

```
In [ ]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [6]: dt=pd.read_csv("IOT-temp (1).csv")
dt
```

```
Out[6]:
```

		id	room_id	noted_date	temp	out/in
0	__export__.temp_log_196134_bd201015	Room Admin	08/12/2018 09:30	29.0	In	
1	__export__.temp_log_196131_7bca51bc	Room Admin	08/12/2018 09:30	29.0	In	
2	__export__.temp_log_196127_522915e3	Room Admin	08/12/2018 09:29	41.0	Out	
3	__export__.temp_log_196128_be0919cf	Room Admin	08/12/2018 09:29	41.0	Out	
4	__export__.temp_log_196126_d30b72fb	Room Admin	08/12/2018 09:29	31.0	In	
...	
97601	__export__.temp_log_91076_7fbd08ca	Room Admin	28/07/2018 07:07	31.0	In	
97602	__export__.temp_log_147733_62c03f31	Room Admin	28/07/2018 07:07	31.0	In	
97603	__export__.temp_log_100386_84093a68	Room Admin	28/07/2018 07:06	31.0	In	
97604	__export__.temp_log_123297_4d8e690b	Room Admin	28/07/2018 07:06	31.0	In	
97605	__export__.temp_log_133741_32958703	Room Admin	28/07/2018 07:06	31.0	In	

97606 rows × 5 columns

```
In [7]: dt.shape
```

```
Out[7]: (97606, 5)
```

```
In [9]: dt.rename(columns = {'out/in':'status'},inplace=True)
dt
```

```
Out[9]:
```

		id	room_id	noted_date	temp	status
0	__export__.temp_log_196134_bd201015	Room Admin	08/12/2018 09:30	29.0	In	
1	__export__.temp_log_196131_7bca51bc	Room Admin	08/12/2018 09:30	29.0	In	
2	__export__.temp_log_196127_522915e3	Room Admin	08/12/2018 09:29	41.0	Out	
3	__export__.temp_log_196128_be0919cf	Room Admin	08/12/2018 09:29	41.0	Out	
4	__export__.temp_log_196126_d30b72fb	Room Admin	08/12/2018 09:29	31.0	In	
...	
97601	__export__.temp_log_91076_7fbd08ca	Room Admin	28/07/2018 07:07	31.0	In	
97602	__export__.temp_log_147733_62c03f31	Room Admin	28/07/2018 07:07	31.0	In	
97603	__export__.temp_log_100386_84093a68	Room Admin	28/07/2018 07:06	31.0	In	
97604	__export__.temp_log_123297_4d8e690b	Room Admin	28/07/2018 07:06	31.0	In	
97605	__export__.temp_log_133741_32958703	Room Admin	28/07/2018 07:06	31.0	In	

97606 rows × 5 columns

```
In [10]: dt.isna().sum()
```

```
Out[10]: id          0
room_id         0
noted_date      3
temp            5
status          5
dtype: int64
```

```
In [11]: dt.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 97606 entries, 0 to 97605
Data columns (total 5 columns):
#   Column          Non-Null Count  Dtype
---  -
0   id              97606 non-null  object
1   room_id         97606 non-null  object
2   noted_date      97603 non-null  object
3   temp            97601 non-null  float64
4   status          97601 non-null  object
dtypes: float64(1), object(4)
memory usage: 3.7+ MB
```

```
In [12]: dt.describe()
```

```
Out[12]:
```

	temp
count	97601.000000
mean	35.054948
std	5.719685
min	2.000000
25%	30.000000
50%	35.000000
75%	40.000000
max	135.000000

```
In [14]: dt.status.dropna(inplace=True)
dt
```

```
Out[14]:
```

		id	room_id	noted_date	temp	status
0	__export__.temp_log_196134_bd201015	Room Admin	08/12/2018 09:30	29.0	In	
1	__export__.temp_log_196131_7bca51bc	Room Admin	08/12/2018 09:30	29.0	In	
2	__export__.temp_log_196127_522915e3	Room Admin	08/12/2018 09:29	41.0	Out	
3	__export__.temp_log_196128_be0919cf	Room Admin	08/12/2018 09:29	41.0	Out	
4	__export__.temp_log_196126_d30b72fb	Room Admin	08/12/2018 09:29	31.0	In	
...	
97601	__export__.temp_log_91076_7fbd08ca	Room Admin	28/07/2018 07:07	31.0	In	
97602	__export__.temp_log_147733_62c03f31	Room Admin	28/07/2018 07:07	31.0	In	
97603	__export__.temp_log_100386_84093a68	Room Admin	28/07/2018 07:06	31.0	In	
97604	__export__.temp_log_123297_4d8e690b	Room Admin	28/07/2018 07:06	31.0	In	
97605	__export__.temp_log_133741_32958703	Room Admin	28/07/2018 07:06	31.0	In	

97606 rows × 5 columns

```
In [15]: dt.dtypes
```

```
Out[15]: id           object
room_id        object
noted_date     object
temp          float64
status         object
dtype: object
```

```
In [16]: dt.room_id.fillna(method='ffill',inplace=True)
dt
```

```
Out[16]:
```

		id	room_id	noted_date	temp	status
0	__export__.temp_log_196134_bd201015	Room Admin	08/12/2018 09:30	29.0	In	
1	__export__.temp_log_196131_7bca51bc	Room Admin	08/12/2018 09:30	29.0	In	
2	__export__.temp_log_196127_522915e3	Room Admin	08/12/2018 09:29	41.0	Out	
3	__export__.temp_log_196128_be0919cf	Room Admin	08/12/2018 09:29	41.0	Out	
4	__export__.temp_log_196126_d30b72fb	Room Admin	08/12/2018 09:29	31.0	In	
...	
97601	__export__.temp_log_91076_7fbd08ca	Room Admin	28/07/2018 07:07	31.0	In	
97602	__export__.temp_log_147733_62c03f31	Room Admin	28/07/2018 07:07	31.0	In	
97603	__export__.temp_log_100386_84093a68	Room Admin	28/07/2018 07:06	31.0	In	
97604	__export__.temp_log_123297_4d8e690b	Room Admin	28/07/2018 07:06	31.0	In	
97605	__export__.temp_log_133741_32958703	Room Admin	28/07/2018 07:06	31.0	In	

97606 rows × 5 columns

```
In [18]: dt.noted_date.fillna(method='ffill',inplace=True)
dt
```

```
Out[18]:
```

		id	room_id	noted_date	temp	status
0	__export__.temp_log_196134_bd201015	Room Admin	08/12/2018 09:30	29.0	In	
1	__export__.temp_log_196131_7bca51bc	Room Admin	08/12/2018 09:30	29.0	In	
2	__export__.temp_log_196127_522915e3	Room Admin	08/12/2018 09:29	41.0	Out	
3	__export__.temp_log_196128_be0919cf	Room Admin	08/12/2018 09:29	41.0	Out	
4	__export__.temp_log_196126_d30b72fb	Room Admin	08/12/2018 09:29	31.0	In	
...	
97601	__export__.temp_log_91076_7fbd08ca	Room Admin	28/07/2018 07:07	31.0	In	
97602	__export__.temp_log_147733_62c03f31	Room Admin	28/07/2018 07:07	31.0	In	
97603	__export__.temp_log_100386_84093a68	Room Admin	28/07/2018 07:06	31.0	In	
97604	__export__.temp_log_123297_4d8e690b	Room Admin	28/07/2018 07:06	31.0	In	
97605	__export__.temp_log_133741_32958703	Room Admin	28/07/2018 07:06	31.0	In	

97606 rows × 5 columns

```
In [20]: dt.status.fillna(method='ffill',inplace=True)
dt
```

```
Out[20]:
```

		id	room_id	noted_date	temp	status
0	__export__.temp_log_196134_bd201015	Room Admin	08/12/2018 09:30	29.0	In	
1	__export__.temp_log_196131_7bca51bc	Room Admin	08/12/2018 09:30	29.0	In	
2	__export__.temp_log_196127_522915e3	Room Admin	08/12/2018 09:29	41.0	Out	
3	__export__.temp_log_196128_be0919cf	Room Admin	08/12/2018 09:29	41.0	Out	
4	__export__.temp_log_196126_d30b72fb	Room Admin	08/12/2018 09:29	31.0	In	
...	
97601	__export__.temp_log_91076_7fbd08ca	Room Admin	28/07/2018 07:07	31.0	In	
97602	__export__.temp_log_147733_62c03f31	Room Admin	28/07/2018 07:07	31.0	In	
97603	__export__.temp_log_100386_84093a68	Room Admin	28/07/2018 07:06	31.0	In	
97604	__export__.temp_log_123297_4d8e690b	Room Admin	28/07/2018 07:06	31.0	In	
97605	__export__.temp_log_133741_32958703	Room Admin	28/07/2018 07:06	31.0	In	

97606 rows × 5 columns

```
In [21]: dt.status.unique()
```

```
Out[21]: array(['In', 'Out'], dtype=object)
```

```
In [23]: dt.head(11)
```

```
Out[23]:
```

		id	room_id	noted_date	temp	status
0	__export__.temp_log_196134_bd201015	Room Admin	08/12/2018 09:30	29.0	In	
1	__export__.temp_log_196131_7bca51bc	Room Admin	08/12/2018 09:30	29.0	In	
2	__export__.temp_log_196127_522915e3	Room Admin	08/12/2018 09:29	41.0	Out	
3	__export__.temp_log_196128_be0919cf	Room Admin	08/12/2018 09:29	41.0	Out	
4	__export__.temp_log_196126_d30b72fb	Room Admin	08/12/2018 09:29	31.0	In	
5	__export__.temp_log_196125_b0fa0b41	Room Admin	08/12/2018 09:29	31.0	In	
6	__export__.temp_log_196121_01544d45	Room Admin	08/12/2018 09:28	29.0	In	
7	__export__.temp_log_196122_f8b80a9f	Room Admin	08/12/2018 09:28	29.0	In	
8	__export__.temp_log_196111_6b7a0848	Room Admin	08/12/2018 09:26	29.0	In	
9	__export__.temp_log_196112_e134aebd	Room Admin	08/12/2018 09:26	29.0	In	
10	__export__.temp_log_196108_4a983c7e	Room Admin	08/12/2018 09:25	42.0	Out	

In [24]: `dt.tail(5)`

Out[24]:

		id	room_id	noted_date	temp	status
97601	__export__.temp_log_91076_7fbd08ca	Room Admin	28/07/2018 07:07	31.0	In	
97602	__export__.temp_log_147733_62c03f31	Room Admin	28/07/2018 07:07	31.0	In	
97603	__export__.temp_log_100386_84093a68	Room Admin	28/07/2018 07:06	31.0	In	
97604	__export__.temp_log_123297_4d8e690b	Room Admin	28/07/2018 07:06	31.0	In	
97605	__export__.temp_log_133741_32958703	Room Admin	28/07/2018 07:06	31.0	In	

In [25]: `tp=dt.temp.median()
tp`

Out[25]: 35.0

In [27]: `dt.temp.fillna(tp,inplace=True)
dt`

Out[27]:

		id	room_id	noted_date	temp	status
0	__export__.temp_log_196134_bd201015	Room Admin	08/12/2018 09:30	29.0	In	
1	__export__.temp_log_196131_7bca51bc	Room Admin	08/12/2018 09:30	29.0	In	
2	__export__.temp_log_196127_522915e3	Room Admin	08/12/2018 09:29	41.0	Out	
3	__export__.temp_log_196128_be0919cf	Room Admin	08/12/2018 09:29	41.0	Out	
4	__export__.temp_log_196126_d30b72fb	Room Admin	08/12/2018 09:29	31.0	In	
...	
97601	__export__.temp_log_91076_7fbd08ca	Room Admin	28/07/2018 07:07	31.0	In	
97602	__export__.temp_log_147733_62c03f31	Room Admin	28/07/2018 07:07	31.0	In	
97603	__export__.temp_log_100386_84093a68	Room Admin	28/07/2018 07:06	31.0	In	
97604	__export__.temp_log_123297_4d8e690b	Room Admin	28/07/2018 07:06	31.0	In	
97605	__export__.temp_log_133741_32958703	Room Admin	28/07/2018 07:06	31.0	In	

97606 rows × 5 columns

In [28]: `tp=dt.temp.mode()
tp`

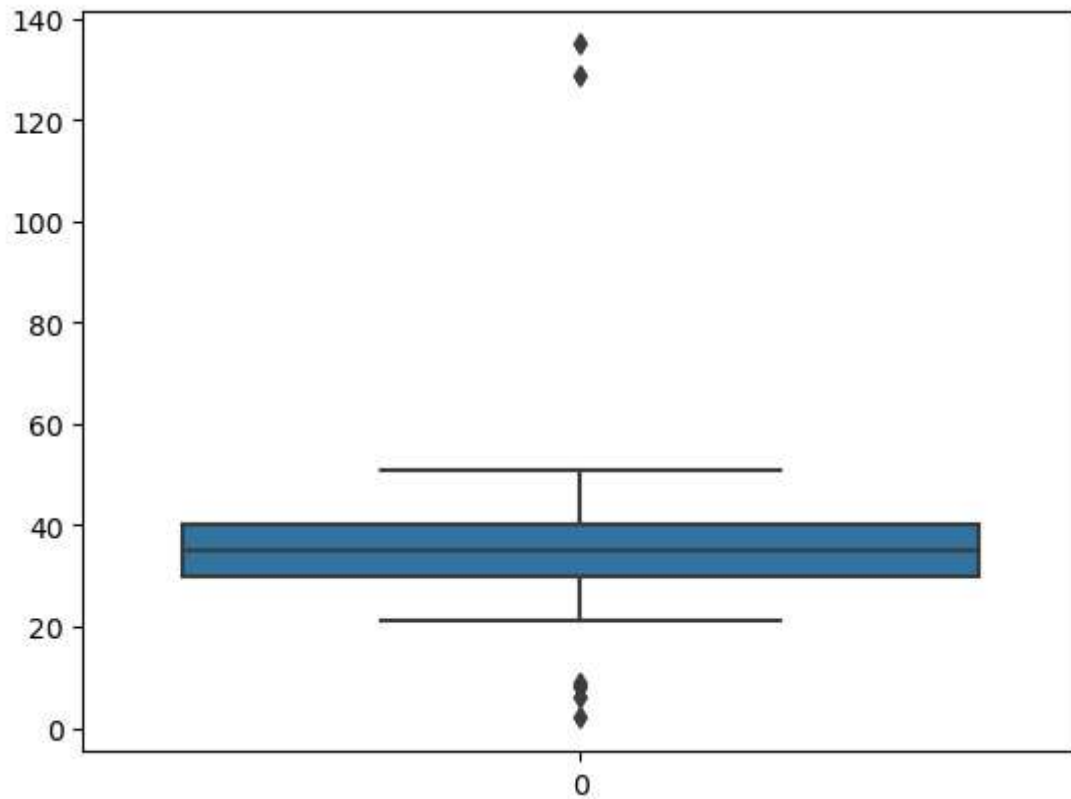
Out[28]: 0 39.0
Name: temp, dtype: float64

```
In [29]: dt.nunique()
```

```
Out[29]: id          97605  
room_id         1  
noted_date     27920  
temp           37  
status         2  
dtype: int64
```

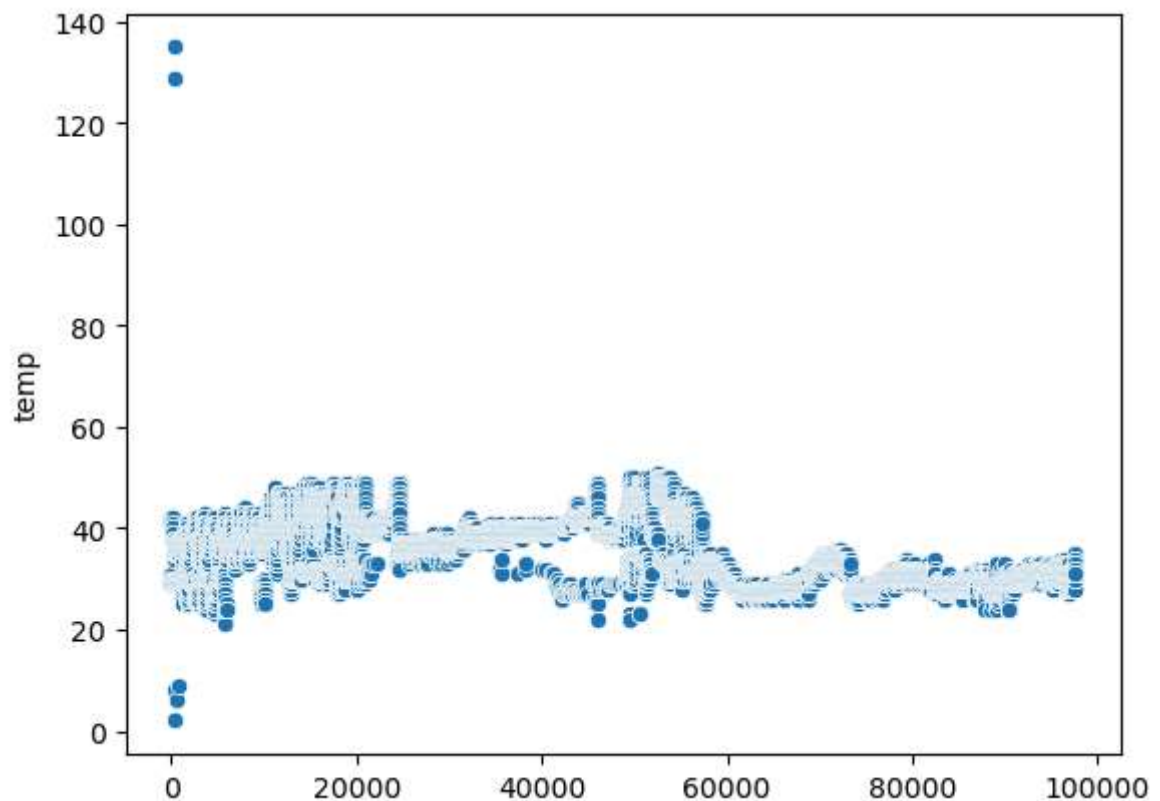
```
In [30]: sns.boxplot(data=dt['temp'])
```

```
Out[30]: <Axes: >
```



```
In [31]: sns.scatterplot(data=dt['temp'])
```

```
Out[31]: <Axes: ylabel='temp'>
```



```
In [32]: Q1=np.percentile(dt['temp'],25)
Q3=np.percentile(dt['temp'],75)
IQR=Q3-Q1
IQR
```

```
Out[32]: 10.0
```

```
In [34]: lower_bound=Q1-1.5*IQR
upper_bound=Q3+1.5*IQR
```

```
In [35]: lower_bound
```

```
Out[35]: 15.0
```

```
In [36]: upper_bound
```

```
Out[36]: 55.0
```

```
In [37]: outliers=[x for x in dt['temp'] if x < lower_bound or x > upper_bound]
```

```
In [38]: outliers
```

```
Out[38]: [8.0, 2.0, 129.0, 135.0, 6.0, 9.0]
```



```
In [39]: print("Q1:",Q1)
print("Q3:",Q3)
print("IQR:",IQR)
print("Lower_Bound:",lower_bound)
print("Upper_Bound:",upper_bound)
print("Outliers:",outliers)
```

```
Q1: 30.0
Q3: 40.0
IQR: 10.0
Lower_Bound: 15.0
Upper_Bound: 55.0
Outliers: [8.0, 2.0, 129.0, 135.0, 6.0, 9.0]
```

```
In [44]: dt=dt[((dt['temp']>=lower_bound)&(dt['temp']<=upper_bound))]
dt
```

```
Out[44]:
```

		id	room_id	noted_date	temp	status
0	__export__.temp_log_196134_bd201015	Room Admin	08/12/2018 09:30	29.0	In	
1	__export__.temp_log_196131_7bca51bc	Room Admin	08/12/2018 09:30	29.0	In	
2	__export__.temp_log_196127_522915e3	Room Admin	08/12/2018 09:29	41.0	Out	
3	__export__.temp_log_196128_be0919cf	Room Admin	08/12/2018 09:29	41.0	Out	
4	__export__.temp_log_196126_d30b72fb	Room Admin	08/12/2018 09:29	31.0	In	
...	
97601	__export__.temp_log_91076_7fbd08ca	Room Admin	28/07/2018 07:07	31.0	In	
97602	__export__.temp_log_147733_62c03f31	Room Admin	28/07/2018 07:07	31.0	In	
97603	__export__.temp_log_100386_84093a68	Room Admin	28/07/2018 07:06	31.0	In	
97604	__export__.temp_log_123297_4d8e690b	Room Admin	28/07/2018 07:06	31.0	In	
97605	__export__.temp_log_133741_32958703	Room Admin	28/07/2018 07:06	31.0	In	

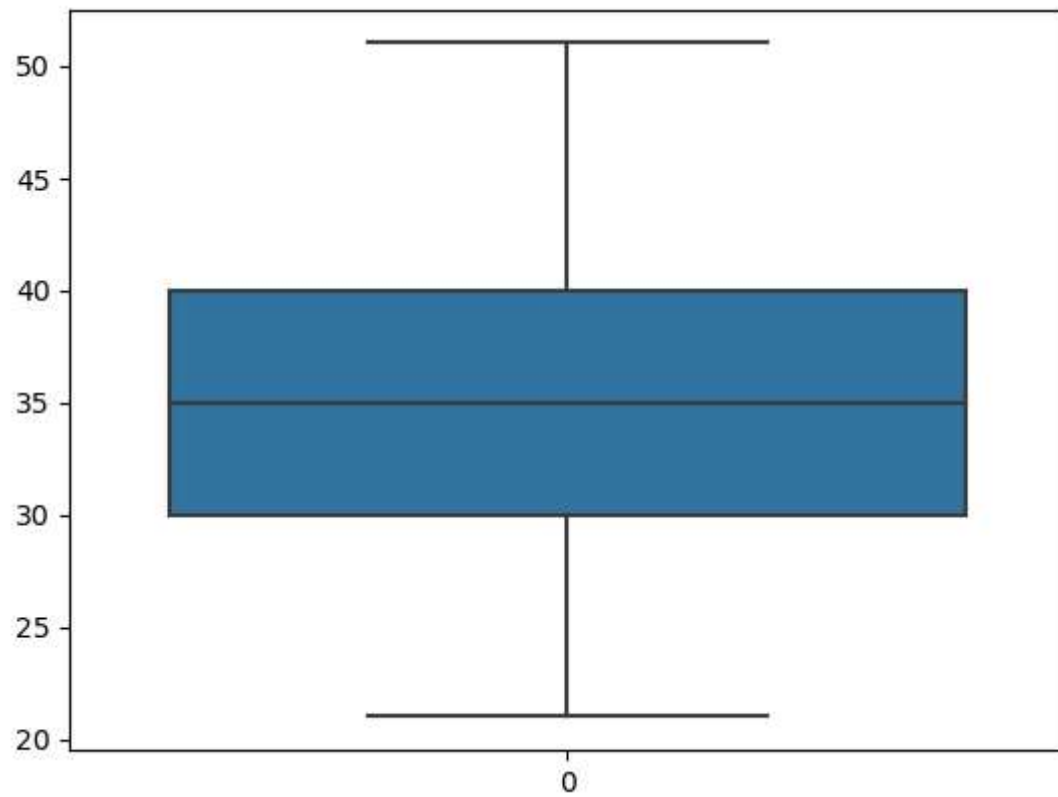
97600 rows × 5 columns

```
In [45]: dt['temp'].value_counts()
```

```
Out[45]: 39.0    10203
          28.0     8831
          29.0     7918
          40.0     7798
          31.0     7236
          30.0     6613
          37.0     5721
          32.0     5408
          27.0     4631
          41.0     4354
          36.0     3963
          38.0     3866
          42.0     3447
          33.0     3437
          34.0     2613
          43.0     2004
          44.0     1774
          35.0     1586
          45.0     1508
          46.0     1201
          47.0     1044
          48.0      971
          26.0      699
          49.0      401
          25.0      224
          24.0       66
          50.0       55
          22.0       19
          23.0        5
          21.0        2
          51.0        2
          Name: temp, dtype: int64
```

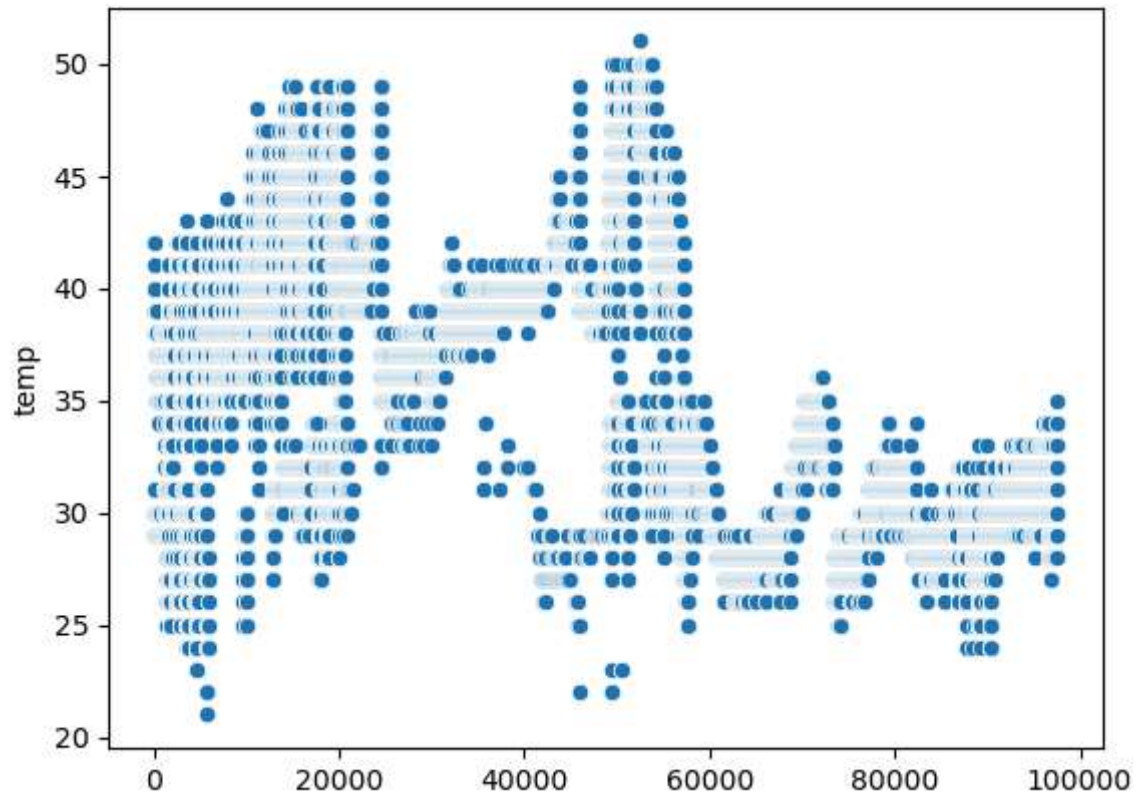
```
In [46]: sns.boxplot(data=dt['temp'])
```

```
Out[46]: <Axes: >
```



```
In [47]: sns.scatterplot(data=dt['temp'])
```

```
Out[47]: <Axes: ylabel='temp'>
```



```
In [ ]:
```