

```
In [1]: import numpy as np  
import pandas as pd
```

```
In [2]: df = pd.read_excel('E:/nikhitha/datasets/CGC/CGC Total Power consumption.xlsx', sheetname='Sheet1')
df
```

```
E:\nikhitha\Anaconda\lib\site-packages\pandas\util\_decorators.py:188: Future
Warning: The `sheetname` keyword is deprecated, use `sheet_name` instead
  return func(*args, **kwargs)
```

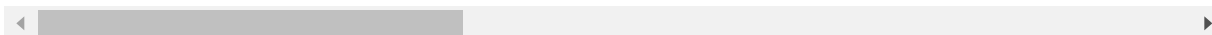
Out[2]:

	Description	UOM	Type of Data	Tag	2014-06-10 00:00:00	2014-06-11 00:00:00	2014-06-12 00:00:00	2014-06-13 00:00:00
0	1st Stage Suction Temperature	°C	Measured	01TI2356-PV	30.245354	33.657000	32.857358	31.500000
1	1st Stage Suction Pressure	kg/cm2g	Measured	01PC2358-PV	0.420737	0.354000	0.392626	0.400000
2	1st Stage Discharge Temperature	°C	Measured	01TI2378-PV	88.910154	91.477000	92.121653	89.070000
3	1st Stage Discharge Pressure	kg/cm2g	Measured	01PI2364-PV	2.006712	2.007000	2.038484	2.000000
4	2nd Stage Suction Temperature	°C	Measured	01TI2402-PV	32.622496	32.967000	34.982900	34.400000
5	2nd Stage Suction Pressure	kg/cm2g	Measured	01PI2401-PV	2.098296	1.934000	2.079111	2.110000
6	2nd Stage Discharge Temperature	°C	Measured	01TI2407-PV	91.599221	91.405000	94.051158	92.030000
7	2nd Stage Discharge Pressure	kg/cm2g	Measured	01PI2408-PV	5.836346	5.407000	5.825295	6.000000
8	3rd Stage Suction Temperature	°C	Measured	01TI2453-PV	34.886521	34.709000	37.076689	36.900000
9	3rd Stage Suction Pressure	kg/cm2g	Measured	01PI2451-PV	5.761200	5.321000	5.730305	5.900000
10	3rd Stage Discharge Temperature	°C	Measured	01TI2461-PV	91.219079	90.237000	93.370126	92.200000
11	3rd Stage Discharge Pressure	kg/cm2g	Measured	01PI2456-PV	12.210367	11.395000	12.399858	12.700000
12	4th Stage Suction Temperature	°C	Measured	01TI2501-PV	33.708813	33.369000	36.125521	36.200000
13	4th Stage Suction Pressure	kg/cm2g	Measured	01PI2502-PV	12.158546	12.048000	12.230716	12.450000
14	4th Stage Discharge Temperature	°C	Measured	01TI2503-PV	82.778342	82.146000	84.412268	83.400000
15	4th Stage Discharge Pressure	kg/cm2g	Measured	01PI2507-PV	21.362683	20.091000	21.743305	22.200000
16	5th Stage Suction Temperature	°C	Measured	01TI2552-PV	31.567275	30.934000	33.666705	33.800000

	Description	UOM	Type of Data	Tag	2014-06-10 00:00:00	2014-06-11 00:00:00	2014-06-12 00:00:00	2014-0 00:00
17	5th Stage Suction Pressure	kg/cm2g	Measured	01PI2557-PV	20.284200	19.048000	20.551216	20.920
18	5th Stage Discharge Temperature	°C	Measured	01TI2566-PV	90.887338	90.375000	92.750100	91.620
19	5th Stage Discharge Pressure	kg/cm2g	Measured	01PI2563-PV	39.772858	37.484000	39.813463	39.510
20	1st Stage Discharge Flow	kNm3/hr	Measured	01FI2365-PV	92.381179	92.016000	96.568858	100.030
21	3rd Stage Discharge Flow	kNm3/hr	Measured	01FI2458-PV	93.824883	90.718000	97.994137	100.900
22	5th Stage Discharge Flow	kNm3/hr	Measured	01FI2564-PV	89.265237	85.032000	95.193979	98.400
23	C3 Splitter Purge to 4th Stage Suction	Nm3/hr	Measured	01FC4307-PV	287.000000	359.200000	421.000000	392.600
24	C2 Splitter Purge to 5th Stage Suction	Nm3/hr	Measured	01FC3804-PV	281.900000	814.600000	485.000000	267.300
25	CW Supply Temperature	°C	Measured	01TI9553-PV	29.263592	29.166000	30.534489	29.160
26	CW Flow to Olefins	km3/hr	Measured	01FI9550-PV	20.539429	20.440000	20.352505	20.440
27	CW Pressure	kg/cm2g	Measured	01PI9551-PV	4.117504	4.075000	4.052121	4.070
28	Compressor Speed	rpm	Measured	01SI2387-PV	4554.039754	4546.400000	4601.986516	4508.800
29	UHP Steam Flow to KT-1	tons/hr	Measured	01FI9826-PV	94.621504	98.975567	103.414342	111.300
30	UHP Steam Pressure	kg/cm2g	Measured	01PI2531-PV	105.488896	105.695946	105.708616	105.700
31	UHP Steam Temperature	°C	Measured	01TI2532-PV	464.565700	459.615217	459.158653	451.900
32	HP Steam Extraction Flow from KT-1	tons/hr	Measured	01FI2533-PV	25.553396	39.696554	40.955668	39.880
33	HP Steam Extraction Pressure	kg/cm2g	Measured	01PI2535-PV	45.368088	45.387513	45.677821	45.870
34	HP Steam Extraction Temperature	°C	Measured	01TI2534-PV	368.727175	368.214733	367.629526	361.190

	Description	UOM	Type of Data	Tag	2014-06-10 00:00:00	2014-06-11 00:00:00	2014-06-12 00:00:00	2014-0 00:0
35	E-24 PG Inlet Temperature	°C	Measured	01TI2629- PV	33.043400	33.399000	36.669700	36.99
36	Total Power	MW	Objective Function	NaN	13.888504	13.579780	14.658402	14.71

37 rows × 1184 columns



```
In [3]: df1 = df.drop(columns = ["UOM", "Type of Data", "Tag"])
```

```
In [4]: df1 = df1.T.reset_index()
df1.dtypes
```

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

```
In [5]: header = df1.iloc[0]
        header
```

```
Out[5]: index          Description
0          1st Stage Suction Temperature
1          1st Stage Suction Pressure
2          1st Stage Discharge Temperature
3          1st Stage Discharge Pressure
4          2nd Stage Suction Temperature
5          2nd Stage Suction Pressure
6          2nd Stage Discharge Temperature
7          2nd Stage Discharge Pressure
8          3rd Stage Suction Temperature
9          3rd Stage Suction Pressure
10         3rd Stage Discharge Temperature
11         3rd Stage Discharge Pressure
12         4th Stage Suction Temperature
13         4th Stage Suction Pressure
14         4th Stage Discharge Temperature
15         4th Stage Discharge Pressure
16         5th Stage Suction Temperature
17         5th Stage Suction Pressure
18         5th Stage Discharge Temperature
19         5th Stage Discharge Pressure
20         1st Stage Discharge Flow
21         3rd Stage Discharge Flow
22         5th Stage Discharge Flow
23         C3 Splitter Purge to 4th Stage Suction
24         C2 Splitter Purge to 5th Stage Suction
25         CW Supply Temperature
26         CW Flow to Olefins
27         CW Pressure
28         Compressor Speed
29         UHP Steam Flow to KT-1
30         UHP Steam Pressure
31         UHP Steam Temperature
32         HP Steam Extraction Flow from KT-1
33         HP Steam Extraction Pressure
34         HP Steam Extraction Temperature
35         E-24 PG Inlet Temperature
36         Total Power
Name: 0, dtype: object
```

```
In [6]: df1 = df1[1:]  
df1
```


Out[6]:

	index	0	1	2	3	4	5	6	7	8
1	2014-06-10 00:00:00	30.2454	0.420737	88.9102	2.00671	32.6225	2.0983	91.5992	5.83635	34.8865
2	2014-06-11 00:00:00	33.657	0.354	91.477	2.007	32.967	1.934	91.405	5.407	34.709
3	2014-06-12 00:00:00	32.8574	0.392626	92.1217	2.03848	34.9829	2.07911	94.0512	5.82529	37.0767
4	2014-06-13 00:00:00	31.5	0.4	89.07	2	34.4	2.11	92.03	6	36.9
5	2014-06-14 00:00:00	30.3	0.4	87.3	2	33	2.11	90.64	6	35.3
6	2014-06-15 00:00:00	31.9228	0.424725	88.6112	2.01713	34.458	2.11647	92.2026	5.97663	36.4904
7	2014-06-16 00:00:00	31.4	0.4	86.91	2	34	2.08	89.51	5.8	36.1
8	2014-06-17 00:00:00	30.6996	0.405825	86.191	1.99068	33.6463	2.06415	88.8016	5.74162	35.489
9	2014-06-18 00:00:00	29.4	0.4	85.59	2	32.4	1.98	87.88	5.6	34.4
10	2014-06-19 00:00:00	29.8	0.3	86.62	2	32.8	1.96	88.7	5.5	34.8
11	2014-06-20 00:00:00	30.4	0.3	88.85	2	33.3	1.92	91.29	5.5	35.2
12	2014-06-21 00:00:00	29.584	0.392421	89.4318	1.96448	32.4496	2.04806	91.7566	5.70552	34.406
13	2014-06-22 00:00:00	30.4	0.4	90.14	2	33.2	2.08	92.43	5.8	35.3
14	2014-06-23 00:00:00	30.7	0.4	90.85	2	33.5	2.07	93.11	5.8	35.5
15	2014-06-24 00:00:00	30.5118	0.3913	90.1351	1.98506	33.2732	2.05269	92.2337	5.76443	35.277
16	2014-06-25 00:00:00	30.4846	0.377021	90.4941	1.98905	33.1563	2.0247	92.2617	5.70532	34.9724
17	2014-06-26 00:00:00	30.9486	0.360775	89.499	1.99429	33.5426	1.97673	91.3722	5.58413	35.2247

	index	0	1	2	3	4	5	6	7	8
18	2014-06-27 00:00:00	30.7381	0.349854	91.2897	1.97881	33.6283	1.99617	93.6547	5.73933	35.5921
19	2014-06-28 00:00:00	30.2	0.3	90.59	2	33	1.99	93.15	5.7	35.1
20	2014-06-29 00:00:00	31	0.3	91.95	2	33.9	1.99	94.51	5.7	35.9
21	2014-06-30 00:00:00	30.7908	0.368658	92.3045	1.98524	33.7511	2.03572	94.4288	5.8486	35.8589
22	2014-07-01 00:00:00	30.7226	0.392108	91.8209	1.98238	33.7788	2.08032	94.0071	5.93203	35.8444
23	2014-07-02 00:00:00	30.9616	0.408667	90.595	1.98044	33.7155	2.07762	92.9515	5.88584	35.4227
24	2014-07-03 00:00:00	30.8434	0.420462	90.4357	1.97289	33.6403	2.11537	92.7029	5.97191	35.4896
25	2014-07-05 00:00:00	29.8	0.45	89	1.97	32.6	1.97	91	5.98	34.5
26	2014-07-06 00:00:00	30.8	0.424	89	1.98	33.2	1.98	91	5.89	35.1
27	2014-07-07 00:00:00	30.3	0.35	88	1.97	32.5	1.97	89	5.65	34.5
28	2014-07-30 00:00:00	31.9058	0.449991	91.7957	1.97118	34.1678	2.19162	93.213	6	37.123
29	2014-07-31 00:00:00	31.4471	0.449888	91.2566	1.97014	33.7068	2.18615	92.604	6	36.6001
30	2014-08-01 00:00:00	30.8289	0.449833	90.6136	1.96319	33.1623	2.19164	91.9825	6	36.0688
...
1151	2017-12-02 00:00:00	35.5014	0.500346	87.6066	2.43032	38.4283	2.39715	94.5702	6.85706	50.1499
1152	2017-12-03 00:00:00	35.5684	0.489821	86.5712	2.42703	38.1072	2.36322	93.1084	6.74497	49.9257
1153	2017-12-04 00:00:00	35.3144	0.476929	86.018	2.4305	37.9252	2.33644	92.4737	6.65496	49.8282
1154	2017-12-05 00:00:00	35.2347	0.397038	83.4981	2.44204	37.2322	2.15942	89.7969	6.26096	48.5317

	index	0	1	2	3	4	5	6	7	8
1155	2017-12-06 00:00:00	34.5368	0.360513	85.1048	2.43005	35.5451	2.04804	87.6495	6.04315	46.3178
1156	2017-12-07 00:00:00	32.9935	0.34675	88.9341	2.41035	34.4712	2.0332	87.3843	6.0631	45.0128
1157	2017-12-08 00:00:00	33.8752	0.36125	90.7121	2.42535	35.0861	2.05875	89.5053	6.16943	46.3747
1158	2017-12-09 00:00:00	32.8308	0.364767	88.6232	2.41431	33.6756	2.06738	88.0295	6.20489	45.564
1159	2017-12-10 00:00:00	33.1725	0.364662	88.3768	2.42661	34.2227	2.06967	88.3412	6.20215	45.8754
1160	2017-12-11 00:00:00	33.3289	0.348362	87.4447	2.42728	34.0889	2.01312	87.35	6.0538	45.4315
1161	2017-12-12 00:00:00	33.0885	0.349793	87.0709	2.44288	33.8715	2.01155	87.0682	6.03374	45.0396
1162	2017-12-13 00:00:00	33.6276	0.364425	89.261	2.42901	35.2488	2.07797	89.7433	6.21295	46.1527
1163	2017-12-14 00:00:00	34.9154	0.434117	91.4099	2.42384	37.1988	2.2378	92.7954	6.58831	47.9487
1164	2017-12-15 00:00:00	35.1196	0.492612	91.3105	2.43427	37.0949	2.34517	92.2413	6.76333	48.3441
1165	2017-12-16 00:00:00	35.0952	0.484404	91.6189	2.42132	36.2987	2.31909	92.2182	6.73102	47.9326
1166	2017-12-17 00:00:00	34.4992	0.484721	91.5039	2.40793	36.7825	2.33752	93.7957	6.76917	47.9722
1167	2017-12-18 00:00:00	35.2076	0.488658	91.9059	2.41772	38.4166	2.35793	95.4101	6.78856	49.2515
1168	2017-12-19 00:00:00	35.0068	0.498213	92.1369	2.4137	38.5469	2.38481	93.2464	6.86003	49.5561
1169	2017-12-20 00:00:00	34.9147	0.485925	88.71	2.42912	39.0202	2.35563	90.5491	6.71098	49.3142
1170	2017-12-21 00:00:00	35.077	0.387813	86.2456	2.42374	38.767	2.14457	86.7892	6.21414	49.0352
1171	2017-12-22 00:00:00	35.2236	0.372329	85.5458	2.41039	37.4304	2.09513	87.3374	6.20972	47.4517

	index	0	1	2	3	4	5	6	7	8
1172	2017-12-23 00:00:00	34.0824	0.366712	84.8076	2.38793	35.9569	2.08193	87.726	6.21024	46.3288
1173	2017-12-24 00:00:00	34.4659	0.442096	84.3382	2.36855	36.7351	2.2041	87.4951	6.39412	47.1021
1174	2017-12-25 00:00:00	32.8723	0.353642	82.4471	2.329	33.0565	2.02992	84.211	6.1133	44.513
1175	2017-12-26 00:00:00	33.1561	0.397717	83.8778	2.328	33.8873	2.1348	86.3755	6.37432	45.3184
1176	2017-12-27 00:00:00	32.4967	0.449746	84.3375	2.3358	35.249	2.25562	87.5858	6.50616	45.9856
1177	2017-12-28 00:00:00	33.5651	0.431175	84.4884	2.34222	36.143	2.20435	87.3292	6.34512	46.4738
1178	2017-12-29 00:00:00	34.3238	0.428258	84.339	2.34598	35.8291	2.18771	86.7332	6.3673	45.9603
1179	2017-12-30 00:00:00	35.7191	0.491954	90.681	2.34991	37.9229	2.36835	92.5487	6.88377	49.3699
1180	2017-12-31 00:00:00	33.0444	0.499692	91.0992	2.34868	34.8271	2.35424	89.9763	6.82784	47.178

1180 rows × 38 columns



```
In [7]: df1 =df1.rename(columns = header)
df1
```

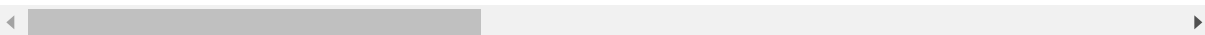
Out[7]:

	Description	1st Stage Suction Temperature	1st Stage Suction Pressure	1st Stage Discharge Temperature	1st Stage Discharge Pressure	2nd Stage Suction Temperature	2nd Stage Suction Pressure	2nd Dis Temp
1	2014-06-10 00:00:00	30.2454	0.420737	88.9102	2.00671	32.6225	2.0983	!
2	2014-06-11 00:00:00	33.657	0.354	91.477	2.007	32.967	1.934	!
3	2014-06-12 00:00:00	32.8574	0.392626	92.1217	2.03848	34.9829	2.07911	!
4	2014-06-13 00:00:00	31.5	0.4	89.07	2	34.4	2.11	!
5	2014-06-14 00:00:00	30.3	0.4	87.3	2	33	2.11	!
6	2014-06-15 00:00:00	31.9228	0.424725	88.6112	2.01713	34.458	2.11647	!
7	2014-06-16 00:00:00	31.4	0.4	86.91	2	34	2.08	!
8	2014-06-17 00:00:00	30.6996	0.405825	86.191	1.99068	33.6463	2.06415	!
9	2014-06-18 00:00:00	29.4	0.4	85.59	2	32.4	1.98	!
10	2014-06-19 00:00:00	29.8	0.3	86.62	2	32.8	1.96	!
11	2014-06-20 00:00:00	30.4	0.3	88.85	2	33.3	1.92	!
12	2014-06-21 00:00:00	29.584	0.392421	89.4318	1.96448	32.4496	2.04806	!
13	2014-06-22 00:00:00	30.4	0.4	90.14	2	33.2	2.08	!
14	2014-06-23 00:00:00	30.7	0.4	90.85	2	33.5	2.07	!
15	2014-06-24 00:00:00	30.5118	0.3913	90.1351	1.98506	33.2732	2.05269	!
16	2014-06-25 00:00:00	30.4846	0.377021	90.4941	1.98905	33.1563	2.0247	!
17	2014-06-26 00:00:00	30.9486	0.360775	89.499	1.99429	33.5426	1.97673	!
18	2014-06-27 00:00:00	30.7381	0.349854	91.2897	1.97881	33.6283	1.99617	!
19	2014-06-28 00:00:00	30.2	0.3	90.59	2	33	1.99	!
20	2014-06-29 00:00:00	31	0.3	91.95	2	33.9	1.99	!
21	2014-06-30 00:00:00	30.7908	0.368658	92.3045	1.98524	33.7511	2.03572	!
22	2014-07-01 00:00:00	30.7226	0.392108	91.8209	1.98238	33.7788	2.08032	!

	Description	1st Stage Suction Temperature	1st Stage Suction Pressure	1st Stage Discharge Temperature	1st Stage Discharge Pressure	2nd Stage Suction Temperature	2nd Stage Suction Pressure	2nd Dis Temp
23	2014-07-02 00:00:00	30.9616	0.408667	90.595	1.98044	33.7155	2.07762	!
24	2014-07-03 00:00:00	30.8434	0.420462	90.4357	1.97289	33.6403	2.11537	!
25	2014-07-05 00:00:00	29.8	0.45	89	1.97	32.6	1.97	!
26	2014-07-06 00:00:00	30.8	0.424	89	1.98	33.2	1.98	!
27	2014-07-07 00:00:00	30.3	0.35	88	1.97	32.5	1.97	!
28	2014-07-30 00:00:00	31.9058	0.449991	91.7957	1.97118	34.1678	2.19162	!
29	2014-07-31 00:00:00	31.4471	0.449888	91.2566	1.97014	33.7068	2.18615	!
30	2014-08-01 00:00:00	30.8289	0.449833	90.6136	1.96319	33.1623	2.19164	!
...	!
1151	2017-12-02 00:00:00	35.5014	0.500346	87.6066	2.43032	38.4283	2.39715	!
1152	2017-12-03 00:00:00	35.5684	0.489821	86.5712	2.42703	38.1072	2.36322	!
1153	2017-12-04 00:00:00	35.3144	0.476929	86.018	2.4305	37.9252	2.33644	!
1154	2017-12-05 00:00:00	35.2347	0.397038	83.4981	2.44204	37.2322	2.15942	!
1155	2017-12-06 00:00:00	34.5368	0.360513	85.1048	2.43005	35.5451	2.04804	!
1156	2017-12-07 00:00:00	32.9935	0.34675	88.9341	2.41035	34.4712	2.0332	!
1157	2017-12-08 00:00:00	33.8752	0.36125	90.7121	2.42535	35.0861	2.05875	!
1158	2017-12-09 00:00:00	32.8308	0.364767	88.6232	2.41431	33.6756	2.06738	!
1159	2017-12-10 00:00:00	33.1725	0.364662	88.3768	2.42661	34.2227	2.06967	!
1160	2017-12-11 00:00:00	33.3289	0.348362	87.4447	2.42728	34.0889	2.01312	!
1161	2017-12-12 00:00:00	33.0885	0.349793	87.0709	2.44288	33.8715	2.01155	!
1162	2017-12-13 00:00:00	33.6276	0.364425	89.261	2.42901	35.2488	2.07797	!
1163	2017-12-14 00:00:00	34.9154	0.434117	91.4099	2.42384	37.1988	2.2378	!
1164	2017-12-15 00:00:00	35.1196	0.492612	91.3105	2.43427	37.0949	2.34517	!

	Description	1st Stage Suction Temperature	1st Stage Suction Pressure	1st Stage Discharge Temperature	1st Stage Discharge Pressure	2nd Stage Suction Temperature	2nd Stage Suction Pressure	2nd Dis Temp
1165	2017-12-16 00:00:00	35.0952	0.484404	91.6189	2.42132	36.2987	2.31909	!
1166	2017-12-17 00:00:00	34.4992	0.484721	91.5039	2.40793	36.7825	2.33752	!
1167	2017-12-18 00:00:00	35.2076	0.488658	91.9059	2.41772	38.4166	2.35793	!
1168	2017-12-19 00:00:00	35.0068	0.498213	92.1369	2.4137	38.5469	2.38481	!
1169	2017-12-20 00:00:00	34.9147	0.485925	88.71	2.42912	39.0202	2.35563	!
1170	2017-12-21 00:00:00	35.077	0.387813	86.2456	2.42374	38.767	2.14457	!
1171	2017-12-22 00:00:00	35.2236	0.372329	85.5458	2.41039	37.4304	2.09513	!
1172	2017-12-23 00:00:00	34.0824	0.366712	84.8076	2.38793	35.9569	2.08193	!
1173	2017-12-24 00:00:00	34.4659	0.442096	84.3382	2.36855	36.7351	2.2041	!
1174	2017-12-25 00:00:00	32.8723	0.353642	82.4471	2.329	33.0565	2.02992	!
1175	2017-12-26 00:00:00	33.1561	0.397717	83.8778	2.328	33.8873	2.1348	!
1176	2017-12-27 00:00:00	32.4967	0.449746	84.3375	2.3358	35.249	2.25562	!
1177	2017-12-28 00:00:00	33.5651	0.431175	84.4884	2.34222	36.143	2.20435	!
1178	2017-12-29 00:00:00	34.3238	0.428258	84.339	2.34598	35.8291	2.18771	!
1179	2017-12-30 00:00:00	35.7191	0.491954	90.681	2.34991	37.9229	2.36835	!
1180	2017-12-31 00:00:00	33.0444	0.499692	91.0992	2.34868	34.8271	2.35424	!

1180 rows × 38 columns



```
In [8]: df1=df1.rename(columns={"Description": "DateTime", "Total Power":"TotalPower"})
df1
df1.isnull().sum()
df1=df1.dropna()
df1=df1.drop('DateTime',axis=1)
```



```
In [9]: a = ("1st Stage Suction Temperature","TotalPower","1st Stage Discharge Temperature",
"4th Stage Suction Pressure","4th Stage Discharge Temperature","4th Stage Discharge Pressure",
"5th Stage Suction Temperature","5th Stage Suction Pressure","5th Stage Discharge Temperature",
"5th Stage Discharge Pressure","1st Stage Discharge Flow","3rd Stage Discharge Flow",
"5th Stage Discharge Flow","C3 Splitter Purge to 4th Stage Suction","C2 Splitter Purge to 5th Stage Suction",
"CW Supply Temperature","CW Flow to Olefins","CW Pressure","Compressor Speed",
"UHP Steam Pressure","UHP Steam Temperature","HP Steam Extraction Flow from KT-1",
"HP Steam Extraction Pressure","HP Steam Extraction Temperature","E-24 PG Inlet Temperature",
"1st Stage Discharge Pressure","2nd Stage Suction Temperature","2nd Stage Suction Pressure",
"2nd Stage Discharge Temperature","2nd Stage Discharge Pressure","3rd Stage Suction Temperature",
"3rd Stage Suction Pressure","3rd Stage Discharge Temperature","3rd Stage Discharge Pressure",
"4th Stage Suction Temperature","UHP Steam Flow to KT-1")
for i in a:
    #df1[i] = df1[i].astype(float)
    df1[i] = pd.to_numeric(df1[i])
```

```
In [10]: #df1['UHP Steam Flow to KT-1'] = pd.to_numeric(df1['UHP Steam Flow to KT-1'])
df1.dtypes
```

```
Out[10]: 1st Stage Suction Temperature    float64
1st Stage Suction Pressure              object
1st Stage Discharge Temperature         float64
1st Stage Discharge Pressure            float64
2nd Stage Suction Temperature           float64
2nd Stage Suction Pressure              float64
2nd Stage Discharge Temperature         float64
2nd Stage Discharge Pressure            float64
3rd Stage Suction Temperature            float64
3rd Stage Suction Pressure              float64
3rd Stage Discharge Temperature         float64
3rd Stage Discharge Pressure            float64
4th Stage Suction Temperature            float64
4th Stage Suction Pressure              float64
4th Stage Discharge Temperature         float64
4th Stage Discharge Pressure            float64
5th Stage Suction Temperature            float64
5th Stage Suction Pressure              float64
5th Stage Discharge Temperature         float64
5th Stage Discharge Pressure            float64
1st Stage Discharge Flow                 float64
3rd Stage Discharge Flow                 float64
5th Stage Discharge Flow                 float64
C3 Splitter Purge to 4th Stage Suction   float64
C2 Splitter Purge to 5th Stage Suction   float64
CW Supply Temperature                   float64
CW Flow to Olefins                      float64
CW Pressure                             float64
Compressor Speed                        float64
UHP Steam Flow to KT-1                   float64
UHP Steam Pressure                      float64
UHP Steam Temperature                   float64
HP Steam Extraction Flow from KT-1       float64
HP Steam Extraction Pressure             float64
HP Steam Extraction Temperature          float64
E-24 PG Inlet Temperature                float64
TotalPower                              float64
dtype: object
```

```
In [11]: from sklearn.model_selection import train_test_split
y=df1.TotalPower
x=df1.drop('TotalPower',axis=1)
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2)
x_train.head()
```

Out[11]:

	1st Stage Suction Temperature	1st Stage Suction Pressure	1st Stage Discharge Temperature	1st Stage Discharge Pressure	2nd Stage Suction Temperature	2nd Stage Suction Pressure	2nd Stage Discharge Temperature	2nd Stage Discharge Pressure
611	35.503908	0.299971	89.303742	1.990879	36.318196	1.905496	90.374108	5.79
49	31.000000	0.5	91.410000	2.400000	33.900000	2.330000	93.410000	6.70
774	34.201021	0.475521	87.453146	2.390950	36.509708	2.309388	91.158708	6.47
708	33.113146	0.3906	88.340121	2.198992	36.126121	2.123033	92.517862	6.13
971	38.131833	0.400133	87.095737	2.135200	36.226071	2.091638	89.153517	6.12

5 rows × 36 columns

```
In [12]: from sklearn.ensemble import RandomForestRegressor

regressor = RandomForestRegressor(n_estimators=20, random_state=0)
regressor.fit(x_train, y_train)
x_test = x_test.fillna(x_train.mean())
y_pred = regressor.predict(x_test)
```

```
In [13]: from sklearn.ensemble import RandomForestRegressor

forest_reg = RandomForestRegressor(n_estimators=10, random_state=51)
forest_reg.fit(x_train, y_train)
```

```
Out[13]: RandomForestRegressor(bootstrap=True, criterion='mse', max_depth=None,
                                max_features='auto', max_leaf_nodes=None,
                                min_impurity_decrease=0.0, min_impurity_split=None,
                                min_samples_leaf=1, min_samples_split=2,
                                min_weight_fraction_leaf=0.0, n_estimators=10, n_jobs=None,
                                oob_score=False, random_state=51, verbose=0, warm_start=False)
```

```
In [14]: y_pred = forest_reg.predict(x_test)
```

```
In [15]: from sklearn.metrics import mean_squared_error

rf_mse = mean_squared_error(y_test, y_pred)
rf_rmse = np.sqrt(rf_mse)
rf_rmse
```

Out[15]: 0.3839858049102134

In []: