```
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]:
```python
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]:
```python
dt.isna().sum()
```

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

In [11]:
```python
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]:
```python
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]:
```python
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]:
```python
dt.dtypes
```

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

In [16]:
```python
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]:
```python
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]:
```python
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]:
```python
dt.status.unique()
```

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

In [23]:
```python
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]:
```python
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]:
```python
tp=dt.temp.median()
tp
```

Out[25]: 35.0

In [27]:
```python
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]:
```python
tp=dt.temp.mode()
tp
```

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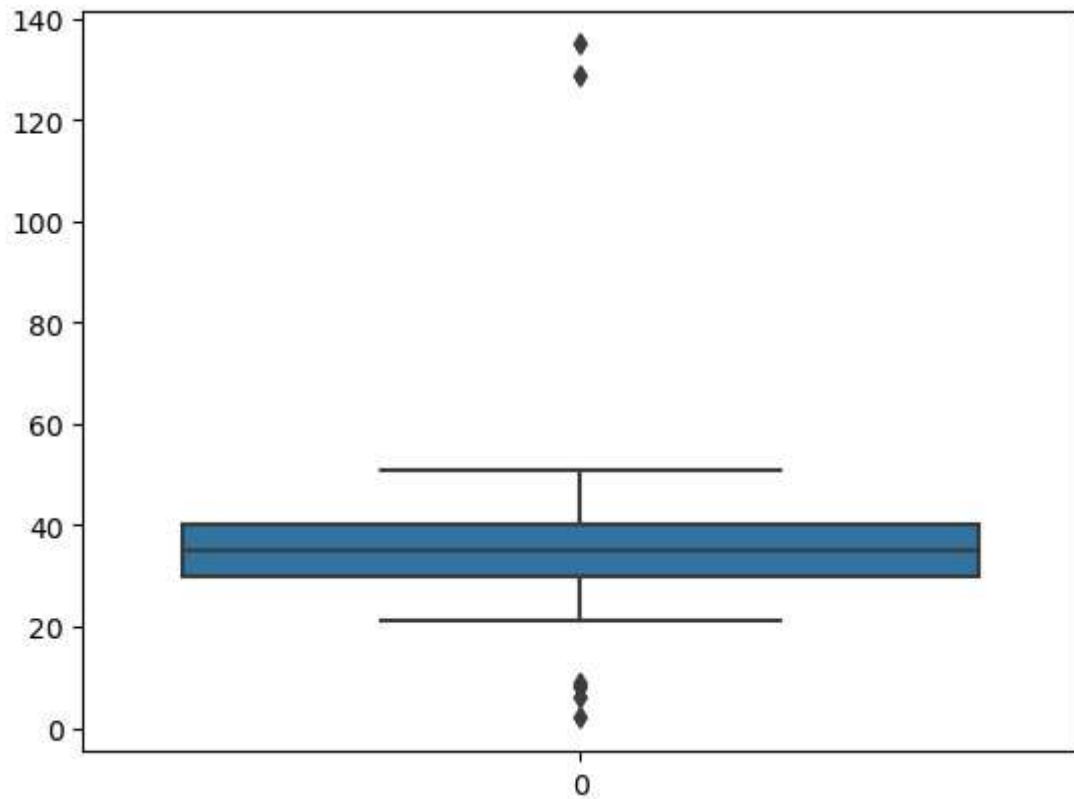```
0   39.0
Name: temp, dtype: float64
```

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

Out[29]:
```
id            97605
room_id           1
noted_date    27920
temp             37
status            2
dtype: int64
```
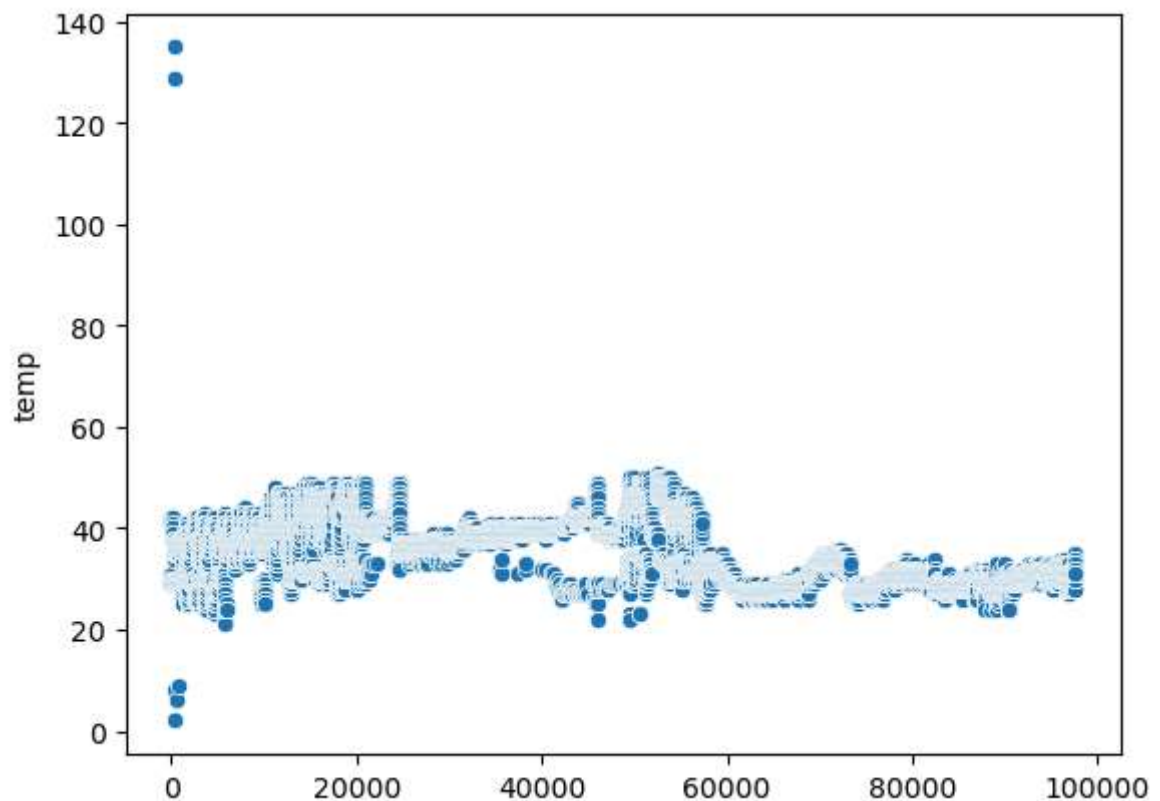
In [30]:
```python
sns.boxplot(data=dt['temp'])
```

Out[30]: `<Axes: >`

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

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

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

Out[32]: 10.0

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

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

Out[35]: 15.0

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

Out[36]: 55.0

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

In [38]:
```python
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]:

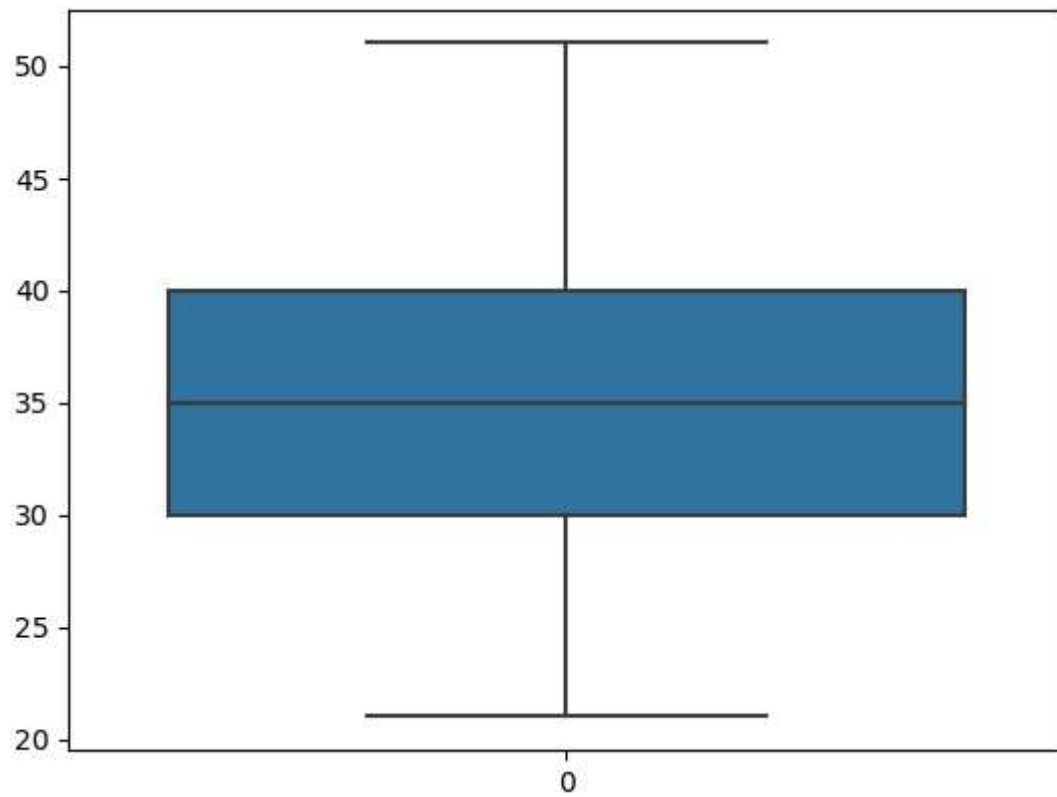|	id	room_id	noted_date	temp	status
0	__export__.temp_log_196134_bd201015	Room Admin	08/12/2018 09:30	29.0	In
1	__export__.temp_log_196131_7bca51bc	Room Admin	08/12/2018 09:30	29.0	In
2	__export__.temp_log_196127_522915e3	Room Admin	08/12/2018 09:29	41.0	Out
3	__export__.temp_log_196128_be0919cf	Room 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
```
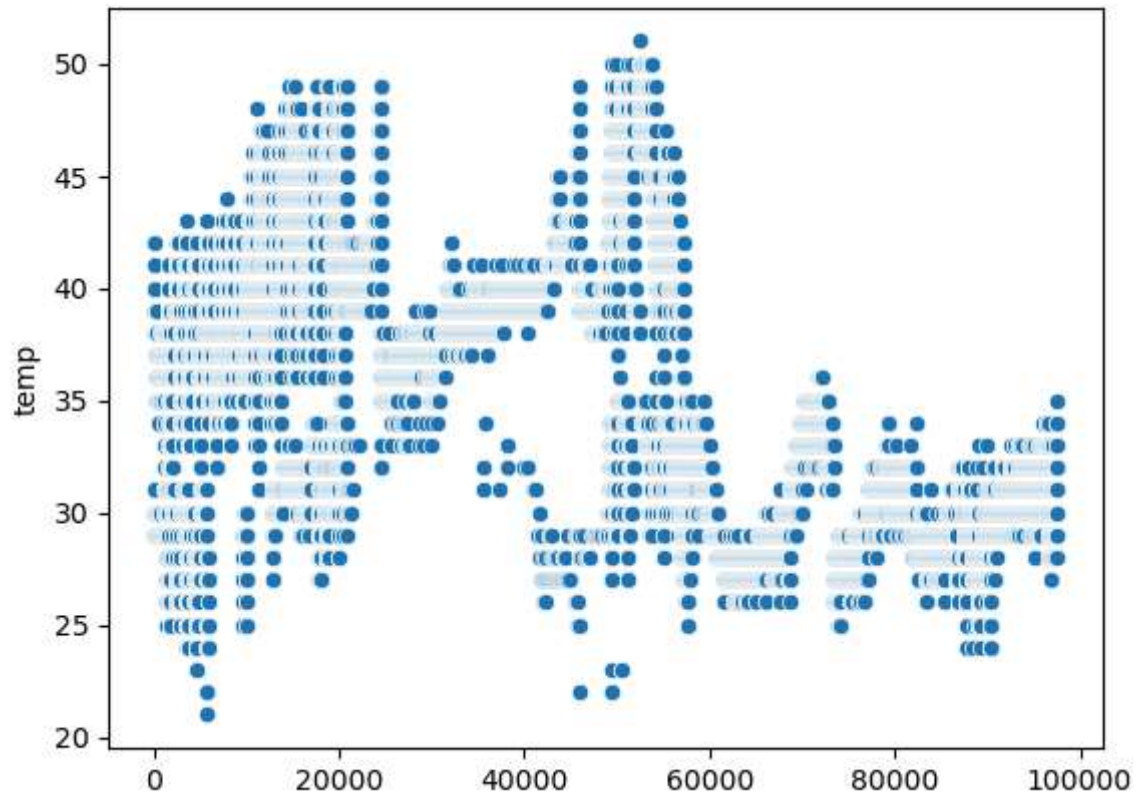
In [46]:
```python
sns.boxplot(data=dt['temp'])
```

Out[46]: `<Axes: >`

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

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

In [ ]: