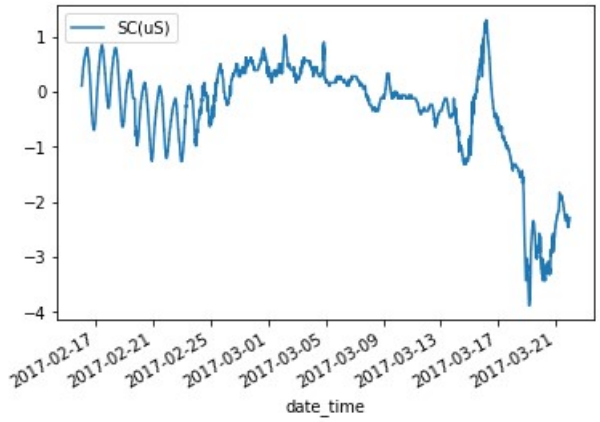
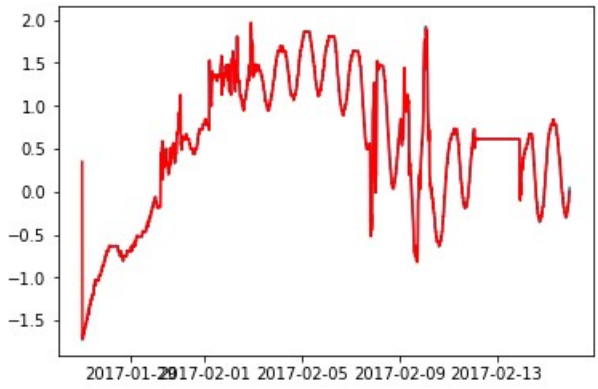
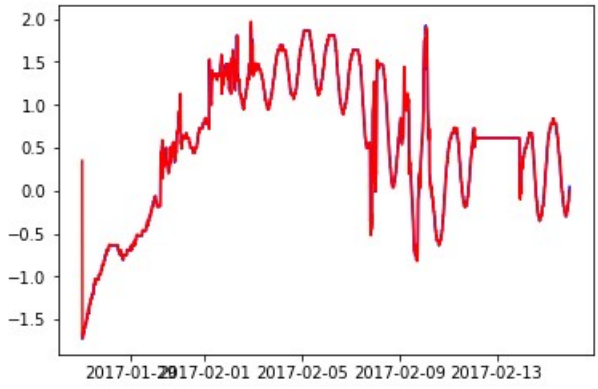
```
In [58]: sc_test.plot()
Out[58]: <matplotlib.axes._subplots.AxesSubplot at 0x228843db278>
```



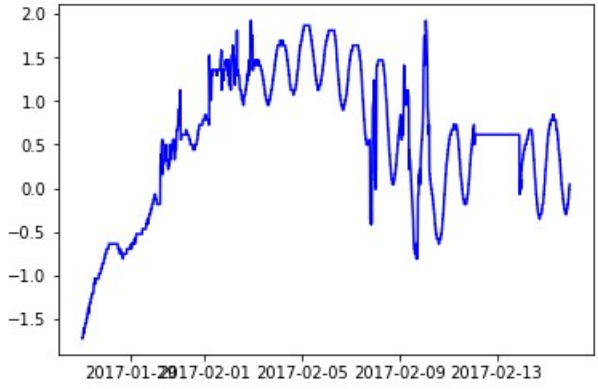

```
In [59]: import matplotlib.pylab as plt #for visualization
    ...:

In [60]: sc_arima = ARIMA(sc_train,order=(12,0,0))
    ...: sc_arima_fit = sc_arima.fit(disp=-1)
    ...: plt.plot(sc_train)
    ...: plt.plot(sc_arima_fit.fittedvalues, color = 'red')
    ...: print(sc_arima_fit.aic)
C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:225:
ValueWarning: A date index has been provided, but it has no associated frequency
information and so will be ignored when e.g. forecasting.
  ' ignored when e.g. forecasting.', ValueWarning)
C:\Users\admin\Anaconda3\lib\site-packages\scipy\signal\signaltools.py:1341:
FutureWarning: Using a non-tuple sequence for multidimensional indexing is deprecated; use
`arr[tuple(seq)]` instead of `arr[seq]`. In the future this will be interpreted as an
array index, `arr[np.array(seq)]`, which will result either in an error or a different
result.
  out_full[ind] += zi
C:\Users\admin\Anaconda3\lib\site-packages\scipy\signal\signaltools.py:1344:
FutureWarning: Using a non-tuple sequence for multidimensional indexing is deprecated; use
`arr[tuple(seq)]` instead of `arr[seq]`. In the future this will be interpreted as an
array index, `arr[np.array(seq)]`, which will result either in an error or a different
result.
  out = out_full[ind]
C:\Users\admin\Anaconda3\lib\site-packages\scipy\signal\signaltools.py:1350:
FutureWarning: Using a non-tuple sequence for multidimensional indexing is deprecated; use
`arr[tuple(seq)]` instead of `arr[seq]`. In the future this will be interpreted as an
array index, `arr[np.array(seq)]`, which will result either in an error or a different
result.
  zf = out_full[ind]
-4477.238111066485
```



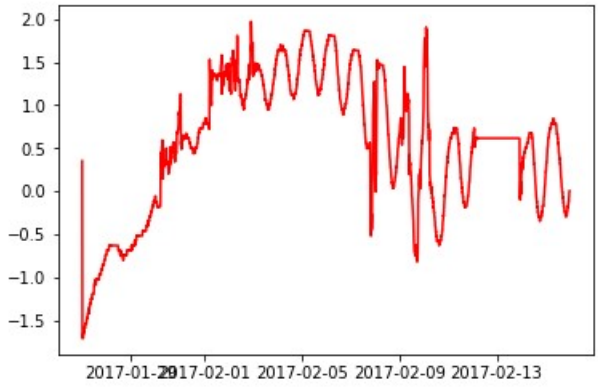

```
In [61]: sc_arima = ARIMA(sc_train,order=(12,0,0))
    ...: sc_arima_fit = sc_arima.fit(disp=-1)
    ...: plt.plot(sc_train, color = 'blue')
    ...: plt.plot(sc_arima_fit.fittedvalues, color = 'red')
    ...: print(sc_arima_fit.aic)
C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:225:
ValueWarning: A date index has been provided, but it has no associated frequency
information and so will be ignored when e.g. forecasting.
  ' ignored when e.g. forecasting.', ValueWarning)
-4477.238111066485
```




```
In [62]: plt.plot(sc_train, color = 'blue')
    ...:
Out[62]: [<matplotlib.lines.Line2D at 0x22884b8e710>]
```

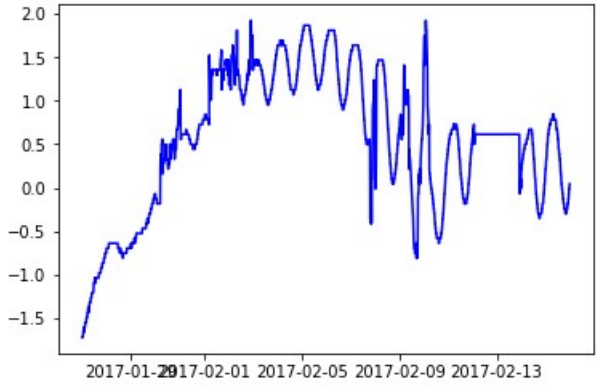


```
In [63]: plt.plot(sc_arima_fit.fittedvalues, color = 'red')
    ...:
Out[63]: [<matplotlib.lines.Line2D at 0x22884b795c0>]
```

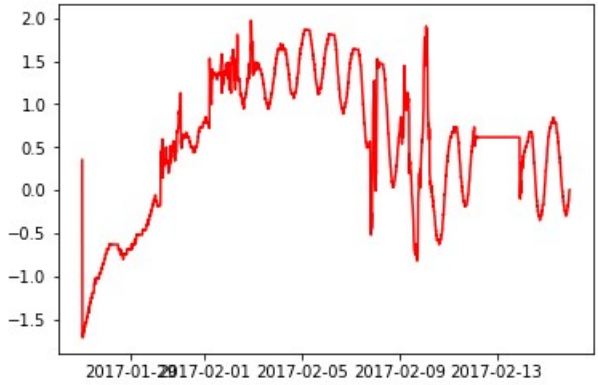



```
In [64]: sc_arima = ARIMA(sc_train,order=(12,0,0))
    ...: sc_arima_fit = sc_arima.fit(disp=-1)
    ...: plt.plot(sc_train, color = 'blue')
    ...: plt.plot(sc_arima_fit, color = 'red')
    ...: print(sc_arima_fit.aic)
C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:225:
ValueWarning: A date index has been provided, but it has no associated frequency
information and so will be ignored when e.g. forecasting.
  ' ignored when e.g. forecasting.', ValueWarning)
Traceback (most recent call last):

  File "<ipython-input-64-4ba9f80e9388>", line 4, in <module>
    plt.plot(sc_arima_fit, color = 'red')

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\pyplot.py", line 2813, in
plot
    is not None else {}), **kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\__init__.py", line 1810, in
inner
    return func(ax, *args, **kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_axes.py", line 1612,
in plot
    self.add_line(line)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_base.py", line 1895,
in add_line
    self._update_line_limits(line)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_base.py", line 1917,
in _update_line_limits
    path = line.get_path()

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\lines.py", line 945, in
get_path
    self.recache()

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\lines.py", line 645, in
```

```
recache
    y = _to_unmasked_float_array(yconv).ravel()

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\cbook\__init__.py", line
1365, in _to_unmasked_float_array
    return np.asarray(x, float)

  File "C:\Users\admin\Anaconda3\lib\site-packages\numpy\core\numeric.py", line 501, in
asarray
    return array(a, dtype, copy=False, order=order)

TypeError: float() argument must be a string or a number, not 'ARMAResultsWrapper'
```

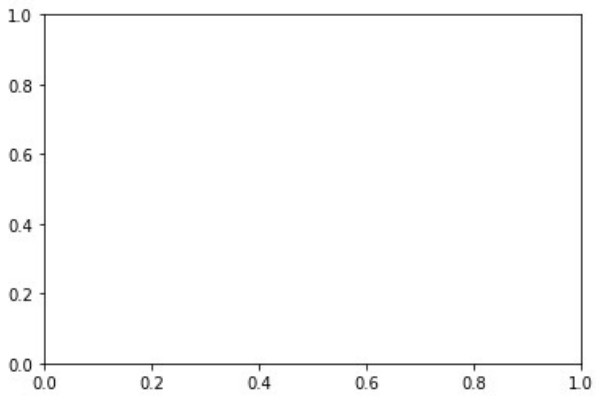



```
In [65]:

In [65]: plt.plot(sc_arima_fit.fittedvalues, color = 'red')
    ...:
Out[65]: [<matplotlib.lines.Line2D at 0x2288f1a9d68>]
```

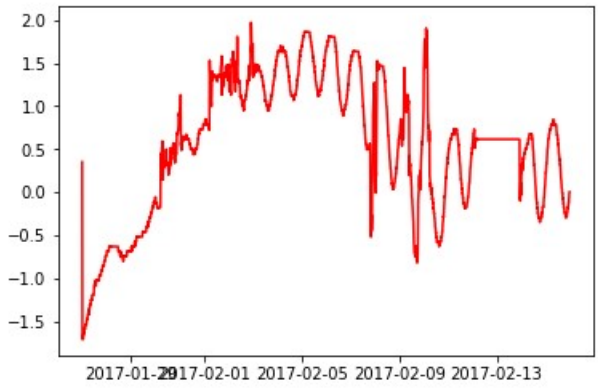



```
In [66]: plt.plot(sc_arima_fit, color = 'red')
    ...:
Traceback (most recent call last):

  File "<ipython-input-66-c7a88a278d6d>", line 1, in <module>
    plt.plot(sc_arima_fit, color = 'red')

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\pyplot.py", line 2813, in
plot
```

```
    is not None else {}), **kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\__init__.py", line 1810, in
inner
    return func(ax, *args, **kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_axes.py", line 1612,
in plot
    self.add_line(line)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_base.py", line 1895,
in add_line
    self._update_line_limits(line)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_base.py", line 1917,
in _update_line_limits
    path = line.get_path()

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\lines.py", line 945, in
get_path
    self.recache()

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\lines.py", line 645, in
recache
    y = _to_unmasked_float_array(yconv).ravel()

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\cbook\__init__.py", line
1365, in _to_unmasked_float_array
    return np.asarray(x, float)

  File "C:\Users\admin\Anaconda3\lib\site-packages\numpy\core\numeric.py", line 501, in
asarray
    return array(a, dtype, copy=False, order=order)

TypeError: float() argument must be a string or a number, not 'ARMAResultsWrapper'
```

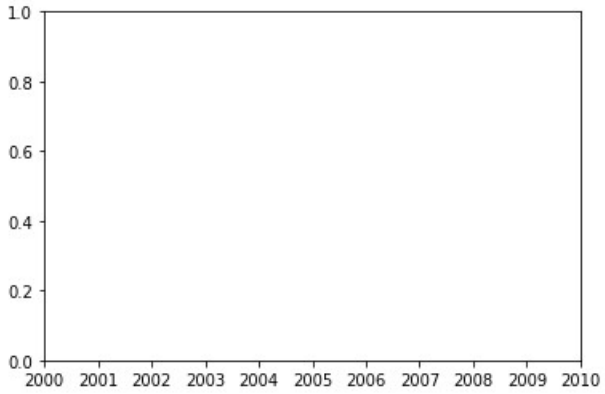



```
In [67]:

In [67]: plt.plot(sc_arima_fit.fittedvalues, color = 'red')
    ...:
Out[67]: [<matplotlib.lines.Line2D at 0x2288f23b9e8>]
```




```
In [68]: plt.plot(sc_arima_fit.fittedvalues, color = 'red', figsize=(16,9))
Traceback (most recent call last):

  File "<ipython-input-68-e6ece393cb34>", line 1, in <module>
    plt.plot(sc_arima_fit.fittedvalues, color = 'red', figsize=(16,9))

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\pyplot.py", line 2813, in
plot
    is not None else {}), **kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\__init__.py", line 1810, in
inner
    return func(ax, *args, **kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_axes.py", line 1611,
in plot
    for line in self._get_lines(*args, **kwargs):

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_base.py", line 393, in
_grab_next_args
    yield from self._plot_args(this, kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_base.py", line 383, in
_plot_args
    seg = func(x[:, j % ncx], y[:, j % ncy], kw, kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_base.py", line 288, in
_makeline
    seg = mlines.Line2D(x, y, **kw)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\lines.py", line 410, in
__init__
    self.update(kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\artist.py", line 916, in
update
    ret = [_update_property(self, k, v) for k, v in props.items()]

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\artist.py", line 916, in
<listcomp>
    ret = [_update_property(self, k, v) for k, v in props.items()]
```

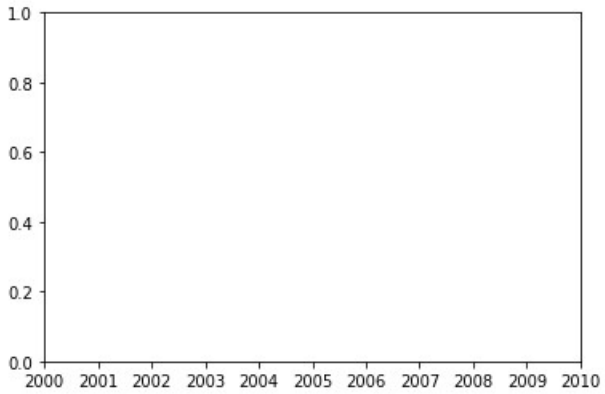
```
  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\artist.py", line 912, in
_update_property
    raise AttributeError('Unknown property %s' % k)

AttributeError: Unknown property figsize
```



In [69]:

```
In [69]: plt.plot(sc_arima_fit.fittedvalues, color = 'red', figsize=(20,20))
    ...:
Traceback (most recent call last):

  File "<ipython-input-69-e9e2bf02a7e7>", line 1, in <module>
    plt.plot(sc_arima_fit.fittedvalues, color = 'red', figsize=(20,20))

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\pyplot.py", line 2813, in
plot
    is not None else {}), **kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\__init__.py", line 1810, in
inner
    return func(ax, *args, **kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_axes.py", line 1611,
in plot
    for line in self._get_lines(*args, **kwargs):

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_base.py", line 393, in
_grab_next_args
    yield from self._plot_args(this, kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_base.py", line 383, in
_plot_args
    seg = func(x[:, j % ncx], y[:, j % ncy], kw, kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\axes\_base.py", line 288, in
_makeline
    seg = mlines.Line2D(x, y, **kw)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\lines.py", line 410, in
__init__
```

```
    self.update(kwargs)

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\artist.py", line 916, in
update
    ret = [_update_property(self, k, v) for k, v in props.items()]

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\artist.py", line 916, in
<listcomp>
    ret = [_update_property(self, k, v) for k, v in props.items()]

  File "C:\Users\admin\Anaconda3\lib\site-packages\matplotlib\artist.py", line 912, in
_update_property
    raise AttributeError('Unknown property %s' % k)

AttributeError: Unknown property figsize
```




```
In [70]:

In [70]: print(parser(2017-02-16 00:00))
  File "<ipython-input-70-48e0b9a4f157>", line 1
    print(parser(2017-02-16 00:00))
                         ^
SyntaxError: invalid token


In [71]:

In [71]: print(parser("2017-02-16 00:00"))
2017-02-16 00:00:00

In [72]: type(parser("2017-02-16 00:00"))
    ...:
Out[72]: datetime.datetime

In [73]: start_index = datetime("2017-02-16 00:00")
    ...: end_index = datetime("2017-03-21 23:45")
    ...: forecast = model_fit.predict(start=start_index, end=end_index)
Traceback (most recent call last):

  File "<ipython-input-73-1d84b8b3e854>", line 1, in <module>
    start_index = datetime("2017-02-16 00:00")
```

```
TypeError: an integer is required (got type str)


In [74]:

In [74]: start_index = datetime("2017-02-16 00:00")
    ...: end_index = datetime("2017-03-21 23:45")
    ...: forecast = sc_arima_fit.predict(start=start_index, end=end_index)
Traceback (most recent call last):

  File "<ipython-input-74-1d2474f9aecc>", line 1, in <module>
    start_index = datetime("2017-02-16 00:00")

TypeError: an integer is required (got type str)


In [75]:

In [75]: start_index = datetime(2017-02-16 00:00)
    ...: end_index = datetime(2017-03-21 23:45)
    ...: forecast = sc_arima_fit.predict(start=start_index, end=end_index)
  File "<ipython-input-75-a670b0bb609c>", line 1
    start_index = datetime(2017-02-16 00:00)
                           ^
SyntaxError: invalid token


In [76]:

In [76]: start_index = datetime.datetime(2017-02-16 00:00)
    ...: end_index = datetime.datetime(2017-03-21 23:45)
    ...: forecast = sc_arima_fit.predict(start=start_index, end=end_index)
  File "<ipython-input-76-b2c4e0c5ccf1>", line 1
    start_index = datetime.datetime(2017-02-16 00:00)
                                    ^
SyntaxError: invalid token


In [77]:

In [77]: start_index = datetime.datetime("2017-02-16 00:00")
    ...: end_index = datetime.datetime("2017-03-21 23:45")
    ...: forecast = sc_arima_fit.predict(start=start_index, end=end_index)
Traceback (most recent call last):

  File "<ipython-input-77-bf296395629f>", line 1, in <module>
    start_index = datetime.datetime("2017-02-16 00:00")

AttributeError: type object 'datetime.datetime' has no attribute 'datetime'


In [78]:

In [78]: start_index = parser("2017-02-16 00:00")
```

```
    ...: end_index = parser("2017-03-21 23:45")
    ...: forecast = sc_arima_fit.predict(start=start_index, end=end_index)
Traceback (most recent call last):

  File "<ipython-input-78-dd66fa2f0fec>", line 3, in <module>
    forecast = sc_arima_fit.predict(start=start_index, end=end_index)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\base\wrapper.py", line 95,
in wrapper
    obj = data.wrap_output(func(results, *args, **kwargs), how)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
1506, in predict
    return self.model.predict(self.params, start, end, exog, dynamic)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
719, in predict
    self._get_prediction_index(start, end, dynamic))

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
651, in _get_prediction_index
    super(ARMA, self)._get_prediction_index(start, end, index))

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py",
line 477, in _get_prediction_index
    start, start_index, start_oos = self._get_index_label_loc(start)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py",
line 412, in _get_index_label_loc
    self._get_index_loc(key, base_index))

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py",
line 353, in _get_index_loc
    index[key]

  File "C:\Users\admin\Anaconda3\lib\site-packages\pandas\core\indexes\range.py", line
498, in __getitem__
    n = int(key)

TypeError: int() argument must be a string, a bytes-like object or a number, not
'datetime.datetime'


In [79]:

In [79]: start_index = parser("2017-02-16 00:00")
    ...: end_index = parser("2017-03-21 23:45")
    ...: forecast = sc_arima_fit.forecast(start=start_index, end=end_index)
Traceback (most recent call last):

  File "<ipython-input-79-7b240994f199>", line 3, in <module>
    forecast = sc_arima_fit.forecast(start=start_index, end=end_index)

TypeError: forecast() got an unexpected keyword argument 'start'
```

```
In [80]:

In [80]: start_index = "2017-02-16 00:00"
    ...: end_index = "2017-03-21 23:45"
    ...: forecast = sc_arima_fit.predict(start=start_index, end=end_index)
Traceback (most recent call last):

  File "<ipython-input-80-b20c5862bf05>", line 3, in <module>
    forecast = sc_arima_fit.predict(start=start_index, end=end_index)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\base\wrapper.py", line 95,
in wrapper
    obj = data.wrap_output(func(results, *args, **kwargs), how)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
1506, in predict
    return self.model.predict(self.params, start, end, exog, dynamic)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
719, in predict
    self._get_prediction_index(start, end, dynamic))

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
651, in _get_prediction_index
    super(ARMA, self)._get_prediction_index(start, end, index))

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py",
line 479, in _get_prediction_index
    raise KeyError('The `start` argument could not be matched to a'

KeyError: 'The `start` argument could not be matched to a location related to the index of
the data.'


In [81]:

In [81]: start_index = "2017-02-16 00:00"
    ...: end_index = "2017-03-21 23:45"
    ...: forecast = sc_arima_fit.predict(start=start_index, end=end_index)
Traceback (most recent call last):

  File "<ipython-input-81-b20c5862bf05>", line 3, in <module>
    forecast = sc_arima_fit.predict(start=start_index, end=end_index)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\base\wrapper.py", line 95,
in wrapper
    obj = data.wrap_output(func(results, *args, **kwargs), how)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
1506, in predict
    return self.model.predict(self.params, start, end, exog, dynamic)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
719, in predict
```

```
    self._get_prediction_index(start, end, dynamic))

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
651, in _get_prediction_index
    super(ARMA, self)._get_prediction_index(start, end, index))

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py",
line 479, in _get_prediction_index
    raise KeyError('The `start` argument could not be matched to a'

KeyError: 'The `start` argument could not be matched to a location related to the index of
the data.'


In [82]:

In [82]: start_index = parser("2017-02-16 00:00")
    ...: end_index = "2017-03-21 23:45"
    ...: forecast = sc_arima_fit.predict(start=start_index, end=end_index)
Traceback (most recent call last):

  File "<ipython-input-82-0540f0f99a0e>", line 3, in <module>
    forecast = sc_arima_fit.predict(start=start_index, end=end_index)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\base\wrapper.py", line 95,
in wrapper
    obj = data.wrap_output(func(results, *args, **kwargs), how)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
1506, in predict
    return self.model.predict(self.params, start, end, exog, dynamic)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
719, in predict
    self._get_prediction_index(start, end, dynamic))

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py", line
651, in _get_prediction_index
    super(ARMA, self)._get_prediction_index(start, end, index))

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py",
line 477, in _get_prediction_index
    start, start_index, start_oos = self._get_index_label_loc(start)

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py",
line 412, in _get_index_label_loc
    self._get_index_loc(key, base_index))

  File "C:\Users\admin\Anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py",
line 353, in _get_index_loc
    index[key]

  File "C:\Users\admin\Anaconda3\lib\site-packages\pandas\core\indexes\range.py", line
498, in __getitem__
    n = int(key)
```

```
TypeError: int() argument must be a string, a bytes-like object or a number, not
'datetime.datetime'


In [83]:

In [83]: sc[2017-03-21 23:45]
  File "<ipython-input-83-7d6adf58f7d3>", line 1
    sc[2017-03-21 23:45]
              ^
SyntaxError: invalid token


In [84]:

In [84]: sc["2017-03-21 23:45"]
Traceback (most recent call last):

  File "<ipython-input-84-d9fc1c21b4f9>", line 1, in <module>
    sc["2017-03-21 23:45"]

  File "C:\Users\admin\Anaconda3\lib\site-packages\pandas\core\frame.py", line 2688, in
__getitem__
    return self._getitem_column(key)

  File "C:\Users\admin\Anaconda3\lib\site-packages\pandas\core\frame.py", line 2695, in
_getitem_column
    return self._get_item_cache(key)

  File "C:\Users\admin\Anaconda3\lib\site-packages\pandas\core\generic.py", line 2489, in
_get_item_cache
    values = self._data.get(item)

  File "C:\Users\admin\Anaconda3\lib\site-packages\pandas\core\internals.py", line 4115,
in get
    loc = self.items.get_loc(item)

  File "C:\Users\admin\Anaconda3\lib\site-packages\pandas\core\indexes\base.py", line
3080, in get_loc
    return self._engine.get_loc(self._maybe_cast_indexer(key))

  File "pandas\_libs\index.pyx", line 140, in pandas._libs.index.IndexEngine.get_loc

  File "pandas\_libs\index.pyx", line 162, in pandas._libs.index.IndexEngine.get_loc

  File "pandas\_libs\hashtable_class_helper.pxi", line 1492, in
pandas._libs.hashtable.PyObjectHashTable.get_item

  File "pandas\_libs\hashtable_class_helper.pxi", line 1500, in
pandas._libs.hashtable.PyObjectHashTable.get_item

KeyError: '2017-03-21 23:45'
```

```
In [85]:

In [85]: sc[parser("2017-03-21 23:45"])
  File "<ipython-input-85-2d454081dbac>", line 1
    sc[parser("2017-03-21 23:45"])
                                  ^
SyntaxError: invalid syntax


In [86]:

In [86]: x = parser("2017-03-21 23:45"])
    ...: print(
    ...:
```