	169	47	14.08	120	140.83	0
Harbhajan Singh	13	3	0	29	19	9.66	36	80.55	0
Hardik Pandya	13	13	4	260	50	28.88	195	133.33	0
Harshal Patel	5	2	1	60	36	60	33	181.81	0
Heinrich Klaasen	4	4	1	57	32	19	47	121.27	0
Ishan Kishan	14	12	0	275	62	22.91	184	149.45	0
Jason Roy	5	5	1	120	91	30	94	127.65	0
Jaydev U0dkat	15	7	3	49	26	12.25	38	128.94	0
Jofra Archer	10	8	3	15	8	3	21	71.42	0
Jos Buttler	13	13	3	548	95	54.8	353	155.24	0
JP Duminy	6	4	3	36	23	36	40	90.00	0
Kane Williamson	17	17	3	735	84	52.5	516	142.44	0
Karun Oir	13	12	0	301	54	25.08	221	136.19	0
Kedar Jadhav	1	1	1	24	24	-	22	109.09	0
Kieron Pollard	9	8	1	133	50	19	100	133.00	0
Krish0ppa Gowtham	15	13	4	126	33	14	64	196.87	0
Kru0l Pandya	14	13	3	228	41	22.8	157	145.22	0
Lokesh Rahul	14	14	2	659	95	54.91	416	158.41	0
Mahipal Lomror	2	2	1	20	11	20	21	95.23	0
Ma0n Vohra	4	4	0	55	45	13.75	47	117.02	0
Mandeep Singh	14	13	3	252	47	25.2	186	135.48	0
Manish Pandey	15	13	2	284	62	25.81	246	115.44	0
Manoj Tiwary	5	4	1	47	35	15.66	44	106.81	0
Marcus Stoinis	7	7	3	99	29	24.75	76	130.26	0
Mayank Agarwal	11	11	1	120	30	12	94	127.65	0
Mayank Markande	14	6	4	21	7	10.5	24	87.50	0
Mitchell Johnson	6	2	2	16	12	-	11	145.45	0
Moeen Ali	5	4	0	77	65	19.25	46	167.39	0
Mohammad Obi	2	2	0	18	14	9	12	150.00	0
Mohammed Siraj	11	4	2	25	14	12.5	22	113.63	0
MS Dhoni	16	15	9	455	79	75.83	302	150.66	0

Nitish Ra0	15	15	2	304	59	23.38	232	131.03	0
Parthiv Patel	6	6	1	153	53	30.6	109	140.36	0
Piyush Chawla	15	7	3	27	12	6.75	34	79.41	0
Prithvi Shaw	9	9	0	245	65	27.22	160	153.12	0
Quinton de Kock	8	8	0	201	53	25.12	162	124.07	0
Rahul Tewatia	8	5	2	50	24	16.66	43	116.27	0
Rahul Tripathi	12	12	3	226	80	25.11	167	135.32	0
Rashid Khan	17	7	2	59	34	11.8	31	190.32	0
Ravichandran Ashwin	14	9	1	102	45	12.75	71	143.66	0
Ravindra Jadeja	16	10	5	89	27	17.8	74	120.27	0
Rinku Singh	4	4	0	29	16	7.25	31	93.54	0
Rishabh Pant	14	14	1	684	128	52.61	394	173.60	1
Robin Uthappa	16	16	0	351	54	21.93	265	132.45	0
Rohit Sharma	14	14	2	286	94	23.83	215	133.02	0
Sam Billings	10	8	0	108	56	13.5	78	138.46	0
Sanju Samson	15	15	1	441	92	31.5	320	137.81	0
Sarfaraz Khan	7	6	1	51	22	10.2	41	124.39	0
Shakib Al Hasan	17	13	2	239	35	21.72	197	121.31	0
Shane Watson	15	15	1	555	117	39.64	359	154.59	2
Shardul Thakur	13	1	1	15	15	-	5	300.00	0
Shikhar Dhawan	16	16	3	497	92	38.23	363	136.91	0
Shivam Mavi	9	4	1	13	7	4.33	15	86.66	0
Shreevats Goswami	6	3	0	52	35	17.33	40	130.00	0
Shreyas Gopal	11	4	1	50	24	16.66	45	111.11	0
Shreyas Iyer	14	14	3	411	93	37.36	310	132.58	0
Shubman Gill	13	11	5	203	57	33.83	139	146.04	0
Stuart Binny	7	5	0	44	22	8.8	39	112.82	0
Sunil Orine	16	16	0	357	75	22.31	188	189.89	0
Suresh Rai0	15	15	3	445	75	37.08	336	132.44	0
Suryakumar Yadav	14	14	0	512	72	36.57	384	133.33	0
Tim Southee	8	4	2	52	36	26	46	113.04	0
Tom Curran	5	4	1	23	18	7.66	28	82.14	0
Vijay Shankar	13	11	7	212	54	53	148	143.24	0
Virat Kohli	14	14	3	530	92	48.18	381	139.10	0
Washington Sundar	7	6	3	65	35	21.66	38	171.05	0
Wriddhiman Saha	11	10	2	122	35	15.25	102	119.60	0
Yusuf Pathan	15	13	4	260	45	28.88	200	130.00	0
Yuvraj Singh	8	6	0	65	20	10.83	73	89.04	0
Akila Da0njaya	0	0	0	0	0	0	0	0.00	0
Amit Mishra	0	0	0	0	0	0	0	0.00	0
Ankit Rajpoot	0	0	0	0	0	0	0	0.00	0
Ankit Sharma	0	0	0	0	0	0	0	0.00	0
Anureet Singh	0	0	0	0	0	0	0	0.00	0
Avesh Khan	0	0	0	0	0	0	0	0.00	0
Barinder Sran	0	0	0	0	0	0	0	0.00	0
Basil Thampi	0	0	0	0	0	0	0	0.00	0
Ben Laughlin	0	0	0	0	0	0	0	0.00	0

Billy Stanlake	0	0	0	0	0	0	0	0.00	0
Chris Jordan	0	0	0	0	0	0	0	0.00	0
David Willey	0	0	0	0	0	0	0	0.00	0
Dhawal Kulkarni	0	0	0	0	0	0	0	0.00	0
Imran Tahir	0	0	0	0	0	0	0	0.00	0
Ish Sodhi	0	0	0	0	0	0	0	0.00	0
Jasprit Bumrah	0	0	0	0	0	0	0	0.00	0
Javon Searles	0	0	0	0	0	0	0	0.00	0
Junior Dala	0	0	0	0	0	0	0	0.00	0
Karn Sharma	0	0	0	0	0	0	0	0.00	0
Khaleel Ahmed	0	0	0	0	0	0	0	0.00	0
KM Asif	0	0	0	0	0	0	0	0.00	0
Kuldeep Yadav	0	0	0	0	0	0	0	0.00	0
Kulwant Khejroliya	0	0	0	0	0	0	0	0.00	0
Liam Plunkett	0	0	0	0	0	0	0	0.00	0
Lungi Ngidi	0	0	0	0	0	0	0	0.00	0
Mark Wood	0	0	0	0	0	0	0	0.00	0
Mitchell McCleOghan	0	0	0	0	0	0	0	0.00	0
Mohammed Shami	0	0	0	0	0	0	0	0.00	0
Mohit Sharma	0	0	0	0	0	0	0	0.00	0
Mujeeb Ur Rahman	0	0	0	0	0	0	0	0.00	0
Murugan Ashwin	0	0	0	0	0	0	0	0.00	0
Mustafizur Rahman	0	0	0	0	0	0	0	0.00	0
Pawan Negi	0	0	0	0	0	0	0	0.00	0
Pradeep Sangwan	0	0	0	0	0	0	0	0.00	0
Prasidh Krish0	0	0	0	0	0	0	0	0.00	0
Sandeep Lamichhane	0	0	0	0	0	0	0	0.00	0
Sandeep Sharma	0	0	0	0	0	0	0	0.00	0
Shahbaz Odeem	0	0	0	0	0	0	0	0.00	0
Siddarth Kaul	0	0	0	0	0	0	0	0.00	0
Trent Boult	0	0	0	0	0	0	0	0.00	0
Umesh Yadav	0	0	0	0	0	0	0	0.00	0
Vi0y Kumar	0	0	0	0	0	0	0	0.00	0
Yuzvendra Chahal	0	0	0	0	0	0	0	0.00	0

	X50	X4s	X6s	Mat.y	Inns.y	Ov	Runs.y	Wkts	BBI	\
PLAYER										
Aaron Finch	0	6	8	0	0	0.0	0	0	0	
AB de Villiers	6	39	30	0	0	0.0	0	0	0	
Abhishek Sharma	0	3	5	0	0	0.0	0	0	0	
Ajinkya Rahane	1	39	5	0	0	0.0	0	0	0	
Alex Hales	0	13	6	0	0	0.0	0	0	0	
Ambati Rayudu	3	53	34	0	0	0.0	0	0	0	
Andre Russell	1	17	31	16	15	37.5	355	13	0	
Andrew Tye	0	2	1	14	14	56.0	448	24	0	
Axar Patel	0	3	4	9	8	26.0	218	3	0	
Ben Cutting	0	5	8	9	7	17.0	168	2	0	

Ben Stokes	0	13	6	13	12	37.0	303	8	0
Bhuvneshwar Kumar	0	1	0	12	12	46.1	354	9	0
Brendon McCullum	0	16	6	0	0	0.0	0	0	0
Carlos Brathwaite	0	1	8	4	4	10.1	94	5	0
Chris Gayle	3	30	27	0	0	0.0	0	0	0
Chris Lynn	3	56	18	0	0	0.0	0	0	0
Chris Morris	0	3	2	4	4	14.0	143	3	0
Chris Woakes	0	1	1	5	5	18.2	190	8	0
Colin de Grandhomme	0	4	10	9	7	15.0	129	2	0
Colin Munro	0	7	4	0	0	0.0	0	0	0
Corey Anderson	0	0	1	3	3	8.4	115	3	0
D'Arcy Short	0	11	5	7	2	3.0	19	1	0
Dan Christian	0	0	1	4	4	11.5	101	4	0
David Miller	0	3	2	0	0	0.0	0	0	0
Deepak Chahar	0	1	4	12	12	38.1	278	10	0
Deepak Hooda	0	2	3	9	2	3.0	24	0	0
Dinesh Karthik	2	49	16	0	0	0.0	0	0	0
Dwayne Bravo	1	8	10	16	16	53.3	533	14	0
Evin Lewis	2	32	24	0	0	0.0	0	0	0
Faf du Plessis	1	17	6	0	0	0.0	0	0	0
Gautam Gambhir	1	8	1	0	0	0.0	0	0	0
Glenn Maxwell	0	14	9	12	10	16.0	132	5	0
Harbhajan Singh	0	3	1	13	12	31.5	270	7	0
Hardik Pandya	1	20	11	13	13	42.4	381	18	0
Harshal Patel	0	1	6	5	5	17.3	167	7	0
Heinrich Klaasen	0	5	1	0	0	0.0	0	0	0
Ishan Kishan	2	22	17	0	0	0.0	0	0	0
Jason Roy	1	9	7	0	0	0.0	0	0	0
Jaydev Uddak	0	6	1	15	15	50.2	486	11	0
Jofra Archer	0	2	0	10	10	38.5	325	15	0
Jos Buttler	5	52	21	0	0	0.0	0	0	0
JP Duminy	0	3	1	6	2	3.0	36	0	0
Kane Williamson	8	64	28	0	0	0.0	0	0	0
Karun Oir	2	23	13	0	0	0.0	0	0	0
Kedar Jadhav	0	1	2	0	0	0.0	0	0	0
Kieron Pollard	1	10	7	0	0	0.0	0	0	0
KrishOppa Gowtham	0	9	9	15	15	40.0	312	11	0
Kru01 Pandya	0	22	10	14	13	40.1	284	12	0
Lokesh Rahul	6	66	32	0	0	0.0	0	0	0
Mahipal Lomror	0	1	0	2	2	3.0	27	0	0
MaOn Vohra	0	2	4	0	0	0.0	0	0	0
Mandeep Singh	0	16	11	0	0	0.0	0	0	0
Manish Pandey	3	22	5	0	0	0.0	0	0	0
Manoj Tiwary	0	4	1	5	1	1.0	10	0	0
Marcus Stoinis	0	6	4	7	6	11.0	120	3	0
Mayank Agarwal	0	9	5	0	0	0.0	0	0	0
Mayank Markande	0	2	0	14	14	44.0	368	15	0

Mitchell Johnson	0	2	0	6	6	21.0	216	2	0
Moeen Ali	1	4	6	5	5	13.1	97	3	0
Mohammad Obi	0	3	0	2	2	5.0	47	1	0
Mohammed Siraj	0	2	1	11	11	41.0	367	11	0
MS Dhoni	3	24	30	0	0	0.0	0	0	0
Nitish Ra0	1	26	14	15	5	6.1	44	4	0
Parthiv Patel	1	20	4	0	0	0.0	0	0	0
Piyush Chawla	0	1	1	15	15	49.0	412	14	0
Prithvi Shaw	2	27	10	0	0	0.0	0	0	0
Quinton de Kock	1	20	8	0	0	0.0	0	0	0
Rahul Tewatia	0	5	1	8	8	22.0	173	6	0
Rahul Tripathi	1	18	8	0	0	0.0	0	0	0
Rashid Khan	0	3	6	17	17	68.0	458	21	0
Ravichandran Ashwin	0	7	5	14	14	50.4	410	10	0
Ravindra Jadeja	0	3	4	16	14	41.0	303	11	0
Rinku Singh	0	4	0	0	0	0.0	0	0	0
Rishabh Pant	5	68	37	0	0	0.0	0	0	0
Robin Uthappa	1	30	21	0	0	0.0	0	0	0
Rohit Sharma	2	25	12	0	0	0.0	0	0	0
Sam Billings	1	8	5	0	0	0.0	0	0	0
Sanju Samson	3	30	19	0	0	0.0	0	0	0
Sarfaraz Khan	0	7	1	0	0	0.0	0	0	0
Shakib Al Hasan	0	26	5	17	17	57.0	456	14	0
Shane Watson	2	44	35	15	11	28.0	251	6	0
Shardul Thakur	0	3	0	13	13	46.4	431	16	0
Shikhar Dhawan	4	59	14	0	0	0.0	0	0	0
Shivam Mavi	0	1	0	9	9	28.0	270	5	0
Shreevats Goswami	0	6	1	0	0	0.0	0	0	0
Shreyas Gopal	0	5	0	11	10	31.0	236	11	0
Shreyas Iyer	4	29	21	0	0	0.0	0	0	0
Shubman Gill	1	22	5	0	0	0.0	0	0	0
Stuart Binny	0	2	2	7	1	2.0	33	0	0
Sunil Orine	2	40	23	16	16	61.0	467	17	0
Suresh Rai0	4	46	12	0	0	0.0	0	0	0
Suryakumar Yadav	4	61	16	0	0	0.0	0	0	0
Tim Southee	0	5	1	8	8	29.0	261	5	0
Tom Curran	0	3	0	5	5	10.1	118	6	0
Vijay Shankar	1	11	11	13	4	5.0	58	1	0
Virat Kohli	4	52	18	0	0	0.0	0	0	0
Washington Sundar	0	5	4	7	7	20.0	192	4	0
Wriddhiman Saha	0	17	1	0	0	0.0	0	0	0
Yusuf Pathan	0	22	11	15	1	2.0	14	1	0
Yuvraj Singh	0	6	2	8	2	2.0	23	0	0
Akila Da0njaya	0	0	0	1	1	4.0	47	0	0
Amit Mishra	0	0	0	10	10	37.0	264	12	0
Ankit Rajpoot	0	0	0	8	8	26.1	223	11	0
Ankit Sharma	0	0	0	1	1	1.0	11	0	0

Anureet Singh	0	0	0	3	3	4.0	42	1	0
Avesh Khan	0	0	0	6	6	19.0	204	4	0
Barinder Sran	0	0	0	6	6	22.0	229	4	0
Basil Thampi	0	0	0	4	4	10.1	114	5	0
Ben Laughlin	0	0	0	7	7	21.0	211	9	0
Billy Stanlake	0	0	0	4	4	16.0	130	5	0
Chris Jordan	0	0	0	1	1	4.0	31	0	0
David Willey	0	0	0	3	3	10.0	95	2	0
Dhawal Kulkarni	0	0	0	8	8	19.5	188	4	0
Imran Tahir	0	0	0	6	6	20.4	188	6	0
Ish Sodhi	0	0	0	6	6	23.0	135	5	0
Jaspريت Bumrah	0	0	0	14	14	54.0	372	17	0
Javon Searles	0	0	0	4	3	7.0	89	2	0
Junior Dala	0	0	0	1	1	3.0	34	0	0
Karn Sharma	0	0	0	6	5	9.3	89	4	0
Khaleel Ahmed	0	0	0	1	1	3.0	38	0	0
KM Asif	0	0	0	2	2	6.0	75	3	0
Kuldeep Yadav	0	0	0	16	16	51.2	418	17	0
Kulwant Khejroliya	0	0	0	3	3	10.5	107	2	0
Liam Plunkett	0	0	0	7	7	25.0	225	4	0
Lungi Ngidi	0	0	0	7	7	26.0	156	11	0
Mark Wood	0	0	0	1	1	4.0	49	0	0
Mitchell McCleOghan	0	0	0	11	11	40.0	332	14	0
Mohammed Shami	0	0	0	4	4	13.5	144	3	0
Mohit Sharma	0	0	0	9	9	29.4	322	7	0
Mujeeb Ur Rahman	0	0	0	11	11	41.2	289	14	0
Murugan Ashwin	0	0	0	2	2	7.0	53	3	0
Mustafizur Rahman	0	0	0	7	7	27.3	230	7	0
Pawan Negi	0	0	0	2	2	4.0	49	1	0
Pradeep Sangwan	0	0	0	1	1	2.0	19	0	0
Prasidh Krish0	0	0	0	7	7	28.0	260	10	0
Sandeep Lamichhane	0	0	0	3	3	12.0	82	5	0
Sandeep Sharma	0	0	0	12	12	44.0	333	12	0
Shahbaz Odeem	0	0	0	6	6	15.0	161	3	0
Siddarth Kaul	0	0	0	17	17	66.0	547	21	0
Trent Boult	0	0	0	14	14	52.4	466	18	0
Umesh Yadav	0	0	0	14	14	53.1	418	20	0
Vi0y Kumar	0	0	0	2	2	3.5	65	2	0
Yuzvendra Chahal	0	0	0	14	14	50.0	363	12	0

	Avg.y	Econ	SR.y	X4w	X5w	y
PLAYER						
Aaron Finch	0	0.00	0	0	0	0
AB de Villiers	0	0.00	0	0	0	0
Abhishek Sharma	0	0.00	0	0	0	0
Ajinkya Rahane	0	0.00	0	0	0	0
Alex Hales	0	0.00	0	0	0	0

Ambati Rayudu	0	0.00	0	0	0	0
Andre Russell	27.3	9.38	17.46	0	0	0
Andrew Tye	18.66	8.00	14	3	0	0
Axar Patel	72.66	8.38	52	0	0	0
Ben Cutting	84	9.88	51	0	0	0
Ben Stokes	37.87	8.18	27.75	0	0	0
Bhuvneshwar Kumar	39.33	7.66	30.77	0	0	0
Brendon McCullum	0	0.00	0	0	0	0
Carlos Brathwaite	18.8	9.24	12.2	0	0	0
Chris Gayle	0	0.00	0	0	0	0
Chris Lynn	0	0.00	0	0	0	0
Chris Morris	47.66	10.21	28	0	0	0
Chris Woakes	23.75	10.36	13.75	0	0	0
Colin de Grandhomme	64.5	8.60	45	0	0	0
Colin Munro	0	0.00	0	0	0	0
Corey Anderson	38.33	13.26	17.33	0	0	0
D'Arcy Short	19	6.33	18	0	0	0
Dan Christian	25.25	8.53	17.75	0	0	0
David Miller	0	0.00	0	0	0	0
Deepak Chahar	27.8	7.28	22.9	0	0	0
Deepak Hooda	-	8.00	-	0	0	0
Dinesh Karthik	0	0.00	0	0	0	0
Dwayne Bravo	38.07	9.96	22.92	0	0	0
Evin Lewis	0	0.00	0	0	0	0
Faf du Plessis	0	0.00	0	0	0	0
Gautam Gambhir	0	0.00	0	0	0	0
Glenn Maxwell	26.4	8.25	19.2	0	0	0
Harbhajan Singh	38.57	8.48	27.28	0	0	0
Hardik Pandya	21.16	8.92	14.22	0	0	0
Harshal Patel	23.85	9.54	15	0	0	0
Heinrich Klaasen	0	0.00	0	0	0	0
Ishan Kishan	0	0.00	0	0	0	0
Jason Roy	0	0.00	0	0	0	0
Jaydev U0dkat	44.18	9.65	27.45	0	0	0
Jofra Archer	21.66	8.36	15.53	0	0	0
Jos Buttler	0	0.00	0	0	0	0
JP Duminy	-	12.00	-	0	0	0
Kane Williamson	0	0.00	0	0	0	0
Karun Oir	0	0.00	0	0	0	0
Kedar Jadhav	0	0.00	0	0	0	0
Kieron Pollard	0	0.00	0	0	0	0
Krish0ppa Gowtham	28.36	7.80	21.81	0	0	0
Kru0l Pandya	23.66	7.07	20.08	0	0	0
Lokesh Rahul	0	0.00	0	0	0	0
Mahipal Lomror	-	9.00	-	0	0	0
Ma0n Vohra	0	0.00	0	0	0	0
Mandeep Singh	0	0.00	0	0	0	0

Manish Pandey	0	0.00	0	0	0	0
Manoj Tiwary	-	10.00	-	0	0	0
Marcus Stoinis	40	10.90	22	0	0	0
Mayank Agarwal	0	0.00	0	0	0	0
Mayank Markande	24.53	8.36	17.6	1	0	0
Mitchell Johnson	108	10.28	63	0	0	0
Moeen Ali	32.33	7.36	26.33	0	0	0
Mohammad Obi	47	9.40	30	0	0	0
Mohammed Siraj	33.36	8.95	22.36	0	0	0
MS Dhoni	0	0.00	0	0	0	0
Nitish Ra0	11	7.13	9.25	0	0	0
Parthiv Patel	0	0.00	0	0	0	0
Piyush Chawla	29.42	8.40	21	0	0	0
Prithvi Shaw	0	0.00	0	0	0	0
Quinton de Kock	0	0.00	0	0	0	0
Rahul Tewatia	28.83	7.86	22	0	0	0
Rahul Tripathi	0	0.00	0	0	0	0
Rashid Khan	21.8	6.73	19.42	0	0	0
Ravichandran Ashwin	41	8.09	30.4	0	0	0
Ravindra Jadeja	27.54	7.39	22.36	0	0	0
Rinku Singh	0	0.00	0	0	0	0
Rishabh Pant	0	0.00	0	0	0	0
Robin Uthappa	0	0.00	0	0	0	0
Rohit Sharma	0	0.00	0	0	0	0
Sam Billings	0	0.00	0	0	0	0
Sanju Samson	0	0.00	0	0	0	0
Sarfaraz Khan	0	0.00	0	0	0	0
Shakib Al Hasan	32.57	8.00	24.42	0	0	0
Shane Watson	41.83	8.96	28	0	0	0
Shardul Thakur	26.93	9.23	17.5	0	0	0
Shikhar Dhawan	0	0.00	0	0	0	0
Shivam Mavi	54	9.64	33.6	0	0	0
Shreevats Goswami	0	0.00	0	0	0	0
Shreyas Gopal	21.45	7.61	16.9	1	0	0
Shreyas Iyer	0	0.00	0	0	0	0
Shubman Gill	0	0.00	0	0	0	0
Stuart Binny	-	16.50	-	0	0	0
Sunil Orine	27.47	7.65	21.52	0	0	0
Suresh Rai0	0	0.00	0	0	0	0
Suryakumar Yadav	0	0.00	0	0	0	0
Tim Southee	52.2	9.00	34.8	0	0	0
Tom Curran	19.66	11.60	10.16	0	0	0
Vijay Shankar	58	11.60	30	0	0	0
Virat Kohli	0	0.00	0	0	0	0
Washington Sundar	48	9.60	30	0	0	0
Wriddhiman Saha	0	0.00	0	0	0	0
Yusuf Pathan	14	7.00	12	0	0	0

Yuvraj Singh	-	11.50	-	0	0	0
Akila DaOnjaya	-	11.75	-	0	0	0
Amit Mishra	22	7.13	18.5	0	0	0
Ankit Rajpoot	20.27	8.52	14.27	0	1	0
Ankit Sharma	-	11.00	-	0	0	0
Anureet Singh	42	10.50	24	0	0	0
Avesh Khan	51	10.73	28.5	0	0	0
Barinder Sran	57.25	10.40	33	0	0	0
Basil Thampi	22.8	11.21	12.2	0	0	0
Ben Laughlin	23.44	10.04	14	0	0	0
Billy Stanlake	26	8.12	19.2	0	0	0
Chris Jordan	-	7.75	-	0	0	0
David Willey	47.5	9.50	30	0	0	0
Dhawal Kulkarni	47	9.47	29.75	0	0	0
Imran Tahir	31.33	9.09	20.66	0	0	0
Ish Sodhi	27	5.86	27.6	0	0	0
Jasprit Bumrah	21.88	6.88	19.05	0	0	0
Javon Searles	44.5	12.71	21	0	0	0
Junior Dala	-	11.33	-	0	0	0
Karn Sharma	22.25	9.36	14.25	0	0	0
Khaleel Ahmed	-	12.66	-	0	0	0
KM Asif	25	12.50	12	0	0	0
Kuldeep Yadav	24.58	8.14	18.11	1	0	0
Kulwant Khejroliya	53.5	9.87	32.5	0	0	0
Liam Plunkett	56.25	9.00	37.5	0	0	0
Lungi Ngidi	14.18	6.00	14.18	1	0	0
Mark Wood	-	12.25	-	0	0	0
Mitchell McCleOghan	23.71	8.30	17.14	0	0	0
Mohammed Shami	48	10.40	27.66	0	0	0
Mohit Sharma	46	10.85	25.42	0	0	0
Mujeeb Ur Rahman	20.64	6.99	17.71	0	0	0
Murugan Ashwin	17.66	7.57	14	0	0	0
Mustafizur Rahman	32.85	8.36	23.57	0	0	0
Pawan Negi	49	12.25	24	0	0	0
Pradeep Sangwan	-	9.50	-	0	0	0
Prasidh Krish0	26	9.28	16.8	1	0	0
Sandeep Lamichhane	16.4	6.83	14.4	0	0	0
Sandeep Sharma	27.75	7.56	22	0	0	0
Shahbaz Odeem	53.66	10.73	30	0	0	0
Siddarth Kaul	26.04	8.28	18.85	0	0	0
Trent Boult	25.88	8.84	17.55	0	0	0
Umesh Yadav	20.9	7.86	15.95	0	0	0
Vi0y Kumar	32.5	16.95	11.5	0	0	0
Yuzvendra Chahal	30.25	7.26	25	0	0	0

```
[58]: data.info()
```

```

<class 'pandas.core.frame.DataFrame'>
Index: 143 entries, Aaron Finch to Yuzvendra Chahal
Data columns (total 24 columns):
#   Column      Non-Null Count  Dtype
---  -
0   Mat.x        143 non-null    int64
1   Inns.x       143 non-null    int64
2   NO           143 non-null    int64
3   Runs.x       143 non-null    int64
4   HS           143 non-null    int64
5   Avg.x        143 non-null    object
6   BF           143 non-null    int64
7   SR.x         143 non-null    float64
8   X100         143 non-null    int64
9   X50          143 non-null    int64
10  X4s          143 non-null    int64
11  X6s          143 non-null    int64
12  Mat.y        143 non-null    int64
13  Inns.y       143 non-null    int64
14  Ov           143 non-null    float64
15  Runs.y       143 non-null    int64
16  Wkts         143 non-null    int64
17  BBI          143 non-null    int64
18  Avg.y        143 non-null    object
19  Econ         143 non-null    float64
20  SR.y         143 non-null    object
21  X4w          143 non-null    int64
22  X5w          143 non-null    int64
23  y            143 non-null    int64
dtypes: float64(3), int64(18), object(3)
memory usage: 27.9+ KB

```

```
[59]: data.shape
```

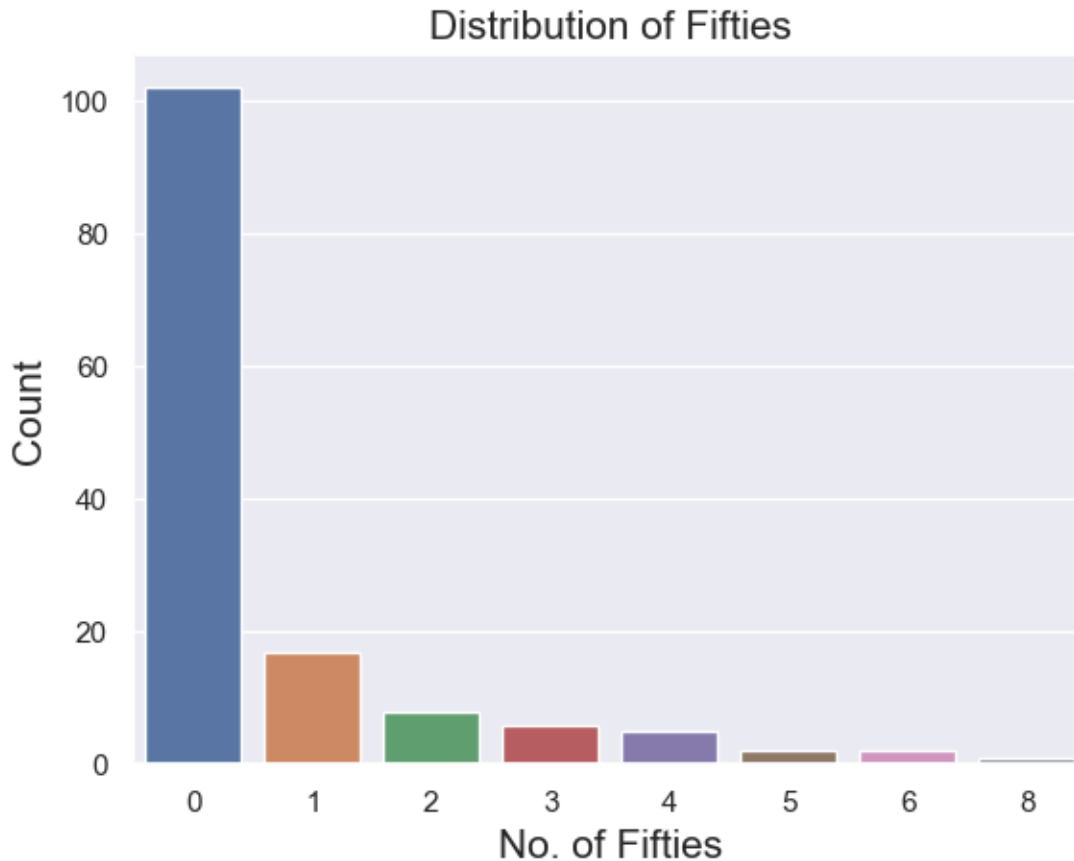
```
[59]: (143, 24)
```

```

[60]: sns.countplot(data =data, x = 'X50')
plt.title('Distribution of Fifties', fontsize = 15)
plt.xlabel('No. of Fifties', fontsize = 15)
plt.ylabel('Count', fontsize = 15)

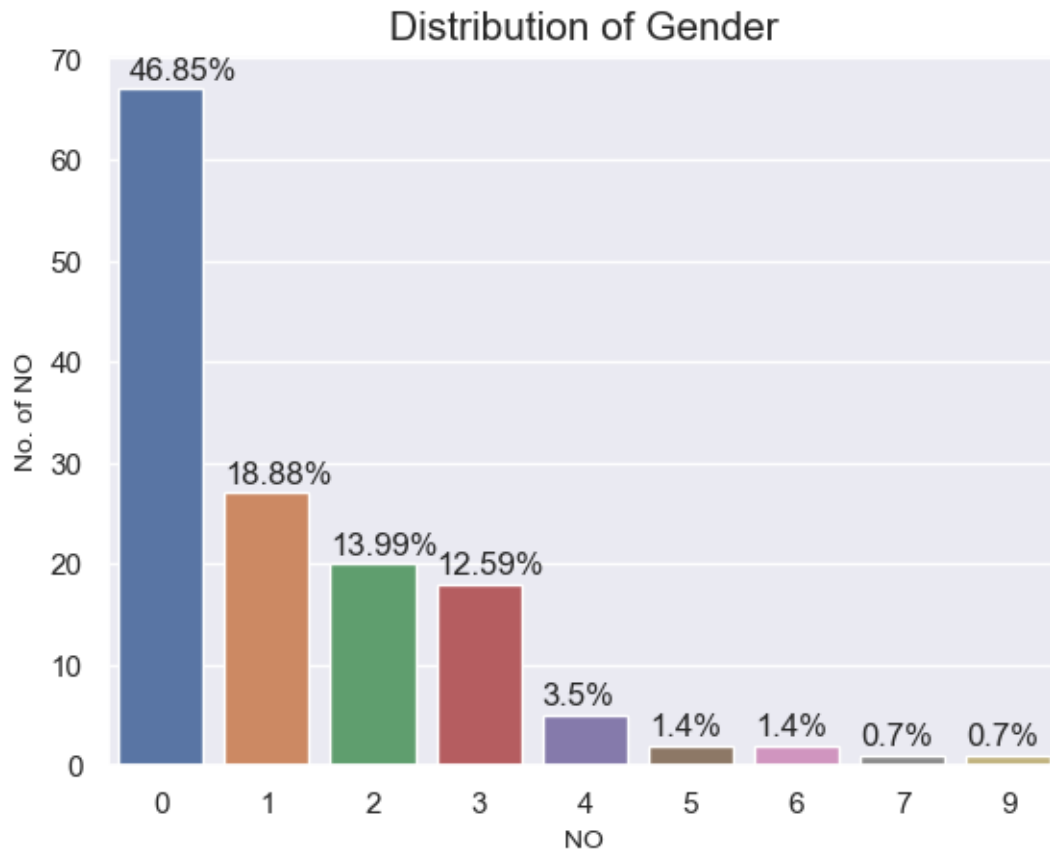
plt.show()

```



```
[61]: sns.countplot(data= data, x = 'NO')
plt.title('Distribution of Gender', fontsize = 15)
plt.xlabel('NO', fontsize = 10)
plt.ylabel('No. of NO', fontsize = 10)
plt.text(x = -0.3, y = data.NO.value_counts()[0] +1,s = str(round((data.NO.
↪value_counts()[0])*100/len(data.NO),2)) + '%')
plt.text(x = 0.60, y =data.NO.value_counts()[1] +1,s = str(round((data.NO.
↪value_counts()[1])*100/len(data.NO),2)) + '%')
plt.text(x = 1.60, y =data.NO.value_counts()[2] +1,s = str(round((data.NO.
↪value_counts()[2])*100/len(data.NO),2)) + '%')
plt.text(x = 2.60, y =data.NO.value_counts()[3] +1,s = str(round((data.NO.
↪value_counts()[3])*100/len(data.NO),2)) + '%')
plt.text(x = 3.60, y =data.NO.value_counts()[4] +1,s = str(round((data.NO.
↪value_counts()[4])*100/len(data.NO),2)) + '%')
plt.text(x = 4.60, y =data.NO.value_counts()[5] +1,s = str(round((data.NO.
↪value_counts()[5])*100/len(data.NO),2)) + '%')
plt.text(x = 5.60, y =data.NO.value_counts()[6] +1,s = str(round((data.NO.
↪value_counts()[6])*100/len(data.NO),2)) + '%')
```

```
plt.text(x = 6.60, y =data.NO.value_counts()[7] +1,s = str(round((data.NO.
↪value_counts()[7])*100/len(data.NO),2)) + '%')
plt.text(x = 7.60, y =data.NO.value_counts()[9] +1,s = str(round((data.NO.
↪value_counts()[9])*100/len(data.NO),2)) + '%')
plt.show()
```



```
[62]: data.describe()
```

```
[62]:
```

	Mat.x	Inns.x	NO	Runs.x	HS	BF \
count	143.000000	143.000000	143.000000	143.000000	143.000000	143.000000
mean	7.286713	6.013986	1.251748	132.349650	33.153846	95.027972
std	6.077692	5.499022	1.629259	175.482243	31.969684	120.286919
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25%	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50%	7.000000	5.000000	1.000000	52.000000	27.000000	41.000000
75%	13.000000	11.000000	2.000000	202.000000	53.500000	152.500000
max	17.000000	17.000000	9.000000	735.000000	128.000000	516.000000

	SR.x	X100	X50	X4s	X6s	Mat.y \
--	------	------	-----	-----	-----	---------

count	143.000000	143.000000	143.000000	143.000000	143.000000	143.000000
mean	93.120280	0.034965	0.706294	11.461538	6.069930	5.608392
std	67.202818	0.219236	1.447836	16.706147	8.793924	5.641939
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25%	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50%	117.020000	0.000000	0.000000	3.000000	2.000000	4.000000
75%	140.595000	0.000000	1.000000	17.000000	8.000000	10.000000
max	300.000000	2.000000	8.000000	68.000000	37.000000	17.000000

	Inns.y	Ov	Runs.y	Wkts	BBI	Econ \
count	143.000000	143.000000	143.000000	143.000000	143.0	143.000000
mean	5.006993	16.047552	137.230769	4.629371	0.0	6.158322
std	5.387121	18.820205	153.662732	5.909742	0.0	4.679642
min	0.000000	0.000000	0.000000	0.000000	0.0	0.000000
25%	0.000000	0.000000	0.000000	0.000000	0.0	0.000000
50%	3.000000	7.000000	82.000000	2.000000	0.0	7.860000
75%	8.500000	28.000000	243.500000	7.500000	0.0	9.500000
max	17.000000	68.000000	547.000000	24.000000	0.0	16.950000

	X4w	X5w	y
count	143.000000	143.000000	143.0
mean	0.055944	0.006993	0.0
std	0.308933	0.083624	0.0
min	0.000000	0.000000	0.0
25%	0.000000	0.000000	0.0
50%	0.000000	0.000000	0.0
75%	0.000000	0.000000	0.0
max	3.000000	1.000000	0.0

```
[63]: data.describe(include = object)
```

```
[63]:
```

	Avg.x	Avg.y	SR.y
count	143	143	143
unique	95	81	69
top	0	0	0
freq	43	48	48

```
[64]: #for variable in ['Avg.x', 'Avg.y', 'SR.y']:
data['Avg.x'] = pd.to_numeric(data['Avg.x'], errors='coerce')
data['Avg.y'] = pd.to_numeric(data['Avg.y'], errors='coerce')
data['SR.y'] = pd.to_numeric(data['SR.y'], errors='coerce')
```

```
[65]: data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 143 entries, Aaron Finch to Yuzvendra Chahal
Data columns (total 24 columns):
```

#	Column	Non-Null Count	Dtype
0	Mat.x	143 non-null	int64
1	Inns.x	143 non-null	int64
2	NO	143 non-null	int64
3	Runs.x	143 non-null	int64
4	HS	143 non-null	int64
5	Avg.x	140 non-null	float64
6	BF	143 non-null	int64
7	SR.x	143 non-null	float64
8	X100	143 non-null	int64
9	X50	143 non-null	int64
10	X4s	143 non-null	int64
11	X6s	143 non-null	int64
12	Mat.y	143 non-null	int64
13	Inns.y	143 non-null	int64
14	Ov	143 non-null	float64
15	Runs.y	143 non-null	int64
16	Wkts	143 non-null	int64
17	BBI	143 non-null	int64
18	Avg.y	130 non-null	float64
19	Econ	143 non-null	float64
20	SR.y	130 non-null	float64
21	X4w	143 non-null	int64
22	X5w	143 non-null	int64
23	y	143 non-null	int64

dtypes: float64(6), int64(18)

memory usage: 32.0+ KB

```
[71]: data.describe()
```

```
[71]:
```

	Mat.x	Inns.x	NO	Runs.x	HS	Avg.x \
count	143.000000	143.000000	143.000000	143.000000	143.000000	140.000000
mean	7.286713	6.013986	1.251748	132.349650	33.153846	17.408929
std	6.077692	5.499022	1.629259	175.482243	31.969684	16.972076
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25%	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50%	7.000000	5.000000	1.000000	52.000000	27.000000	14.665000
75%	13.000000	11.000000	2.000000	202.000000	53.500000	26.050000
max	17.000000	17.000000	9.000000	735.000000	128.000000	75.830000

	BF	SR.x	X100	X50	X4s	X6s \
count	143.000000	143.000000	143.000000	143.000000	143.000000	143.000000
mean	95.027972	93.120280	0.034965	0.706294	11.461538	6.069930
std	120.286919	67.202818	0.219236	1.447836	16.706147	8.793924
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25%	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

50%	41.000000	117.020000	0.000000	0.000000	3.000000	2.000000
75%	152.500000	140.595000	0.000000	1.000000	17.000000	8.000000
max	516.000000	300.000000	2.000000	8.000000	68.000000	37.000000

	Mat.y	Inns.y	Ov	Runs.y	Wkts	BBI \
count	143.000000	143.000000	143.000000	143.000000	143.000000	143.0
mean	5.608392	5.006993	16.047552	137.230769	4.629371	0.0
std	5.641939	5.387121	18.820205	153.662732	5.909742	0.0
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.0
25%	0.000000	0.000000	0.000000	0.000000	0.000000	0.0
50%	4.000000	3.000000	7.000000	82.000000	2.000000	0.0
75%	10.000000	8.500000	28.000000	243.500000	7.500000	0.0
max	17.000000	17.000000	68.000000	547.000000	24.000000	0.0

	Avg.y	Econ	SR.y	X4w	X5w	y
count	130.000000	143.000000	130.000000	143.000000	143.000000	143.0
mean	21.759308	6.158322	14.444923	0.055944	0.006993	0.0
std	21.187861	4.679642	13.406302	0.308933	0.083624	0.0
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.0
25%	0.000000	0.000000	0.000000	0.000000	0.000000	0.0
50%	21.940000	7.860000	15.265000	0.000000	0.000000	0.0
75%	32.780000	9.500000	22.915000	0.000000	0.000000	0.0
max	108.000000	16.950000	63.000000	3.000000	1.000000	0.0

[66]: data

[66]:

	Mat.x	Inns.x	NO	Runs.x	HS	Avg.x	BF	SR.x	X100	\
PLAYER										
Aaron Finch	10	9	1	134	46	16.75	100	134.00	0	
AB de Villiers	12	11	2	480	90	53.33	275	174.54	0	
Abhishek Sharma	3	3	2	63	46	63.00	33	190.90	0	
Ajinkya Rahane	15	14	1	370	65	28.46	313	118.21	0	
Alex Hales	6	6	0	148	45	24.66	118	125.42	0	
Ambati Rayudu	16	16	2	602	100	43.00	402	149.75	1	
Andre Russell	16	14	3	316	88	28.72	171	184.79	0	
Andrew Tye	14	8	2	32	14	5.33	38	84.21	0	
Axar Patel	9	8	2	80	19	13.33	69	115.94	0	
Ben Cutting	9	6	2	96	37	24.00	58	165.51	0	
Ben Stokes	13	13	1	196	45	16.33	161	121.73	0	
Bhuvneshwar Kumar	12	4	2	13	7	6.50	16	81.25	0	
Brendon McCullum	6	6	0	127	43	21.16	88	144.31	0	
Carlos Brathwaite	4	4	1	75	43	25.00	48	156.25	0	
Chris Gayle	11	11	2	368	104	40.88	252	146.03	1	
Chris Lynn	16	16	1	491	74	32.73	377	130.23	0	
Chris Morris	4	4	3	46	27	46.00	26	176.92	0	
Chris Woakes	5	4	2	17	11	8.50	19	89.47	0	
Colin de Grandhomme	9	8	3	131	40	26.20	84	155.95	0	

Colin Munro	5	5	0	63	33	12.60	41	153.65	0
Corey Anderson	3	3	0	17	15	5.66	22	77.27	0
D'Arcy Short	7	7	0	115	44	16.42	99	116.16	0
Dan Christian	4	3	1	26	13	13.00	33	78.78	0
David Miller	3	3	1	74	26	37.00	64	115.62	0
Deepak Chahar	12	4	1	50	39	16.66	29	172.41	0
Deepak Hooda	9	8	4	87	32	21.75	81	107.40	0
Dinesh Karthik	16	16	6	498	52	49.80	337	147.77	0
Dwayne Bravo	16	10	6	141	68	35.25	91	154.94	0
Evin Lewis	13	13	0	382	65	29.38	276	138.40	0
Faf du Plessis	6	6	1	162	67	32.40	129	125.58	0
Gautam Gambhir	6	5	0	85	55	17.00	88	96.59	0
Glenn Maxwell	12	12	0	169	47	14.08	120	140.83	0
Harbhajan Singh	13	3	0	29	19	9.66	36	80.55	0
Hardik Pandya	13	13	4	260	50	28.88	195	133.33	0
Harshal Patel	5	2	1	60	36	60.00	33	181.81	0
Heinrich Klaasen	4	4	1	57	32	19.00	47	121.27	0
Ishan Kishan	14	12	0	275	62	22.91	184	149.45	0
Jason Roy	5	5	1	120	91	30.00	94	127.65	0
Jaydev U0dkat	15	7	3	49	26	12.25	38	128.94	0
Jofra Archer	10	8	3	15	8	3.00	21	71.42	0
Jos Buttler	13	13	3	548	95	54.80	353	155.24	0
JP Duminy	6	4	3	36	23	36.00	40	90.00	0
Kane Williamson	17	17	3	735	84	52.50	516	142.44	0
Karun Oir	13	12	0	301	54	25.08	221	136.19	0
Kedar Jadhav	1	1	1	24	24	NaN	22	109.09	0
Kieron Pollard	9	8	1	133	50	19.00	100	133.00	0
Krish0ppa Gowtham	15	13	4	126	33	14.00	64	196.87	0
Kru0l Pandya	14	13	3	228	41	22.80	157	145.22	0
Lokesh Rahul	14	14	2	659	95	54.91	416	158.41	0
Mahipal Lomror	2	2	1	20	11	20.00	21	95.23	0
Ma0n Vohra	4	4	0	55	45	13.75	47	117.02	0
Mandeep Singh	14	13	3	252	47	25.20	186	135.48	0
Manish Pandey	15	13	2	284	62	25.81	246	115.44	0
Manoj Tiwary	5	4	1	47	35	15.66	44	106.81	0
Marcus Stoinis	7	7	3	99	29	24.75	76	130.26	0
Mayank Agarwal	11	11	1	120	30	12.00	94	127.65	0
Mayank Markande	14	6	4	21	7	10.50	24	87.50	0
Mitchell Johnson	6	2	2	16	12	NaN	11	145.45	0
Moeen Ali	5	4	0	77	65	19.25	46	167.39	0
Mohammad Obi	2	2	0	18	14	9.00	12	150.00	0
Mohammed Siraj	11	4	2	25	14	12.50	22	113.63	0
MS Dhoni	16	15	9	455	79	75.83	302	150.66	0
Nitish Ra0	15	15	2	304	59	23.38	232	131.03	0
Parthiv Patel	6	6	1	153	53	30.60	109	140.36	0
Piyush Chawla	15	7	3	27	12	6.75	34	79.41	0
Prithvi Shaw	9	9	0	245	65	27.22	160	153.12	0

Quinton de Kock	8	8	0	201	53	25.12	162	124.07	0
Rahul Tewatia	8	5	2	50	24	16.66	43	116.27	0
Rahul Tripathi	12	12	3	226	80	25.11	167	135.32	0
Rashid Khan	17	7	2	59	34	11.80	31	190.32	0
Ravichandran Ashwin	14	9	1	102	45	12.75	71	143.66	0
Ravindra Jadeja	16	10	5	89	27	17.80	74	120.27	0
Rinku Singh	4	4	0	29	16	7.25	31	93.54	0
Rishabh Pant	14	14	1	684	128	52.61	394	173.60	1
Robin Uthappa	16	16	0	351	54	21.93	265	132.45	0
Rohit Sharma	14	14	2	286	94	23.83	215	133.02	0
Sam Billings	10	8	0	108	56	13.50	78	138.46	0
Sanju Samson	15	15	1	441	92	31.50	320	137.81	0
Sarfaraz Khan	7	6	1	51	22	10.20	41	124.39	0
Shakib Al Hasan	17	13	2	239	35	21.72	197	121.31	0
Shane Watson	15	15	1	555	117	39.64	359	154.59	2
Shardul Thakur	13	1	1	15	15	NaN	5	300.00	0
Shikhar Dhawan	16	16	3	497	92	38.23	363	136.91	0
Shivam Mavi	9	4	1	13	7	4.33	15	86.66	0
Shreevats Goswami	6	3	0	52	35	17.33	40	130.00	0
Shreyas Gopal	11	4	1	50	24	16.66	45	111.11	0
Shreyas Iyer	14	14	3	411	93	37.36	310	132.58	0
Shubman Gill	13	11	5	203	57	33.83	139	146.04	0
Stuart Binny	7	5	0	44	22	8.80	39	112.82	0
Sunil Orine	16	16	0	357	75	22.31	188	189.89	0
Suresh Rai0	15	15	3	445	75	37.08	336	132.44	0
Suryakumar Yadav	14	14	0	512	72	36.57	384	133.33	0
Tim Southee	8	4	2	52	36	26.00	46	113.04	0
Tom Curran	5	4	1	23	18	7.66	28	82.14	0
Vijay Shankar	13	11	7	212	54	53.00	148	143.24	0
Virat Kohli	14	14	3	530	92	48.18	381	139.10	0
Washington Sundar	7	6	3	65	35	21.66	38	171.05	0
Wriddhiman Saha	11	10	2	122	35	15.25	102	119.60	0
Yusuf Pathan	15	13	4	260	45	28.88	200	130.00	0
Yuvraj Singh	8	6	0	65	20	10.83	73	89.04	0
Akila Da0njaya	0	0	0	0	0	0.00	0	0.00	0
Amit Mishra	0	0	0	0	0	0.00	0	0.00	0
Ankit Rajpoot	0	0	0	0	0	0.00	0	0.00	0
Ankit Sharma	0	0	0	0	0	0.00	0	0.00	0
Anureet Singh	0	0	0	0	0	0.00	0	0.00	0
Avesh Khan	0	0	0	0	0	0.00	0	0.00	0
Barinder Sran	0	0	0	0	0	0.00	0	0.00	0
Basil Thampi	0	0	0	0	0	0.00	0	0.00	0
Ben Laughlin	0	0	0	0	0	0.00	0	0.00	0
Billy Stanlake	0	0	0	0	0	0.00	0	0.00	0
Chris Jordan	0	0	0	0	0	0.00	0	0.00	0
David Willey	0	0	0	0	0	0.00	0	0.00	0
Dhawal Kulkarni	0	0	0	0	0	0.00	0	0.00	0

Imran Tahir	0	0	0	0	0	0.00	0	0.00	0
Ish Sodhi	0	0	0	0	0	0.00	0	0.00	0
Jaspriit Bumrah	0	0	0	0	0	0.00	0	0.00	0
Javon Searles	0	0	0	0	0	0.00	0	0.00	0
Junior Dala	0	0	0	0	0	0.00	0	0.00	0
Karn Sharma	0	0	0	0	0	0.00	0	0.00	0
Khaleel Ahmed	0	0	0	0	0	0.00	0	0.00	0
KM Asif	0	0	0	0	0	0.00	0	0.00	0
Kuldeep Yadav	0	0	0	0	0	0.00	0	0.00	0
Kulwant Khejroliya	0	0	0	0	0	0.00	0	0.00	0
Liam Plunkett	0	0	0	0	0	0.00	0	0.00	0
Lungi Ngidi	0	0	0	0	0	0.00	0	0.00	0
Mark Wood	0	0	0	0	0	0.00	0	0.00	0
Mitchell McCleOghan	0	0	0	0	0	0.00	0	0.00	0
Mohammed Shami	0	0	0	0	0	0.00	0	0.00	0
Mohit Sharma	0	0	0	0	0	0.00	0	0.00	0
Mujeeb Ur Rahman	0	0	0	0	0	0.00	0	0.00	0
Murugan Ashwin	0	0	0	0	0	0.00	0	0.00	0
Mustafizur Rahman	0	0	0	0	0	0.00	0	0.00	0
Pawan Negi	0	0	0	0	0	0.00	0	0.00	0
Pradeep Sangwan	0	0	0	0	0	0.00	0	0.00	0
Prasidh Krish0	0	0	0	0	0	0.00	0	0.00	0
Sandeep Lamichhane	0	0	0	0	0	0.00	0	0.00	0
Sandeep Sharma	0	0	0	0	0	0.00	0	0.00	0
Shahbaz Odeem	0	0	0	0	0	0.00	0	0.00	0
Siddarth Kaul	0	0	0	0	0	0.00	0	0.00	0
Trent Boult	0	0	0	0	0	0.00	0	0.00	0
Umesh Yadav	0	0	0	0	0	0.00	0	0.00	0
Vi0y Kumar	0	0	0	0	0	0.00	0	0.00	0
Yuzvendra Chahal	0	0	0	0	0	0.00	0	0.00	0

	X50	X4s	X6s	Mat.y	Inns.y	Ov	Runs.y	Wkts	BBI	\
PLAYER										
Aaron Finch	0	6	8	0	0	0.0	0	0	0	
AB de Villiers	6	39	30	0	0	0.0	0	0	0	
Abhishek Sharma	0	3	5	0	0	0.0	0	0	0	
Ajinkya Rahane	1	39	5	0	0	0.0	0	0	0	
Alex Hales	0	13	6	0	0	0.0	0	0	0	
Ambati Rayudu	3	53	34	0	0	0.0	0	0	0	
Andre Russell	1	17	31	16	15	37.5	355	13	0	
Andrew Tye	0	2	1	14	14	56.0	448	24	0	
Axar Patel	0	3	4	9	8	26.0	218	3	0	
Ben Cutting	0	5	8	9	7	17.0	168	2	0	
Ben Stokes	0	13	6	13	12	37.0	303	8	0	
Bhuvneshwar Kumar	0	1	0	12	12	46.1	354	9	0	
Brendon McCullum	0	16	6	0	0	0.0	0	0	0	
Carlos Brathwaite	0	1	8	4	4	10.1	94	5	0	

Chris Gayle	3	30	27	0	0	0.0	0	0	0
Chris Lynn	3	56	18	0	0	0.0	0	0	0
Chris Morris	0	3	2	4	4	14.0	143	3	0
Chris Woakes	0	1	1	5	5	18.2	190	8	0
Colin de Grandhomme	0	4	10	9	7	15.0	129	2	0
Colin Munro	0	7	4	0	0	0.0	0	0	0
Corey Anderson	0	0	1	3	3	8.4	115	3	0
D'Arcy Short	0	11	5	7	2	3.0	19	1	0
Dan Christian	0	0	1	4	4	11.5	101	4	0
David Miller	0	3	2	0	0	0.0	0	0	0
Deepak Chahar	0	1	4	12	12	38.1	278	10	0
Deepak Hooda	0	2	3	9	2	3.0	24	0	0
Dinesh Karthik	2	49	16	0	0	0.0	0	0	0
Dwayne Bravo	1	8	10	16	16	53.3	533	14	0
Evin Lewis	2	32	24	0	0	0.0	0	0	0
Faf du Plessis	1	17	6	0	0	0.0	0	0	0
Gautam Gambhir	1	8	1	0	0	0.0	0	0	0
Glenn Maxwell	0	14	9	12	10	16.0	132	5	0
Harbhajan Singh	0	3	1	13	12	31.5	270	7	0
Hardik Pandya	1	20	11	13	13	42.4	381	18	0
Harshal Patel	0	1	6	5	5	17.3	167	7	0
Heinrich Klaasen	0	5	1	0	0	0.0	0	0	0
Ishan Kishan	2	22	17	0	0	0.0	0	0	0
Jason Roy	1	9	7	0	0	0.0	0	0	0
Jaydev U0dkat	0	6	1	15	15	50.2	486	11	0
Jofra Archer	0	2	0	10	10	38.5	325	15	0
Jos Buttler	5	52	21	0	0	0.0	0	0	0
JP Duminy	0	3	1	6	2	3.0	36	0	0
Kane Williamson	8	64	28	0	0	0.0	0	0	0
Karun Oir	2	23	13	0	0	0.0	0	0	0
Kedar Jadhav	0	1	2	0	0	0.0	0	0	0
Kieron Pollard	1	10	7	0	0	0.0	0	0	0
Krish0ppa Gowtham	0	9	9	15	15	40.0	312	11	0
Kru0l Pandya	0	22	10	14	13	40.1	284	12	0
Lokesh Rahul	6	66	32	0	0	0.0	0	0	0
Mahipal Lomror	0	1	0	2	2	3.0	27	0	0
Ma0n Vohra	0	2	4	0	0	0.0	0	0	0
Mandeep Singh	0	16	11	0	0	0.0	0	0	0
Manish Pandey	3	22	5	0	0	0.0	0	0	0
Manoj Tiwary	0	4	1	5	1	1.0	10	0	0
Marcus Stoinis	0	6	4	7	6	11.0	120	3	0
Mayank Agarwal	0	9	5	0	0	0.0	0	0	0
Mayank Markande	0	2	0	14	14	44.0	368	15	0
Mitchell Johnson	0	2	0	6	6	21.0	216	2	0
Moeen Ali	1	4	6	5	5	13.1	97	3	0
Mohammad Obi	0	3	0	2	2	5.0	47	1	0
Mohammed Siraj	0	2	1	11	11	41.0	367	11	0

MS Dhoni	3	24	30	0	0	0.0	0	0	0
Nitish Ra0	1	26	14	15	5	6.1	44	4	0
Parthiv Patel	1	20	4	0	0	0.0	0	0	0
Piyush Chawla	0	1	1	15	15	49.0	412	14	0
Prithvi Shaw	2	27	10	0	0	0.0	0	0	0
Quinton de Kock	1	20	8	0	0	0.0	0	0	0
Rahul Tewatia	0	5	1	8	8	22.0	173	6	0
Rahul Tripathi	1	18	8	0	0	0.0	0	0	0
Rashid Khan	0	3	6	17	17	68.0	458	21	0
Ravichandran Ashwin	0	7	5	14	14	50.4	410	10	0
Ravindra Jadeja	0	3	4	16	14	41.0	303	11	0
Rinku Singh	0	4	0	0	0	0.0	0	0	0
Rishabh Pant	5	68	37	0	0	0.0	0	0	0
Robin Uthappa	1	30	21	0	0	0.0	0	0	0
Rohit Sharma	2	25	12	0	0	0.0	0	0	0
Sam Billings	1	8	5	0	0	0.0	0	0	0
Sanju Samson	3	30	19	0	0	0.0	0	0	0
Sarfaraz Khan	0	7	1	0	0	0.0	0	0	0
Shakib Al Hasan	0	26	5	17	17	57.0	456	14	0
Shane Watson	2	44	35	15	11	28.0	251	6	0
Shardul Thakur	0	3	0	13	13	46.4	431	16	0
Shikhar Dhawan	4	59	14	0	0	0.0	0	0	0
Shivam Mavi	0	1	0	9	9	28.0	270	5	0
Shreevats Goswami	0	6	1	0	0	0.0	0	0	0
Shreyas Gopal	0	5	0	11	10	31.0	236	11	0
Shreyas Iyer	4	29	21	0	0	0.0	0	0	0
Shubman Gill	1	22	5	0	0	0.0	0	0	0
Stuart Binny	0	2	2	7	1	2.0	33	0	0
Sunil Orine	2	40	23	16	16	61.0	467	17	0
Suresh Rai0	4	46	12	0	0	0.0	0	0	0
Suryakumar Yadav	4	61	16	0	0	0.0	0	0	0
Tim Southee	0	5	1	8	8	29.0	261	5	0
Tom Curran	0	3	0	5	5	10.1	118	6	0
Vijay Shankar	1	11	11	13	4	5.0	58	1	0
Virat Kohli	4	52	18	0	0	0.0	0	0	0
Washington Sundar	0	5	4	7	7	20.0	192	4	0
Wriddhiman Saha	0	17	1	0	0	0.0	0	0	0
Yusuf Pathan	0	22	11	15	1	2.0	14	1	0
Yuvraj Singh	0	6	2	8	2	2.0	23	0	0
Akila Da0njaya	0	0	0	1	1	4.0	47	0	0
Amit Mishra	0	0	0	10	10	37.0	264	12	0
Ankit Rajpoot	0	0	0	8	8	26.1	223	11	0
Ankit Sharma	0	0	0	1	1	1.0	11	0	0
Anureet Singh	0	0	0	3	3	4.0	42	1	0
Avesh Khan	0	0	0	6	6	19.0	204	4	0
Barinder Sran	0	0	0	6	6	22.0	229	4	0
Basil Thampi	0	0	0	4	4	10.1	114	5	0

Ben Laughlin	0	0	0	7	7	21.0	211	9	0
Billy Stanlake	0	0	0	4	4	16.0	130	5	0
Chris Jordan	0	0	0	1	1	4.0	31	0	0
David Willey	0	0	0	3	3	10.0	95	2	0
Dhawal Kulkarni	0	0	0	8	8	19.5	188	4	0
Imran Tahir	0	0	0	6	6	20.4	188	6	0
Ish Sodhi	0	0	0	6	6	23.0	135	5	0
Jaspريت Bumrah	0	0	0	14	14	54.0	372	17	0
Javon Searles	0	0	0	4	3	7.0	89	2	0
Junior Dala	0	0	0	1	1	3.0	34	0	0
Karn Sharma	0	0	0	6	5	9.3	89	4	0
Khaleel Ahmed	0	0	0	1	1	3.0	38	0	0
KM Asif	0	0	0	2	2	6.0	75	3	0
Kuldeep Yadav	0	0	0	16	16	51.2	418	17	0
Kulwant Khejroliya	0	0	0	3	3	10.5	107	2	0
Liam Plunkett	0	0	0	7	7	25.0	225	4	0
Lungi Ngidi	0	0	0	7	7	26.0	156	11	0
Mark Wood	0	0	0	1	1	4.0	49	0	0
Mitchell McCleOghan	0	0	0	11	11	40.0	332	14	0
Mohammed Shami	0	0	0	4	4	13.5	144	3	0
Mohit Sharma	0	0	0	9	9	29.4	322	7	0
Mujeeb Ur Rahman	0	0	0	11	11	41.2	289	14	0
Murugan Ashwin	0	0	0	2	2	7.0	53	3	0
Mustafizur Rahman	0	0	0	7	7	27.3	230	7	0
Pawan Negi	0	0	0	2	2	4.0	49	1	0
Pradeep Sangwan	0	0	0	1	1	2.0	19	0	0
Prasidh Krish0	0	0	0	7	7	28.0	260	10	0
Sandeep Lamichhane	0	0	0	3	3	12.0	82	5	0
Sandeep Sharma	0	0	0	12	12	44.0	333	12	0
Shahbaz Odeem	0	0	0	6	6	15.0	161	3	0
Siddarth Kaul	0	0	0	17	17	66.0	547	21	0
Trent Boult	0	0	0	14	14	52.4	466	18	0
Umesh Yadav	0	0	0	14	14	53.1	418	20	0
Vi0y Kumar	0	0	0	2	2	3.5	65	2	0
Yuzvendra Chahal	0	0	0	14	14	50.0	363	12	0

	Avg.y	Econ	SR.y	X4w	X5w	y
PLAYER						
Aaron Finch	0.00	0.00	0.00	0	0	0
AB de Villiers	0.00	0.00	0.00	0	0	0
Abhishek Sharma	0.00	0.00	0.00	0	0	0
Ajinkya Rahane	0.00	0.00	0.00	0	0	0
Alex Hales	0.00	0.00	0.00	0	0	0
Ambati Rayudu	0.00	0.00	0.00	0	0	0
Andre Russell	27.30	9.38	17.46	0	0	0
Andrew Tye	18.66	8.00	14.00	3	0	0
Axar Patel	72.66	8.38	52.00	0	0	0

Ben Cutting	84.00	9.88	51.00	0	0	0
Ben Stokes	37.87	8.18	27.75	0	0	0
Bhuvneshwar Kumar	39.33	7.66	30.77	0	0	0
Brendon McCullum	0.00	0.00	0.00	0	0	0
Carlos Brathwaite	18.80	9.24	12.20	0	0	0
Chris Gayle	0.00	0.00	0.00	0	0	0
Chris Lynn	0.00	0.00	0.00	0	0	0
Chris Morris	47.66	10.21	28.00	0	0	0
Chris Woakes	23.75	10.36	13.75	0	0	0
Colin de Grandhomme	64.50	8.60	45.00	0	0	0
Colin Munro	0.00	0.00	0.00	0	0	0
Corey Anderson	38.33	13.26	17.33	0	0	0
D'Arcy Short	19.00	6.33	18.00	0	0	0
Dan Christian	25.25	8.53	17.75	0	0	0
David Miller	0.00	0.00	0.00	0	0	0
Deepak Chahar	27.80	7.28	22.90	0	0	0
Deepak Hooda	NaN	8.00	NaN	0	0	0
Dinesh Karthik	0.00	0.00	0.00	0	0	0
Dwayne Bravo	38.07	9.96	22.92	0	0	0
Evin Lewis	0.00	0.00	0.00	0	0	0
Faf du Plessis	0.00	0.00	0.00	0	0	0
Gautam Gambhir	0.00	0.00	0.00	0	0	0
Glenn Maxwell	26.40	8.25	19.20	0	0	0
Harbhajan Singh	38.57	8.48	27.28	0	0	0
Hardik Pandya	21.16	8.92	14.22	0	0	0
Harshal Patel	23.85	9.54	15.00	0	0	0
Heinrich Klaasen	0.00	0.00	0.00	0	0	0
Ishan Kishan	0.00	0.00	0.00	0	0	0
Jason Roy	0.00	0.00	0.00	0	0	0
Jaydev U0dkat	44.18	9.65	27.45	0	0	0
Jofra Archer	21.66	8.36	15.53	0	0	0
Jos Buttler	0.00	0.00	0.00	0	0	0
JP Duminy	NaN	12.00	NaN	0	0	0
Kane Williamson	0.00	0.00	0.00	0	0	0
Karun Oir	0.00	0.00	0.00	0	0	0
Kedar Jadhav	0.00	0.00	0.00	0	0	0
Kieron Pollard	0.00	0.00	0.00	0	0	0
Krish0ppa Gowtham	28.36	7.80	21.81	0	0	0
Kru0l Pandya	23.66	7.07	20.08	0	0	0
Lokesh Rahul	0.00	0.00	0.00	0	0	0
Mahipal Lomror	NaN	9.00	NaN	0	0	0
Ma0n Vohra	0.00	0.00	0.00	0	0	0
Mandeep Singh	0.00	0.00	0.00	0	0	0
Manish Pandey	0.00	0.00	0.00	0	0	0
Manoj Tiwary	NaN	10.00	NaN	0	0	0
Marcus Stoinis	40.00	10.90	22.00	0	0	0
Mayank Agarwal	0.00	0.00	0.00	0	0	0

Mayank Markande	24.53	8.36	17.60	1	0	0
Mitchell Johnson	108.00	10.28	63.00	0	0	0
Moeen Ali	32.33	7.36	26.33	0	0	0
Mohammad Obi	47.00	9.40	30.00	0	0	0
Mohammed Siraj	33.36	8.95	22.36	0	0	0
MS Dhoni	0.00	0.00	0.00	0	0	0
Nitish Ra0	11.00	7.13	9.25	0	0	0
Parthiv Patel	0.00	0.00	0.00	0	0	0
Piyush Chawla	29.42	8.40	21.00	0	0	0
Prithvi Shaw	0.00	0.00	0.00	0	0	0
Quinton de Kock	0.00	0.00	0.00	0	0	0
Rahul Tewatia	28.83	7.86	22.00	0	0	0
Rahul Tripathi	0.00	0.00	0.00	0	0	0
Rashid Khan	21.80	6.73	19.42	0	0	0
Ravichandran Ashwin	41.00	8.09	30.40	0	0	0
Ravindra Jadeja	27.54	7.39	22.36	0	0	0
Rinku Singh	0.00	0.00	0.00	0	0	0
Rishabh Pant	0.00	0.00	0.00	0	0	0
Robin Uthappa	0.00	0.00	0.00	0	0	0
Rohit Sharma	0.00	0.00	0.00	0	0	0
Sam Billings	0.00	0.00	0.00	0	0	0
Sanju Samson	0.00	0.00	0.00	0	0	0
Sarfaraz Khan	0.00	0.00	0.00	0	0	0
Shakib Al Hasan	32.57	8.00	24.42	0	0	0
Shane Watson	41.83	8.96	28.00	0	0	0
Shardul Thakur	26.93	9.23	17.50	0	0	0
Shikhar Dhawan	0.00	0.00	0.00	0	0	0
Shivam Mavi	54.00	9.64	33.60	0	0	0
Shreevats Goswami	0.00	0.00	0.00	0	0	0
Shreyas Gopal	21.45	7.61	16.90	1	0	0
Shreyas Iyer	0.00	0.00	0.00	0	0	0
Shubman Gill	0.00	0.00	0.00	0	0	0
Stuart Binny	NaN	16.50	NaN	0	0	0
Sunil Orine	27.47	7.65	21.52	0	0	0
Suresh Rai0	0.00	0.00	0.00	0	0	0
Suryakumar Yadav	0.00	0.00	0.00	0	0	0
Tim Southee	52.20	9.00	34.80	0	0	0
Tom Curran	19.66	11.60	10.16	0	0	0
Vijay Shankar	58.00	11.60	30.00	0	0	0
Virat Kohli	0.00	0.00	0.00	0	0	0
Washington Sundar	48.00	9.60	30.00	0	0	0
Wriddhiman Saha	0.00	0.00	0.00	0	0	0
Yusuf Pathan	14.00	7.00	12.00	0	0	0
Yuvraj Singh	NaN	11.50	NaN	0	0	0
Akila Da0njaya	NaN	11.75	NaN	0	0	0
Amit Mishra	22.00	7.13	18.50	0	0	0
Ankit Rajpoot	20.27	8.52	14.27	0	1	0

Ankit Sharma	NaN	11.00	NaN	0	0	0
Anureet Singh	42.00	10.50	24.00	0	0	0
Avesh Khan	51.00	10.73	28.50	0	0	0
Barinder Sran	57.25	10.40	33.00	0	0	0
Basil Thampi	22.80	11.21	12.20	0	0	0
Ben Laughlin	23.44	10.04	14.00	0	0	0
Billy Stanlake	26.00	8.12	19.20	0	0	0
Chris Jordan	NaN	7.75	NaN	0	0	0
David Willey	47.50	9.50	30.00	0	0	0
Dhawal Kulkarni	47.00	9.47	29.75	0	0	0
Imran Tahir	31.33	9.09	20.66	0	0	0
Ish Sodhi	27.00	5.86	27.60	0	0	0
Jaspriit Bumrah	21.88	6.88	19.05	0	0	0
Javon Searles	44.50	12.71	21.00	0	0	0
Junior Dala	NaN	11.33	NaN	0	0	0
Karn Sharma	22.25	9.36	14.25	0	0	0
Khaleel Ahmed	NaN	12.66	NaN	0	0	0
KM Asif	25.00	12.50	12.00	0	0	0
Kuldeep Yadav	24.58	8.14	18.11	1	0	0
Kulwant Khejroliya	53.50	9.87	32.50	0	0	0
Liam Plunkett	56.25	9.00	37.50	0	0	0
Lungi Ngidi	14.18	6.00	14.18	1	0	0
Mark Wood	NaN	12.25	NaN	0	0	0
Mitchell McCleOghan	23.71	8.30	17.14	0	0	0
Mohammed Shami	48.00	10.40	27.66	0	0	0
Mohit Sharma	46.00	10.85	25.42	0	0	0
Mujeeb Ur Rahman	20.64	6.99	17.71	0	0	0
Murugan Ashwin	17.66	7.57	14.00	0	0	0
Mustafizur Rahman	32.85	8.36	23.57	0	0	0
Pawan Negi	49.00	12.25	24.00	0	0	0
Pradeep Sangwan	NaN	9.50	NaN	0	0	0
Prasidh Krish0	26.00	9.28	16.80	1	0	0
Sandeep Lamichhane	16.40	6.83	14.40	0	0	0
Sandeep Sharma	27.75	7.56	22.00	0	0	0
Shahbaz Odeem	53.66	10.73	30.00	0	0	0
Siddarth Kaul	26.04	8.28	18.85	0	0	0
Trent Boult	25.88	8.84	17.55	0	0	0
Umesh Yadav	20.90	7.86	15.95	0	0	0
Vi0y Kumar	32.50	16.95	11.50	0	0	0
Yuzvendra Chahal	30.25	7.26	25.00	0	0	0

```
[68]: #data.describe(include = object)
```

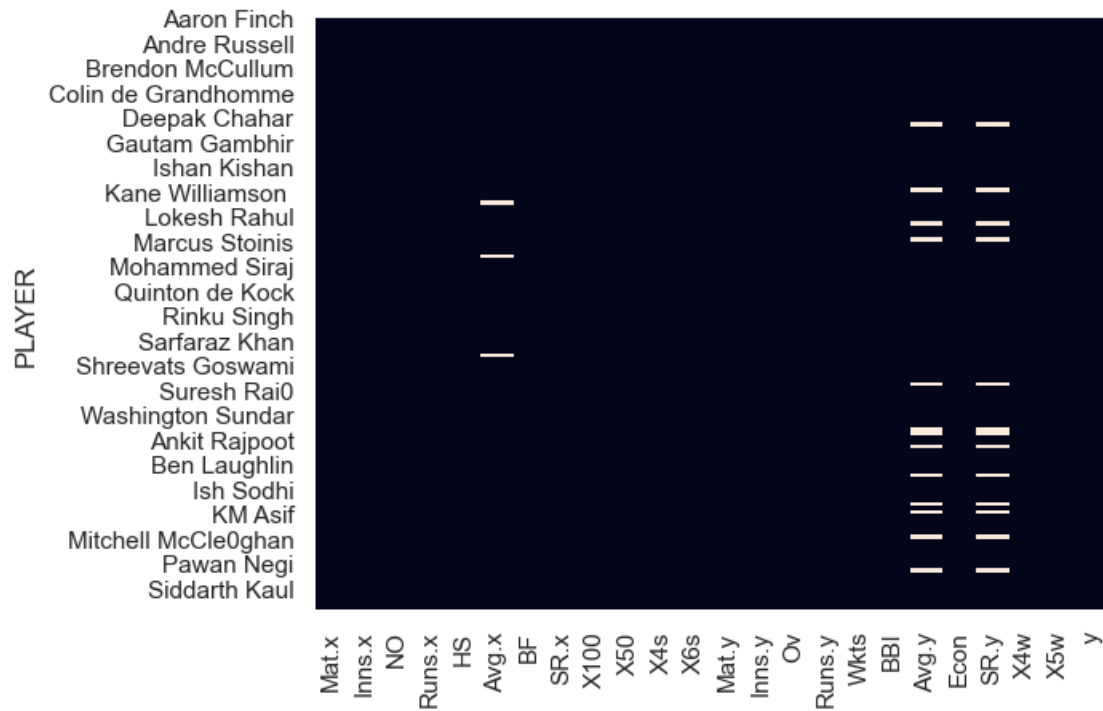
```
[69]: Total = data.isnull().sum().sort_values(ascending = False)
Percentage = (data.isnull().sum()*100/data.isnull().count()).
↳sort_values(ascending = False)
```

```
Missing_Values = pd.concat([Total, Percentage], axis = 1, keys = ['Total', 'Percentage of missing observations'])
Missing_Values
```

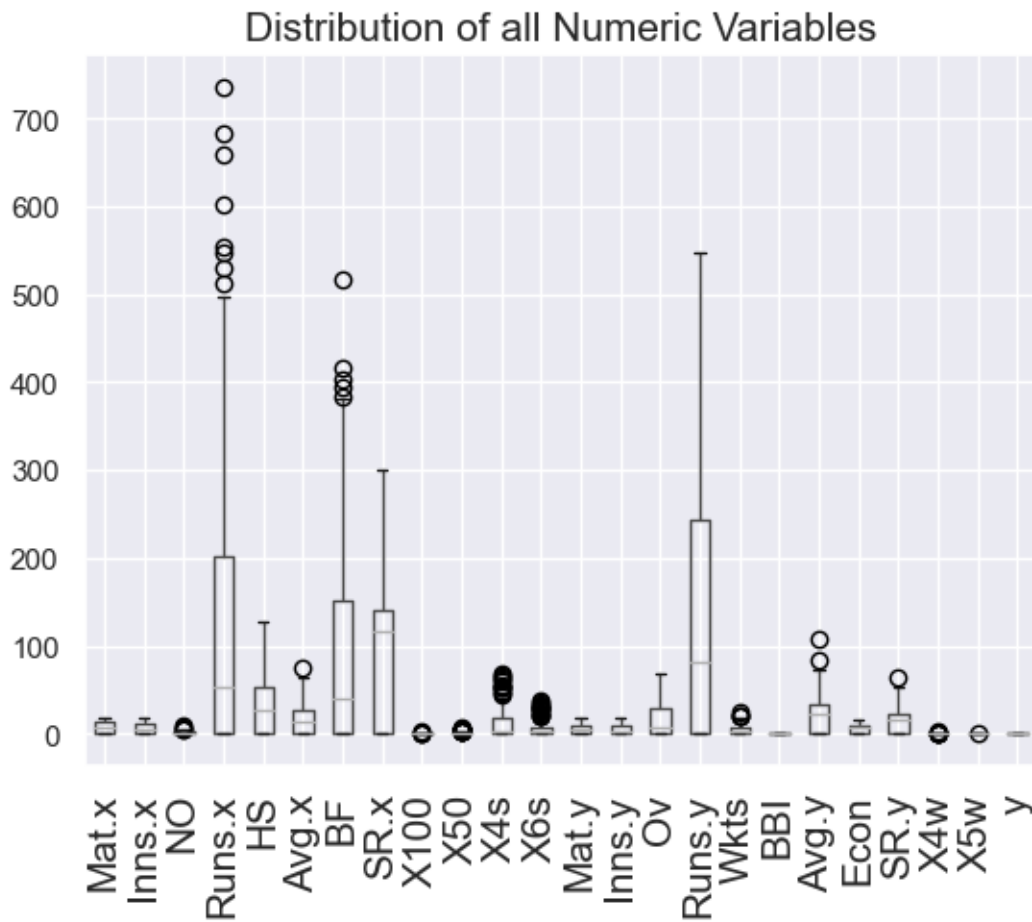
```
[69]:
```

	Total	Percentage of missing observations
SR.y	13	9.090909
Avg.y	13	9.090909
Avg.x	3	2.097902
Mat.x	0	0.000000
Inns.y	0	0.000000
X5w	0	0.000000
X4w	0	0.000000
Econ	0	0.000000
BBI	0	0.000000
Wkts	0	0.000000
Runs.y	0	0.000000
Ov	0	0.000000
Mat.y	0	0.000000
Inns.x	0	0.000000
X6s	0	0.000000
X4s	0	0.000000
X50	0	0.000000
X100	0	0.000000
SR.x	0	0.000000
BF	0	0.000000
HS	0	0.000000
Runs.x	0	0.000000
NO	0	0.000000
y	0	0.000000

```
[70]: sns.heatmap(data.isnull(), cbar=False)
plt.show()
```

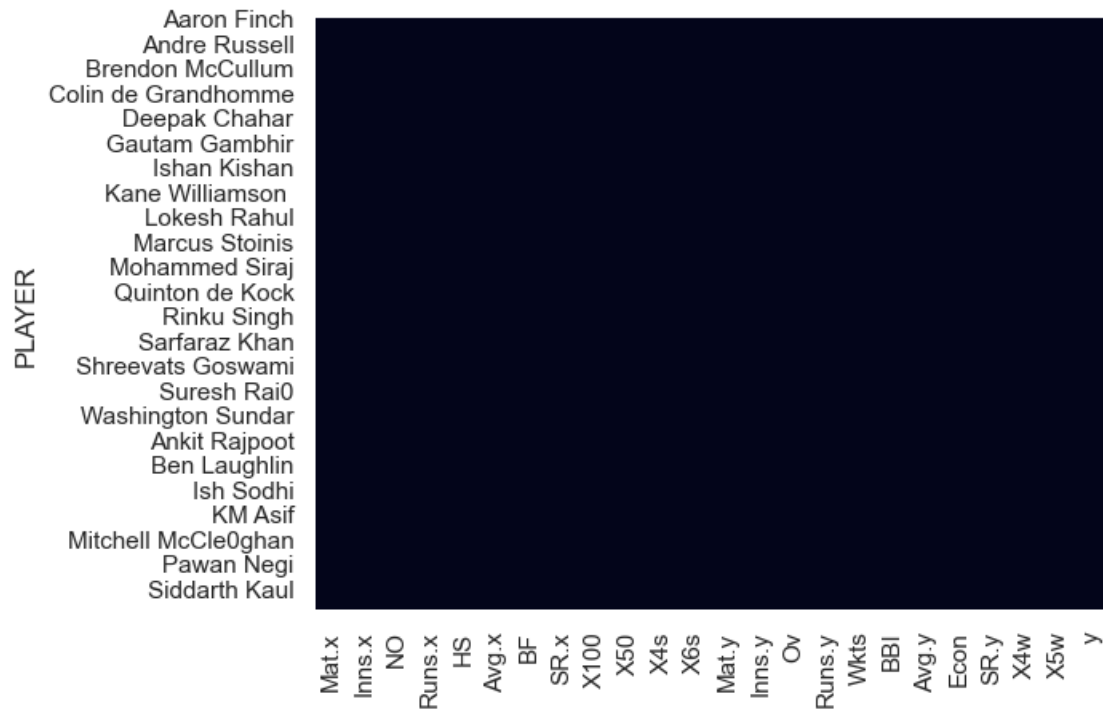


```
[72]: data.boxplot()
plt.title('Distribution of all Numeric Variables', fontsize = 15)
plt.xticks(rotation = 'vertical', fontsize = 15)
plt.show()
```



```
[75]: data['Avg.x'].fillna(data["Avg.x"].mean() , inplace = True)
      data['Avg.y'].fillna(data["Avg.y"].mean() , inplace = True)
      data['SR.y'].fillna(data["SR.y"].mean() , inplace = True)
```

```
[76]: sns.heatmap(data.isnull(), cbar=False)
      plt.show()
```



```
[77]: fig = data.hist(figsize = (18,18))
```



```
[92]: # 'features' contain only the brand names
features = data.drop(['BBI', 'X4w', 'X5w', 'y'], axis=1)

# head() to display top five rows
features.head()
```

```
[92]:
```

	Mat.x	Inns.x	NO	Runs.x	HS	Avg.x	BF	SR.x	X100	X50	\
PLAYER											
Aaron Finch	10	9	1	134	46	16.75	100	134.00	0	0	
AB de Villiers	12	11	2	480	90	53.33	275	174.54	0	6	
Abhishek Sharma	3	3	2	63	46	63.00	33	190.90	0	0	
Ajinkya Rahane	15	14	1	370	65	28.46	313	118.21	0	1	
Alex Hales	6	6	0	148	45	24.66	118	125.42	0	0	

	X4s	X6s	Mat.y	Inns.y	Ov	Runs.y	Wkts	Avg.y	Econ	SR.y
PLAYER										
Aaron Finch	6	8	0	0	0.0	0	0	0.0	0.0	0.0
AB de Villiers	39	30	0	0	0.0	0	0	0.0	0.0	0.0
Abhishek Sharma	3	5	0	0	0.0	0	0	0.0	0.0	0.0
Ajinkya Rahane	39	5	0	0	0.0	0	0	0.0	0.0	0.0
Alex Hales	13	6	0	0	0.0	0	0	0.0	0.0	0.0

```
[93]: data=features
```

```
[80]: from sklearn.preprocessing import StandardScaler
scale = StandardScaler().fit(features)
features = scale.transform(features)
```

```
[82]: data.shape
```

```
[82]: (143, 24)
```

```
[94]: features_scaled = pd.DataFrame(features, columns= data.columns[:20])
features_scaled.head()
```

```
[94]:
```

	Mat.x	Inns.x	NO	Runs.x	HS	Avg.x	BF	SR.x	X100	X50	\
PLAYER											
Aaron Finch	10	9	1	134	46	16.75	100	134.00	0	0	
AB de Villiers	12	11	2	480	90	53.33	275	174.54	0	6	
Abhishek Sharma	3	3	2	63	46	63.00	33	190.90	0	0	
Ajinkya Rahane	15	14	1	370	65	28.46	313	118.21	0	1	
Alex Hales	6	6	0	148	45	24.66	118	125.42	0	0	

	X4s	X6s	Mat.y	Inns.y	Ov	Runs.y	Wkts	Avg.y	Econ	SR.y
PLAYER										
Aaron Finch	6	8	0	0	0.0	0	0	0.0	0.0	0.0
AB de Villiers	39	30	0	0	0.0	0	0	0.0	0.0	0.0
Abhishek Sharma	3	5	0	0	0.0	0	0	0.0	0.0	0.0
Ajinkya Rahane	39	5	0	0	0.0	0	0	0.0	0.0	0.0
Alex Hales	13	6	0	0	0.0	0	0	0.0	0.0	0.0

```
[95]: import warnings
warnings.filterwarnings("ignore")

from sklearn.cluster import KMeans
from sklearn.metrics import silhouette_score

n_clusters = [2,3,4, 5, 6, 7, 8]
for K in n_clusters :
    cluster = KMeans(n_clusters= K, random_state= 10)
```

```

predict = cluster.fit_predict(features_scaled)

score = silhouette_score(features_scaled, predict, random_state= 10)
print ("For n_clusters = {}, silhouette score is {}".format(K, score))

```

```

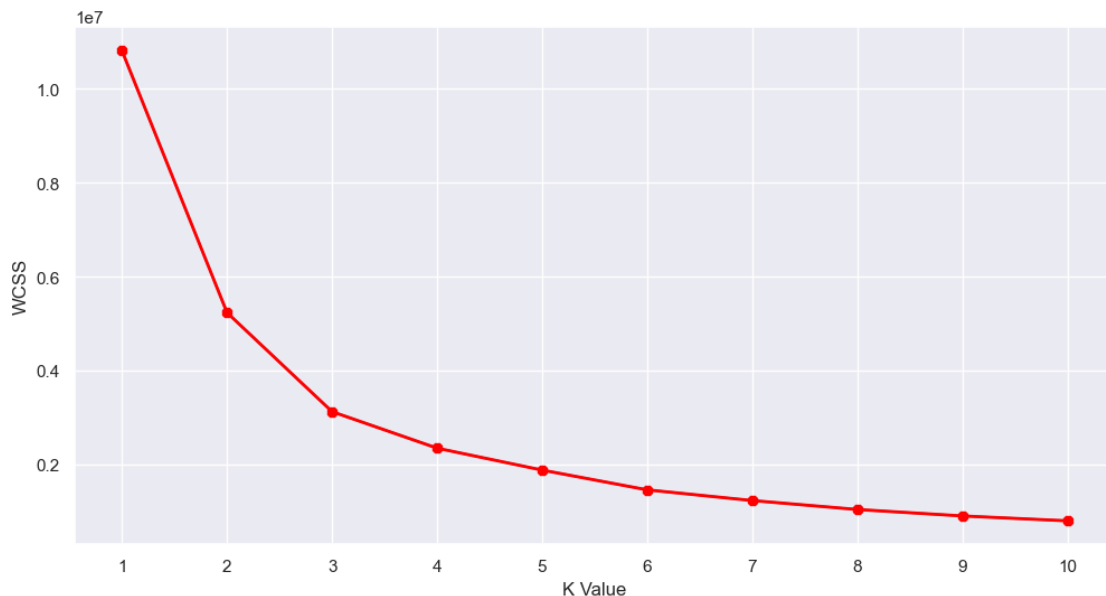
For n_clusters = 2, silhouette score is 0.5240370164487566
For n_clusters = 3, silhouette score is 0.43930592688984327
For n_clusters = 4, silhouette score is 0.3921382032081893
For n_clusters = 5, silhouette score is 0.38979519713754623
For n_clusters = 6, silhouette score is 0.4165766516805764
For n_clusters = 7, silhouette score is 0.4357642255381852
For n_clusters = 8, silhouette score is 0.43000424764559614

```

```

[97]: from sklearn.cluster import KMeans
wcss=[]
for i in range(1,11):
    km=KMeans(n_clusters=i)
    km.fit(features_scaled)
    wcss.append(km.inertia_)
plt.figure(figsize=(12,6))
plt.plot(range(1,11),wcss)
plt.plot(range(1,11),wcss, linewidth=2, color="red", marker ="8")
plt.xlabel("K Value")
plt.xticks(np.arange(1,11,1))
plt.ylabel("WCSS")
plt.show()

```




```
[98]: model = KMeans(n_clusters= 2, random_state= 10)
model.fit(features_scaled)
```

```
[98]: KMeans(n_clusters=2, random_state=10)
```

```
[99]: data_output = data.copy(deep = True)
data_output['Cluster'] = model.labels_
data_output.head()
```

```
[99]:
```

	Mat.x	Inns.x	NO	Runs.x	HS	Avg.x	BF	SR.x	X100	X50	\
PLAYER											
Aaron Finch	10	9	1	134	46	16.75	100	134.00	0	0	
AB de Villiers	12	11	2	480	90	53.33	275	174.54	0	6	
Abhishek Sharma	3	3	2	63	46	63.00	33	190.90	0	0	
Ajinkya Rahane	15	14	1	370	65	28.46	313	118.21	0	1	
Alex Hales	6	6	0	148	45	24.66	118	125.42	0	0	

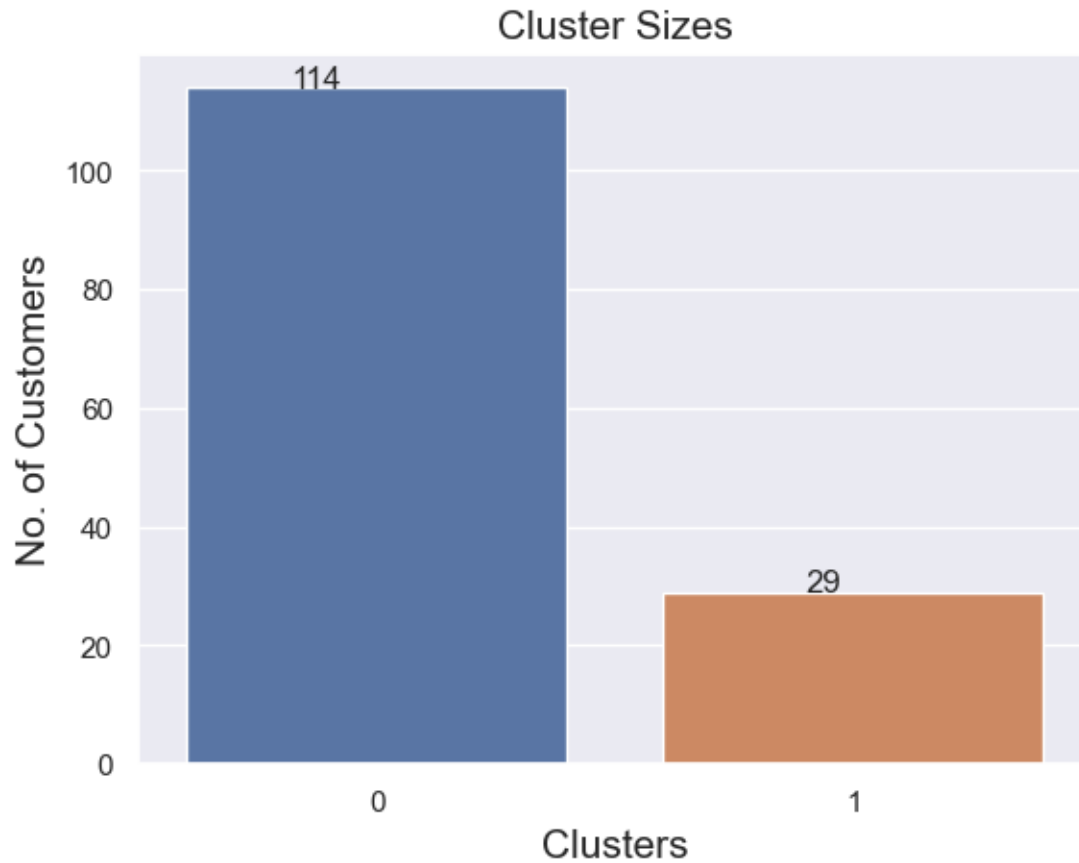
	X4s	X6s	Mat.y	Inns.y	Ov	Runs.y	Wkts	Avg.y	Econ	\
PLAYER										
Aaron Finch	6	8	0	0	0.0	0	0	0.0	0.0	
AB de Villiers	39	30	0	0	0.0	0	0	0.0	0.0	
Abhishek Sharma	3	5	0	0	0.0	0	0	0.0	0.0	
Ajinkya Rahane	39	5	0	0	0.0	0	0	0.0	0.0	
Alex Hales	13	6	0	0	0.0	0	0	0.0	0.0	

	SR.y	Cluster
PLAYER		
Aaron Finch	0.0	0
AB de Villiers	0.0	1
Abhishek Sharma	0.0	0
Ajinkya Rahane	0.0	1
Alex Hales	0.0	0

```
[100]: np.unique(model.labels_, return_counts=True)
```

```
[100]: (array([0, 1]), array([114, 29], dtype=int64))
```

```
[102]: sns.countplot(data= data_output, x = 'Cluster')
plt.title('Cluster Sizes', fontsize = 15)
plt.xlabel('Clusters', fontsize = 15)
plt.ylabel('No. of Customers', fontsize = 15)
plt.text(x = -0.18, y =114, s = np.unique(model.labels_,
↪return_counts=True)[1][0])
plt.text(x = 0.9, y =29, s = np.unique(model.labels_, return_counts=True)[1][1])
plt.show()
```



```
[120]: centers = pd.DataFrame(model.cluster_centers_, columns= data_output.columns[0:
↪20])
centers
```

```
[120]:
```

	Mat.x	Inns.x	NO	Runs.x	HS	Avg.x	\
0	5.517544	4.017544	1.026316	56.833333	21.535088	12.309972	
1	14.241379	13.862069	2.137931	429.206897	78.827586	37.453103	

	BF	SR.x	X100	X50	X4s	X6s	\
0	42.517544	80.812807	-2.775558e-17	0.131579	4.517544	2.710526	
1	301.448276	141.501379	1.724138e-01	2.965517	38.758621	19.275862	

	Mat.y	Inns.y	Ov	Runs.y	Wkts	Avg.y	Econ	\
0	6.640351	6.131579	19.813158	169.429825	5.710526	26.708342	7.522368	
1	1.551724	0.586207	1.244828	10.655172	0.379310	2.304483	0.796207	

	SR.y
0	17.687491
1	1.698276

```
[121]: cluster_1 = sorted(zip(list(centers.iloc[0,:]), list(centers.columns)), reverse_
    ↪= True)[:10]
```

```
[122]: cluster_1
```

```
[122]: [(169.4298245614035, 'Runs.y'),
(80.81280701754386, 'SR.x'),
(56.83333333333347, 'Runs.x'),
(42.51754385964911, 'BF'),
(26.708342105263156, 'Avg.y'),
(21.53508771929824, 'HS'),
(19.813157894736843, 'Ov'),
(17.687491228070176, 'SR.y'),
(12.309971804511278, 'Avg.x'),
(7.522368421052631, 'Econ')]
```

```
[123]: np.unique(model.labels_, return_counts=True)[1][0]
```

```
[123]: 114
```

```
[124]: cluster1_var = pd.DataFrame(cluster_1)[1]
cluster1_var
```

```
[124]: 0    Runs.y
1      SR.x
2    Runs.x
3      BF
4    Avg.y
5      HS
6      Ov
7    SR.y
8    Avg.x
9      Econ
Name: 1, dtype: object
```

```
[125]: data_output[["Runs.x", "HS", "Avg.x", "BF", "SR.x", "Wkts"]][data_output.Cluster == 0].describe()
```

```
[125]:
```

	Runs.x	HS	Avg.x	BF	SR.x	Wkts
count	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000
mean	56.833333	21.535088	12.309972	42.517544	80.812807	5.710526
std	73.685761	22.446467	13.472899	50.892083	69.819583	6.135237
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25%	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
50%	26.500000	15.500000	10.665000	28.500000	94.385000	4.000000
75%	86.500000	36.000000	19.000000	70.500000	132.315000	10.750000
max	357.000000	91.000000	63.000000	197.000000	300.000000	24.000000

```
[126]: cluster_2 = sorted(zip(list(centers.iloc[1,:]), list(centers.columns)), reverse_
      ↪= True)[:10]
      cluster_2
```

```
[126]: [(429.2068965517244, 'Runs.x'),
      (301.44827586206895, 'BF'),
      (141.50137931034484, 'SR.x'),
      (78.82758620689654, 'HS'),
      (38.758620689655174, 'X4s'),
      (37.45310344827586, 'Avg.x'),
      (19.27586206896551, 'X6s'),
      (14.241379310344833, 'Mat.x'),
      (13.862068965517238, 'Inns.x'),
      (10.655172413793167, 'Runs.y')]
```

```
[127]: np.unique(model.labels_, return_counts=True)[1][1]
```

```
[127]: 29
```

```
[128]: cluster1_var = pd.DataFrame(cluster_1)[1]
      cluster1_var
```

```
[128]: 0    Runs.y
      1    SR.x
      2    Runs.x
      3    BF
      4    Avg.y
      5    HS
      6    Ov
      7    SR.y
      8    Avg.x
      9    Econ
      Name: 1, dtype: object
```

```
[129]: data_output[["Runs.x", "HS", "Avg.x", "BF", "SR.x", "Wkts"]][data_output.Cluster == 1].describe()
```

```
[129]:
```

	Runs.x	HS	Avg.x	BF	SR.x	Wkts
count	29.000000	29.000000	29.000000	29.000000	29.000000	29.000000
mean	429.206897	78.827586	37.453103	301.448276	141.501379	0.379310
std	140.597546	20.969483	13.245305	86.995725	13.763791	1.320546
min	226.000000	45.000000	21.930000	160.000000	115.440000	0.000000
25%	301.000000	62.000000	25.810000	232.000000	132.580000	0.000000
50%	441.000000	79.000000	36.570000	310.000000	137.810000	0.000000
75%	512.000000	93.000000	48.180000	363.000000	149.750000	0.000000
max	735.000000	128.000000	75.830000	516.000000	174.540000	6.000000

[]: