In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import math
```

```
C:\Users\amith\AppData\Local\Temp\ipykernel_20016\309917557.py:2: DeprecationWarning:
Pyarrow will become a required dependency of pandas in the next major release of pandas (pandas 3.0),
(to allow more performant data types, such as the Arrow string type, and better interoperability with other librarie
s)
but was not found to be installed on your system.
If this would cause problems for you,
please provide us feedback at https://github.com/pandas-dev/pandas/issues/54466

  import pandas as pd
```

In [2]:
```
data = pd.read_csv('ETH_1H.csv',parse_dates=['Date'],index_col=['Date'])
```

In [3]:
```
data.head()
```

Out[3]:

Date	Unix Timestamp	Symbol	Open	High	Low	Close	Volume
2020-04-16 00:00:00	1586995200000	ETHUSD	152.94	152.94	150.39	150.39	650.188125
2020-04-15 23:00:00	1586991600000	ETHUSD	155.81	155.81	151.39	152.94	4277.567299
2020-04-15 22:00:00	1586988000000	ETHUSD	157.18	157.30	155.32	155.81	106.337279
2020-04-15 21:00:00	1586984400000	ETHUSD	158.04	158.31	157.16	157.18	55.244131
2020-04-15 20:00:00	1586980800000	ETHUSD	157.10	158.10	156.87	158.04	144.262622

In [4]:
```
data = data.sort_index()
```

In [5]:
```
data.head(-5)
```

Out[5]:

Date	Unix Timestamp	Symbol	Open	High	Low	Close	Volume
2016-05-09 13:00:00	1462798800	ETHUSD	0.00	12.00	0.00	9.55	432.562115
2016-05-09 14:00:00	1462802400	ETHUSD	9.55	10.00	9.55	10.00	235.774075
2016-05-09 15:00:00	1462806000	ETHUSD	10.00	10.00	9.99	9.99	10.973567
2016-05-09 16:00:00	1462809600	ETHUSD	9.99	9.99	9.79	9.83	62.379450
2016-05-09 17:00:00	1462813200	ETHUSD	9.83	9.83	9.48	9.49	329.553213
...	...	...	...	...	...	...	...
2020-04-15 15:00:00	1586962800000	ETHUSD	157.12	157.15	155.81	155.81	303.839541
2020-04-15 16:00:00	1586966400000	ETHUSD	155.81	157.52	155.74	157.12	430.083035
2020-04-15 17:00:00	1586970000000	ETHUSD	157.12	157.78	156.90	157.48	156.552221
2020-04-15 18:00:00	1586973600000	ETHUSD	157.48	158.20	157.48	157.78	520.137463
2020-04-15 19:00:00	1586977200000	ETHUSD	157.78	157.84	157.10	157.10	329.356201

34492 rows × 7 columns

In [6]:
```
data.shape
```

Out[6]:
```
(34497, 7)
```

In [7]:
```
data.isna().sum()
```

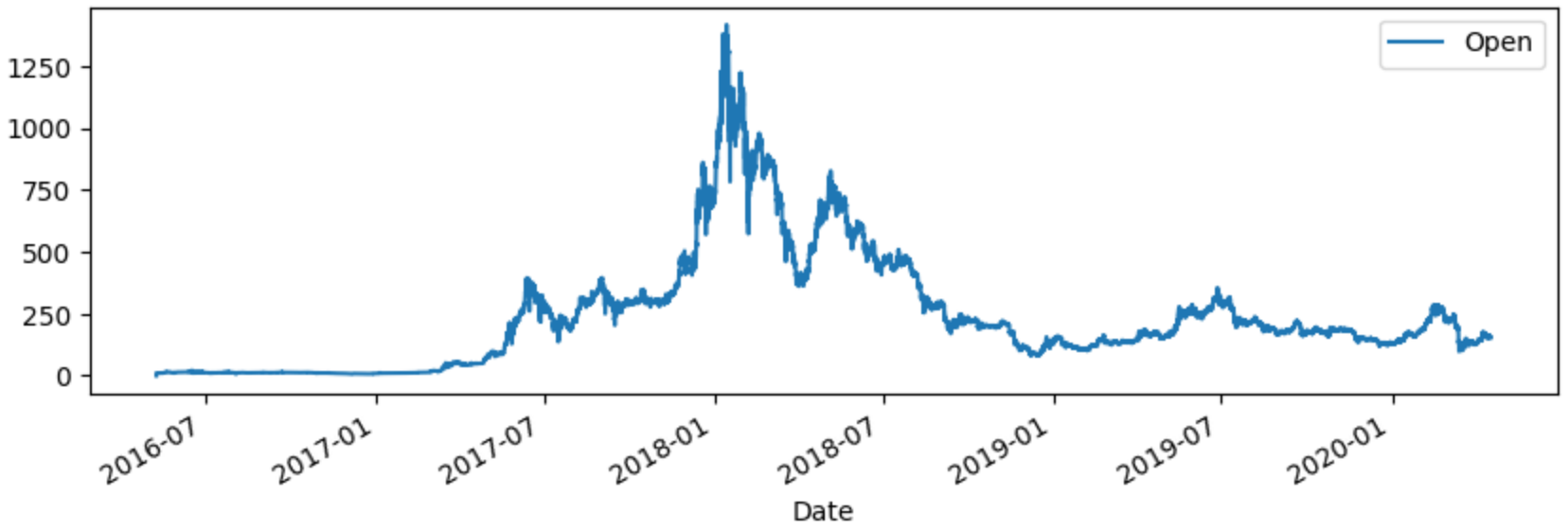
Out[7]:
```
Unix Timestamp    0
Symbol            0
Open              0
High              0
Low               0
Close             0
Volume            0
dtype: int64
```

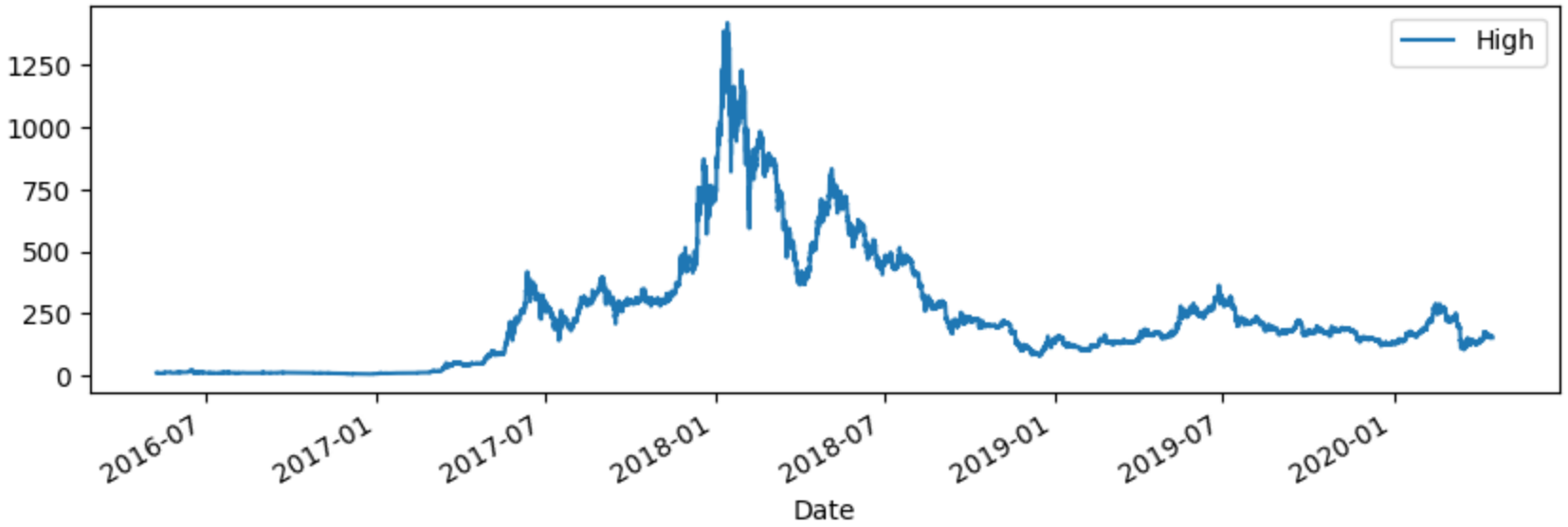
In [8]:
```
data.duplicated().sum()
```

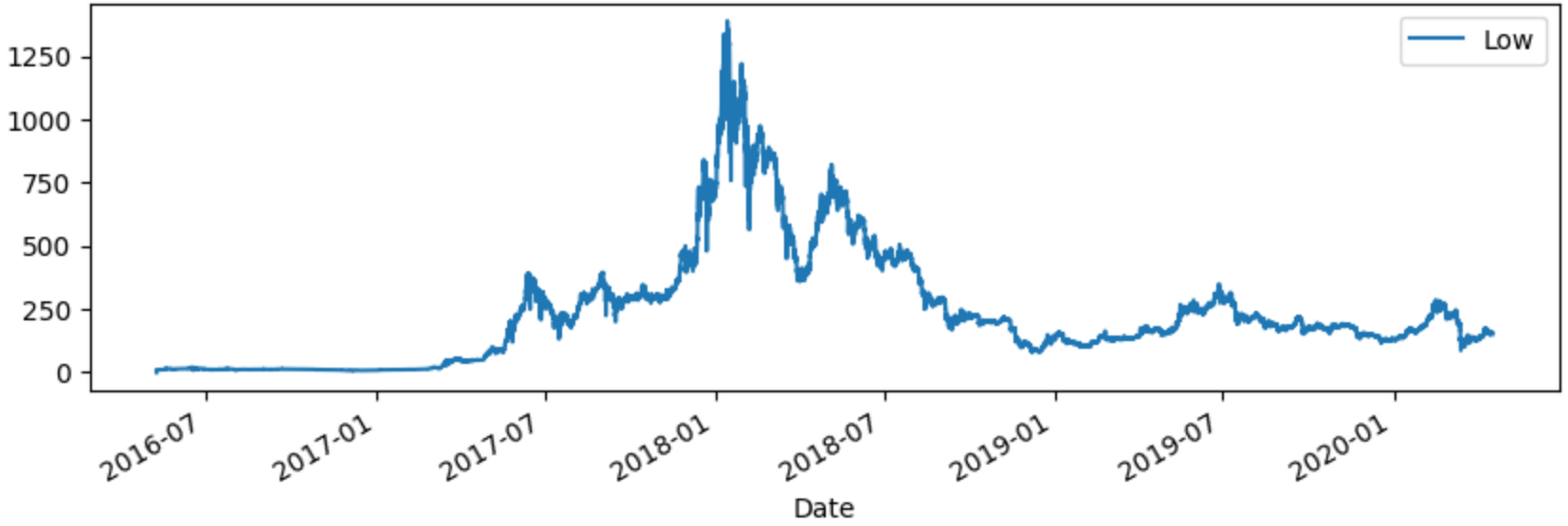
Out[8]:
```
0
```

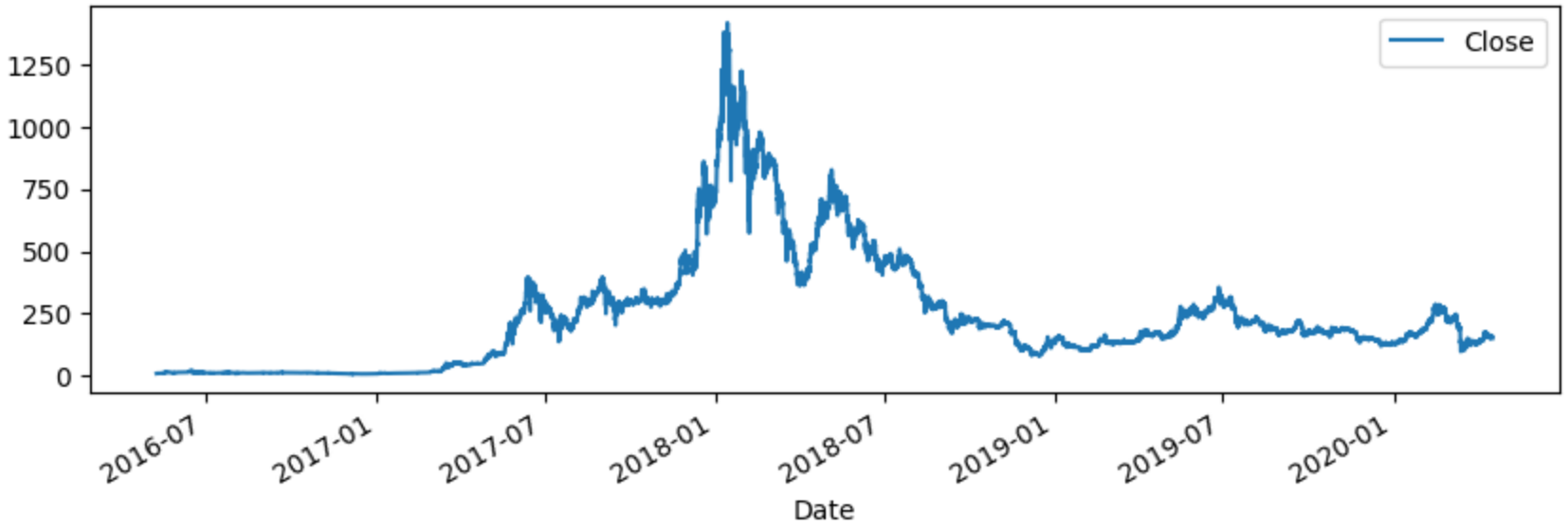
In [9]:
```
data = data.drop(columns=['Unix Timestamp','Symbol'])
```

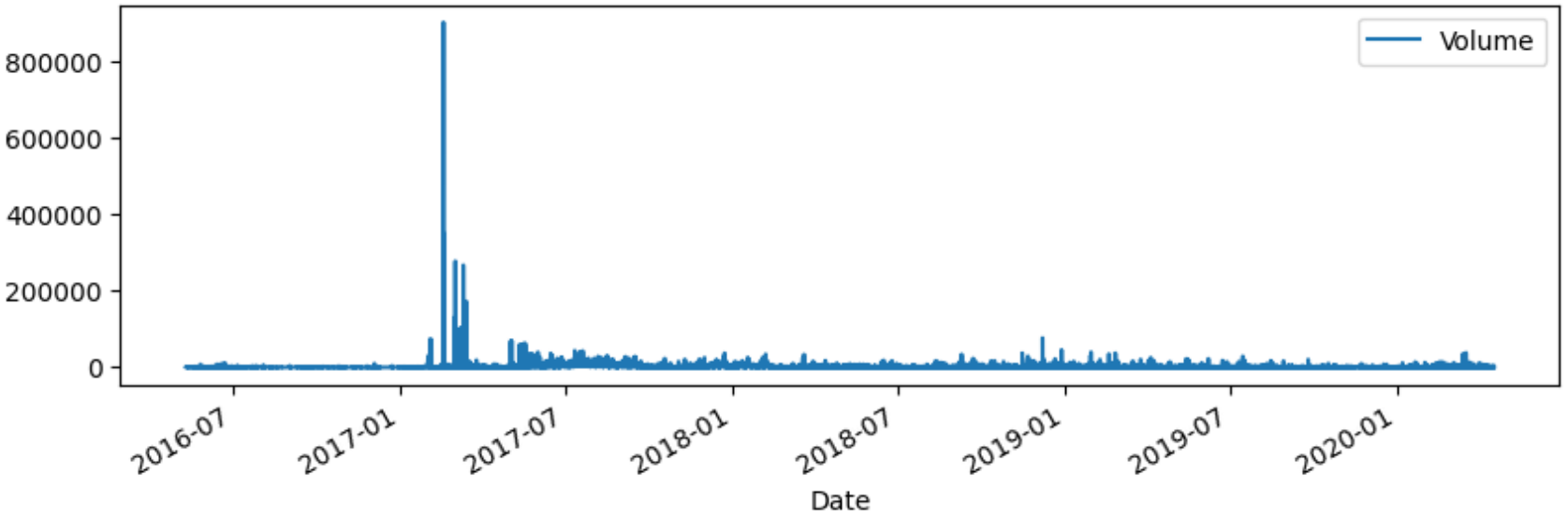
In [10]:
```
for i in data:
    plt.figure(figsize=(10,3))
    data[i].plot(legend=i)
    plt.show()
```




High
1250
1000
750
500
250
0
2016-07
2017-01
2017-07
2018-01
2018-07
2019-01
2019-07
2020-01
Date


Low
1250
1000
750
500
250
0
2016-07
2017-01
2017-07
2018-01
2018-07
2019-01
2019-07
2020-01
Date





In [11]:
```python
#creating the datatime features
def create_f(df):
    df = df.copy()
    df['hour'] = df.index.hour
    df['day'] = df.index.day
    df['month'] = df.index.month
```

```
    df['year'] = df.index.year
    df['dayofweek'] = df.index.dayofweek
    df['dayofyear'] = df.index.dayofyear
    df['weekofyear'] = df.index.isocalendar().week

    return df
```

In [12]:
```
df = create_f(data)
```

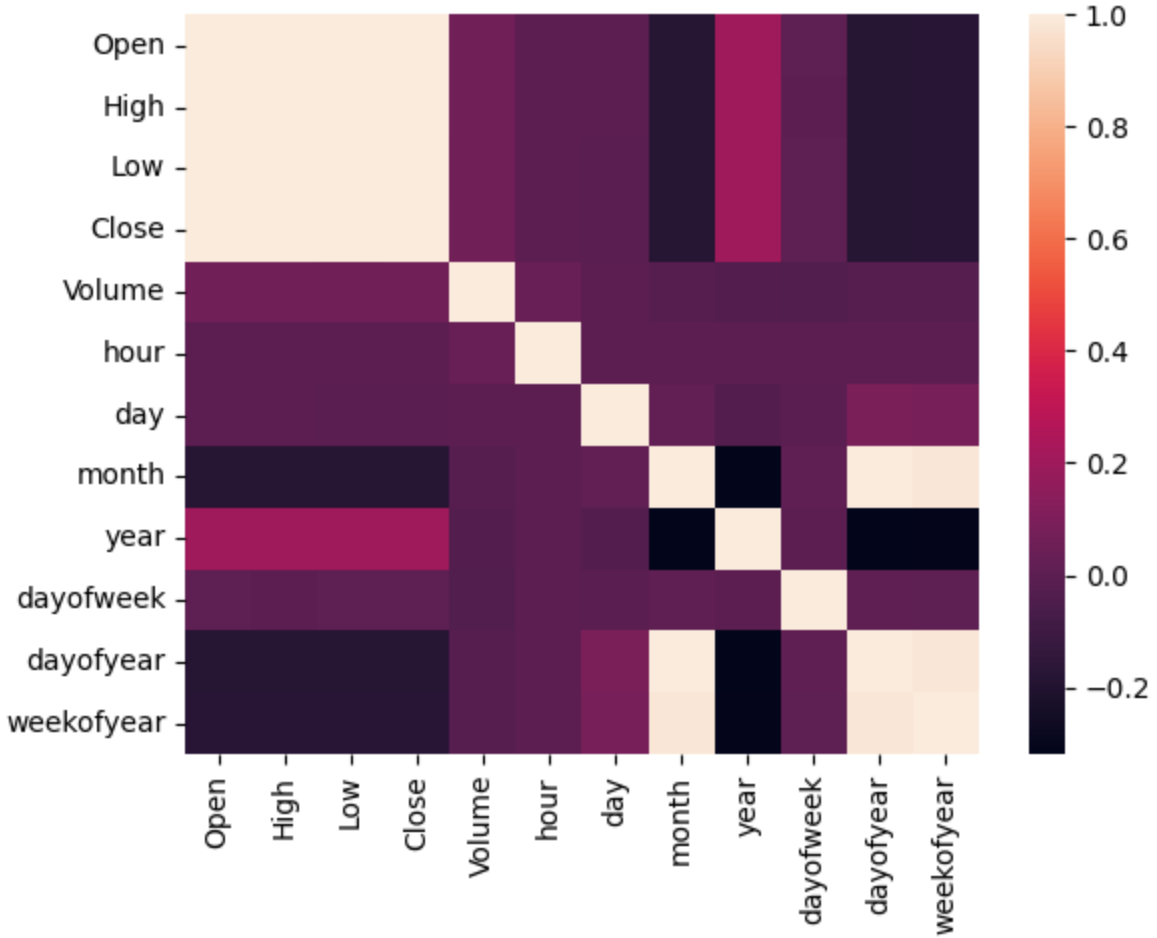
In [13]:
```
df.head()
```

Out[13]:

Date	Open	High	Low	Close	Volume	hour	day	month	year	dayofweek	dayofyear	weekofyear
2016-05-09 13:00:00	0.00	12.00	0.00	9.55	432.562115	13	9	5	2016	0	130	19
2016-05-09 14:00:00	9.55	10.00	9.55	10.00	235.774075	14	9	5	2016	0	130	19
2016-05-09 15:00:00	10.00	10.00	9.99	9.99	10.973567	15	9	5	2016	0	130	19
2016-05-09 16:00:00	9.99	9.99	9.79	9.83	62.379450	16	9	5	2016	0	130	19
2016-05-09 17:00:00	9.83	9.83	9.48	9.49	329.553213	17	9	5	2016	0	130	19

In [14]:
```
#correlation
sns.heatmap(df.corr())
```

Out[14]:
```
<Axes: >
```



In [15]:
```
#generating windows
# 24 hour window to predict 25th hour using only close

close = df.iloc[:,3]
windows=[]
target=[]
length = 240
for i in (range(len(close)-length)):
    x = close.iloc[i:i+length]
    y = close.iloc[i+length]
    windows.append(x)
    target.append(y)
```

```
windows=np.array(windows)
target=np.array(target).reshape(-1,1)
```

In [16]:
```
#creating train and test data

from sklearn.preprocessing import MinMaxScaler



sc = MinMaxScaler()
windows_sc = sc.fit_transform(windows)
target_sc = sc.fit_transform(target)

windows_sc = windows_sc.reshape((len(windows_sc),length,1))
```

In [17]:
```
#splitting

split = int(0.8*len(windows_sc))

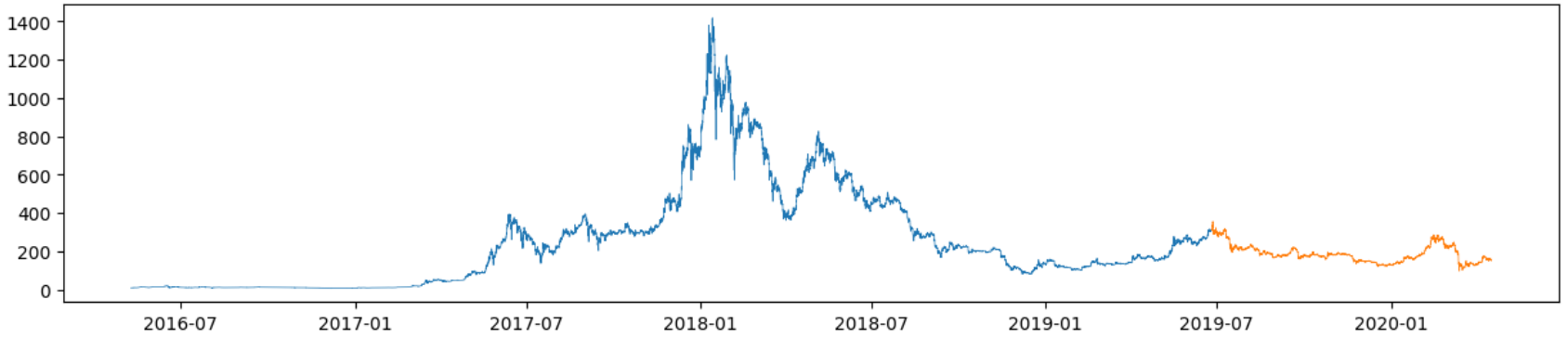
X_train = windows_sc[:split,:,:]
X_test = windows_sc[split:,:,:]
y_train = target_sc[:split,:]
y_test = target_sc[split:,:]
```

In [18]:
```
print(X_train.shape,y_train.shape)
```

```
(27405, 240, 1) (27405, 1)
```

In [19]:
```
plt.figure(figsize=(15,3))
plt.plot(df['Close'][:split],label='Train',linewidth=0.5)
plt.plot(df['Close'][split:],label='Test',linewidth=0.5)
```

Out[19]:
```
[<matplotlib.lines.Line2D at 0x21a4ee08850>]
```



Model building and training

In [20]:
```
from keras.models import Sequential
from keras.layers import LSTM, Dense, Dropout
from sklearn.metrics import *
```

```
WARNING:tensorflow:From C:\Users\amith\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\losses.py:
2976: The name tf.losses.sparse_softmax_cross_entropy is deprecated. Please use tf.compat.v1.losses.sparse_softmax_cr
oss_entropy instead.
```

In [21]:
```
model = Sequential()
model.add(LSTM(100,input_shape=(X_train.shape[1],X_train.shape[2])))
model.add(Dropout(0.2))
model.add(Dense(1, activation='linear'))

model.compile(optimizer='adam', loss='mse')
```

```
WARNING:tensorflow:From C:\Users\amith\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\backend.p
y:873: The name tf.get_default_graph is deprecated. Please use tf.compat.v1.get_default_graph instead.

WARNING:tensorflow:From C:\Users\amith\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\optimizers
\__init__.py:309: The name tf.train.Optimizer is deprecated. Please use tf.compat.v1.train.Optimizer instead.
```

In [22]:
```
model.summary()
```

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 lstm (LSTM)                 (None, 100)               40800

 dropout (Dropout)           (None, 100)               0

 dense (Dense)               (None, 1)                 101

=================================================================
Total params: 40901 (159.77 KB)
Trainable params: 40901 (159.77 KB)
Non-trainable params: 0 (0.00 Byte)
_________________________________________________________________
```

In [23]:
```
model.fit(X_train,y_train, epochs=5, batch_size=100, verbose=1)
```

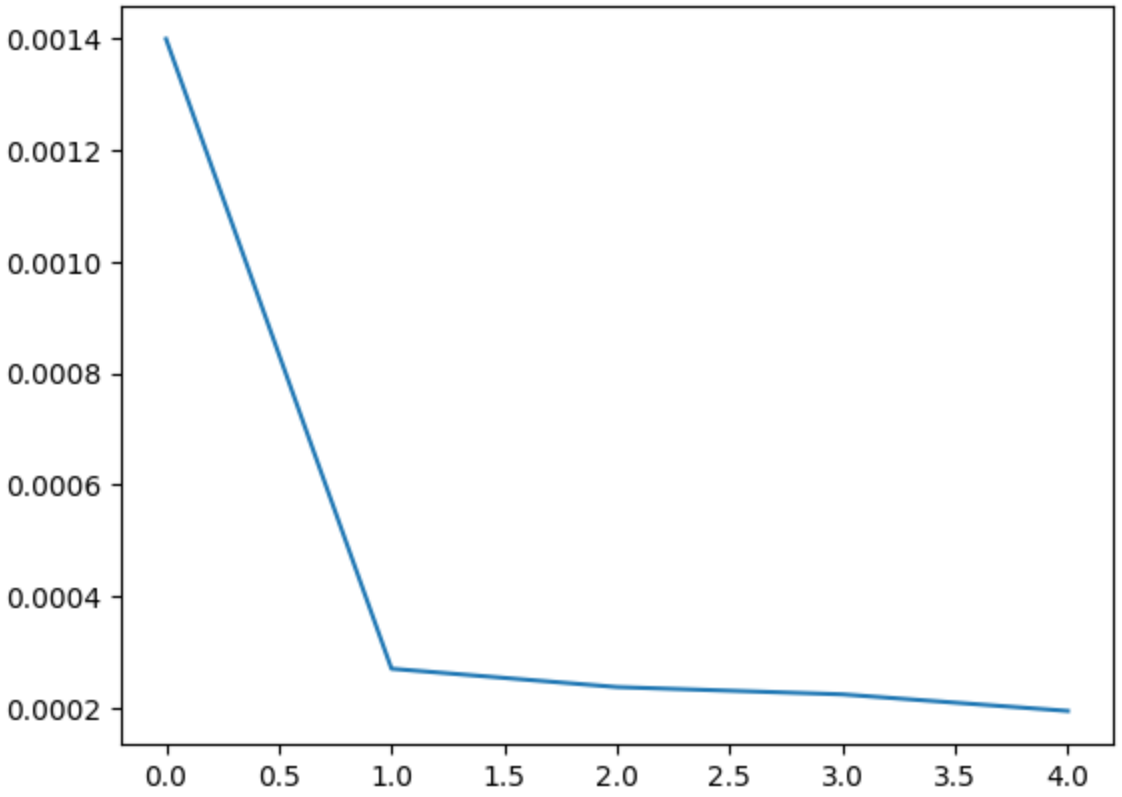
```
Epoch 1/5
WARNING:tensorflow:From C:\Users\amith\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\utils\tf_utils.py:492: The name tf.ragged.RaggedTensorValue is deprecated. Please use tf.compat.v1.ragged.RaggedTensorValue instead.

275/275 [==============================] - 86s 296ms/step - loss: 0.0014
Epoch 2/5
275/275 [==============================] - 76s 278ms/step - loss: 2.6977e-04
Epoch 3/5
275/275 [==============================] - 78s 283ms/step - loss: 2.3687e-04
Epoch 4/5
275/275 [==============================] - 78s 285ms/step - loss: 2.2377e-04
Epoch 5/5
275/275 [==============================] - 84s 306ms/step - loss: 1.9401e-04
```

Out[23]:
```
<keras.src.callbacks.History at 0x21a5c3e3310>
```

In [24]:
```
plt.plot(model.history.history['loss'])
```

Out[24]:
```
[<matplotlib.lines.Line2D at 0x21a5d768d50>]
```



In [25]:
```
pred_sc = model.predict(X_test)
pred = sc.inverse_transform(pred_sc)
y_test_ic = sc.inverse_transform(y_test)
```

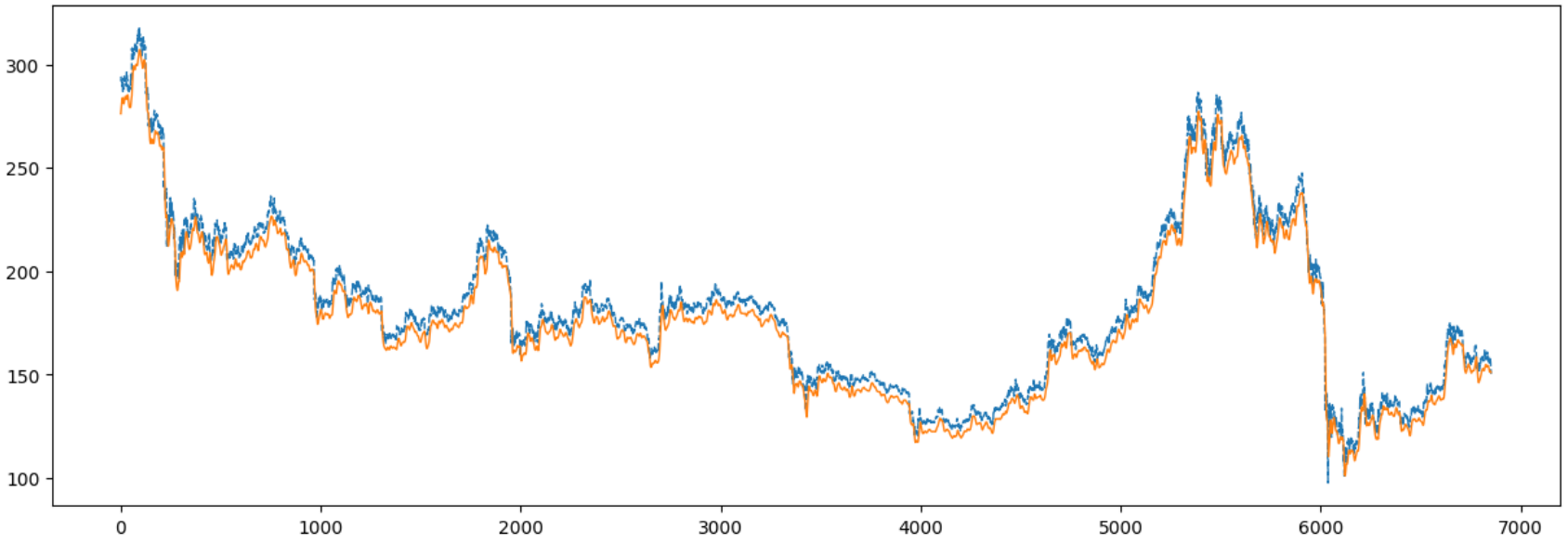
```
215/215 [==============================] - 12s 51ms/step
```

In [26]:
```
print('The Coefficient of determination (R-squared) = {:.3f}'.format(r2_score(pred,y_test_ic)))

plt.figure(figsize=(15,5))
plt.plot(y_test_ic,'--',label='Actual',linewidth=1)
plt.plot(pred,label='Predicted',linewidth=1)
```

```
The Coefficient of determination (R-squared) = 0.972
```

Out[26]:
```
[<matplotlib.lines.Line2D at 0x21a5fced910>]
```



Future Prediction

In [27]:
```
model = Sequential()
model.add(LSTM(100,input_shape=(X_train.shape[1],X_train.shape[2])))
model.add(Dropout(0.2))
model.add(Dense(1, activation='linear'))

model.compile(optimizer='adam', loss='mse')
```

In [28]:
```
#training on entire dataset

X = windows_sc
y = target_sc

model.fit(X,y, epochs=5, batch_size=100, verbose=1)
```

```
Epoch 1/5
343/343 [==============================] - 113s 319ms/step - loss: 0.0012
Epoch 2/5
343/343 [==============================] - 111s 324ms/step - loss: 2.3340e-04
Epoch 3/5
343/343 [==============================] - 117s 341ms/step - loss: 1.9669e-04
Epoch 4/5
343/343 [==============================] - 111s 322ms/step - loss: 1.7856e-04
Epoch 5/5
343/343 [==============================] - 108s 314ms/step - loss: 1.6063e-04
```

Out[28]: <keras.src.callbacks.History at 0x21a5fc58590>

In [29]:
```
from datetime import datetime
from tqdm import tqdm

str_d1 = '2019/04/16'
str_d2 = '2019/05/16'

# convert string to date object
d1 = datetime.strptime(str_d1, "%Y/%m/%d")
d2 = datetime.strptime(str_d2, "%Y/%m/%d")

delta = d2-d1
steps_in_future = delta.days * 24
print("Steps in future: ",steps_in_future)
```

```
Steps in future:  720
```

In [30]:
```
#iterative prediction of each future step

f_wind=windows_sc[-1]
f_tar=target_sc[-1]
new=[]

for i in tqdm(range(steps_in_future)):
    curr = np.append(f_wind[1:],[f_tar]).reshape(-1,1)
    #print(curr,end="\n\n")
    next_pred = model.predict(curr.reshape(1,length,1))
    #pred_ic = sc.inverse_transform(next_pred)
    new.append(next_pred[0][0])
    f_wind = curr
```

```
    f_tar=next_pred
```

```
  0%|                                                                                                | 0/720 [00:00<?, ?it/
s]
1/1 [==============================] - 1s 828ms/step
  0%|                                                                                              | 1/720 [00:00<11:00,  1.09it/
s]
1/1 [==============================] - 0s 58ms/step
  0%|                                                                                              | 2/720 [00:01<05:37,  2.13it/
s]
1/1 [==============================] - 0s 49ms/step
  0%|                                                                                              | 3/720 [00:01<03:45,  3.17it/
s]
1/1 [==============================] - 0s 55ms/step
  1%|                                                                                              | 4/720 [00:01<02:51,  4.17it/
s]
1/1 [==============================] - 0s 64ms/step
  1%|                                                                                              | 5/720 [00:01<02:27,  4.86it/
s]
1/1 [==============================] - 0s 50ms/step
  1%|                                                                                              | 6/720 [00:01<02:08,  5.55it/
s]
1/1 [==============================] - 0s 53ms/step
  1%|                                                                                              | 7/720 [00:01<01:55,  6.18it/
s]
1/1 [==============================] - 0s 50ms/step
  1%|                                                                                              | 8/720 [00:01<01:48,  6.54it/
s]
1/1 [==============================] - 0s 50ms/step
  1%|                                                                                              | 9/720 [00:01<01:41,  7.02it/
s]
1/1 [==============================] - 0s 52ms/step
  1%|                                                                                             | 10/720 [00:02<01:38,  7.24it/
s]
1/1 [==============================] - 0s 62ms/step
  2%|                                                                                             | 11/720 [00:02<01:37,  7.27it/
s]
1/1 [==============================] - 0s 52ms/step
```

```
  2%|▉                                                                                | 12/720 [00:02<01:35,  7.38it/
s]
1/1 [==============================] - 0s 51ms/step
  2%|▉                                                                                | 13/720 [00:02<01:32,  7.64it/
s]
1/1 [==============================] - 0s 57ms/step
  2%|▉                                                                                | 14/720 [00:02<01:33,  7.52it/
s]
1/1 [==============================] - 0s 53ms/step
  2%|▉                                                                                | 15/720 [00:02<01:33,  7.57it/
s]
1/1 [==============================] - 0s 52ms/step
  2%|▉                                                                                | 16/720 [00:02<01:36,  7.26it/
s]
1/1 [==============================] - 0s 56ms/step
  2%|▉                                                                                | 17/720 [00:03<01:35,  7.35it/
s]
1/1 [==============================] - 0s 55ms/step
  2%|▉                                                                                | 18/720 [00:03<01:34,  7.43it/
s]
1/1 [==============================] - 0s 56ms/step
  3%|▉                                                                                | 19/720 [00:03<01:33,  7.48it/
s]
1/1 [==============================] - 0s 51ms/step
  3%|▉                                                                                | 20/720 [00:03<01:32,  7.57it/
s]
1/1 [==============================] - 0s 51ms/step
  3%|▉                                                                                | 21/720 [00:03<01:31,  7.65it/
s]
1/1 [==============================] - 0s 52ms/step
  3%|▉                                                                                | 22/720 [00:03<01:29,  7.79it/
s]
1/1 [==============================] - 0s 48ms/step
  3%|▉                                                                                | 23/720 [00:03<01:28,  7.84it/
s]
1/1 [==============================] - 0s 55ms/step
  3%|▉                                                                                | 24/720 [00:03<01:35,  7.27it/
s]
```

```
1/1 [==============================] - 0s 49ms/step
  3%|██                                                                | 25/720 [00:04<01:29,  7.73it/
s]
1/1 [==============================] - 0s 53ms/step
  4%|██                                                                | 26/720 [00:04<01:33,  7.42it/
s]
1/1 [==============================] - 0s 46ms/step
  4%|██                                                               | 27/720 [00:04<01:30,  7.67it/
s]
1/1 [==============================] - 0s 53ms/step
  4%|██                                                                | 28/720 [00:04<01:29,  7.72it/
s]
1/1 [==============================] - 0s 57ms/step
  4%|██                                                                | 29/720 [00:04<01:30,  7.63it/
s]
1/1 [==============================] - 0s 57ms/step
  4%|██                                                                | 30/720 [00:04<01:30,  7.63it/
s]
1/1 [==============================] - 0s 49ms/step
  4%|██                                                                | 31/720 [00:04<01:28,  7.81it/
s]
1/1 [==============================] - 0s 42ms/step
  4%|██                                                               | 32/720 [00:04<01:23,  8.23it/
s]
1/1 [==============================] - 0s 56ms/step
  5%|██                                                                | 33/720 [00:05<01:23,  8.24it/
s]
1/1 [==============================] - 0s 54ms/step
  5%|██                                                                | 34/720 [00:05<01:24,  8.14it/
s]
1/1 [==============================] - 0s 102ms/step
  5%|██                                                                | 35/720 [00:05<01:34,  7.21it/
s]
1/1 [==============================] - 0s 59ms/step
  5%|██                                                               | 36/720 [00:05<01:31,  7.44it/
s]
1/1 [==============================] - 0s 47ms/step
```

```
  5%|███                                                                 | 37/720 [00:05<01:28,  7.72it/
s]
1/1 [==============================] - 0s 54ms/step
  5%|███                                                                 | 38/720 [00:05<01:28,  7.66it/
s]
1/1 [==============================] - 0s 64ms/step
  5%|███                                                                 | 39/720 [00:05<01:31,  7.45it/
s]
1/1 [==============================] - 0s 56ms/step
  6%|███                                                                | 40/720 [00:06<01:33,  7.24it/
s]
1/1 [==============================] - 0s 55ms/step
  6%|███                                                                | 41/720 [00:06<01:29,  7.60it/
s]
1/1 [==============================] - 0s 56ms/step
  6%|███                                                                 | 42/720 [00:06<01:28,  7.63it/
s]
1/1 [==============================] - 0s 58ms/step
  6%|███                                                                 | 43/720 [00:06<01:30,  7.44it/
s]
1/1 [==============================] - 0s 57ms/step
  6%|███                                                                 | 44/720 [00:06<01:30,  7.49it/
s]
1/1 [==============================] - 0s 55ms/step
  6%|███                                                                | 45/720 [00:06<01:29,  7.53it/
s]
1/1 [==============================] - 0s 62ms/step
  6%|███                                                                 | 46/720 [00:06<01:34,  7.13it/
s]
1/1 [==============================] - 0s 52ms/step
  7%|███                                                                 | 47/720 [00:06<01:31,  7.37it/
s]
1/1 [==============================] - 0s 54ms/step
  7%|███                                                                 | 48/720 [00:07<01:32,  7.23it/
s]
1/1 [==============================] - 0s 46ms/step
  7%|███                                                                | 49/720 [00:07<01:26,  7.71it/
s]
```

```
1/1 [==============================] - 0s 52ms/step
  7%|▉                                                                | 50/720 [00:07<01:25,  7.85it/
s]
1/1 [==============================] - 0s 53ms/step
  7%|▉                                                                | 51/720 [00:07<01:23,  8.06it/
s]
1/1 [==============================] - 0s 55ms/step
  7%|▉                                                                | 52/720 [00:07<01:22,  8.13it/
s]
1/1 [==============================] - 0s 53ms/step
  7%|▉                                                                | 53/720 [00:07<01:21,  8.19it/
s]
1/1 [==============================] - 0s 51ms/step
  8%|▉                                                               | 54/720 [00:07<01:23,  7.98it/
s]
1/1 [==============================] - 0s 57ms/step
  8%|▉                                                                | 55/720 [00:07<01:23,  7.96it/
s]
1/1 [==============================] - 0s 61ms/step
  8%|▉                                                                | 56/720 [00:08<01:25,  7.77it/
s]
1/1 [==============================] - 0s 71ms/step
  8%|▉                                                                | 57/720 [00:08<01:29,  7.41it/
s]
1/1 [==============================] - 0s 61ms/step
  8%|▉                                                               | 58/720 [00:08<01:27,  7.56it/
s]
1/1 [==============================] - 0s 45ms/step
  8%|▉                                                                | 59/720 [00:08<01:23,  7.88it/
s]
1/1 [==============================] - 0s 54ms/step
  8%|▉                                                                | 60/720 [00:08<01:23,  7.86it/
s]
1/1 [==============================] - 0s 57ms/step
  8%|▉                                                                | 61/720 [00:08<01:27,  7.57it/
s]
1/1 [==============================] - 0s 57ms/step
```

```
  9%|▉         | 62/720 [00:08<01:25,  7.66it/s]
1/1 [==============================] - 0s 70ms/step
  9%|▉         | 63/720 [00:09<01:29,  7.32it/s]
1/1 [==============================] - 0s 54ms/step
  9%|▉         | 64/720 [00:09<01:33,  6.98it/s]
1/1 [==============================] - 0s 55ms/step
  9%|▉         | 65/720 [00:09<01:31,  7.13it/s]
1/1 [==============================] - 0s 49ms/step
  9%|▉         | 66/720 [00:09<01:28,  7.41it/s]
1/1 [==============================] - 0s 62ms/step
  9%|▉         | 67/720 [00:09<01:27,  7.45it/s]
1/1 [==============================] - 0s 59ms/step
  9%|▉         | 68/720 [00:09<01:26,  7.55it/s]
1/1 [==============================] - 0s 57ms/step
 10%|▉         | 69/720 [00:09<01:26,  7.55it/s]
1/1 [==============================] - 0s 45ms/step
 10%|▉         | 70/720 [00:09<01:21,  7.93it/s]
1/1 [==============================] - 0s 61ms/step
 10%|▉         | 71/720 [00:10<01:23,  7.78it/s]
1/1 [==============================] - 0s 55ms/step
 10%|▉         | 72/720 [00:10<01:26,  7.46it/s]
1/1 [==============================] - 0s 48ms/step
 10%|▉         | 73/720 [00:10<01:27,  7.42it/s]
1/1 [==============================] - 0s 52ms/step
 10%|▉         | 74/720 [00:10<01:22,  7.79it/s]
```

```
1/1 [==============================] - 0s 56ms/step
 10%|▉         | 75/720 [00:10<01:23,  7.74it/s]
1/1 [==============================] - 0s 59ms/step
 11%|▉         | 76/720 [00:10<01:24,  7.64it/s]
1/1 [==============================] - 0s 63ms/step
 11%|▉         | 77/720 [00:10<01:25,  7.56it/s]
1/1 [==============================] - 0s 53ms/step
 11%|▉         | 78/720 [00:11<01:24,  7.61it/s]
1/1 [==============================] - 0s 53ms/step
 11%|▉         | 79/720 [00:11<01:23,  7.69it/s]
1/1 [==============================] - 0s 49ms/step
 11%|▉         | 80/720 [00:11<01:24,  7.57it/s]
1/1 [==============================] - 0s 55ms/step
 11%|▉         | 81/720 [00:11<01:20,  7.91it/s]
1/1 [==============================] - 0s 49ms/step
 11%|▉         | 82/720 [00:11<01:19,  8.06it/s]
1/1 [==============================] - 0s 50ms/step
 12%|▉         | 83/720 [00:11<01:17,  8.23it/s]
1/1 [==============================] - 0s 54ms/step
 12%|▉         | 84/720 [00:11<01:17,  8.20it/s]
1/1 [==============================] - 0s 55ms/step
 12%|▉         | 85/720 [00:11<01:20,  7.93it/s]
1/1 [==============================] - 0s 62ms/step
 12%|▉         | 86/720 [00:12<01:22,  7.72it/s]
1/1 [==============================] - 0s 57ms/step
```

```
 12%|████████▏                                                                 | 87/720 [00:12<01:23,  7.59it/
s]
1/1 [==============================] - 0s 54ms/step
 12%|████████▏                                                                 | 88/720 [00:12<01:25,  7.36it/
s]
1/1 [==============================] - 0s 54ms/step
 12%|████████▏                                                                | 89/720 [00:12<01:25,  7.40it/
s]
1/1 [==============================] - 0s 70ms/step
 12%|████████▏                                                                 | 90/720 [00:12<01:34,  6.69it/
s]
1/1 [==============================] - 0s 57ms/step
 13%|████████▏                                                                 | 91/720 [00:12<01:30,  6.97it/
s]
1/1 [==============================] - 0s 58ms/step
 13%|████████▏                                                                 | 92/720 [00:12<01:28,  7.11it/
s]
1/1 [==============================] - 0s 52ms/step
 13%|████████▏                                                                 | 93/720 [00:13<01:25,  7.32it/
s]
1/1 [==============================] - 0s 50ms/step
 13%|████████▏                                                                | 94/720 [00:13<01:21,  7.68it/
s]
1/1 [==============================] - 0s 54ms/step
 13%|████████▏                                                                 | 95/720 [00:13<01:20,  7.77it/
s]
1/1 [==============================] - 0s 63ms/step
 13%|████████▏                                                                 | 96/720 [00:13<01:24,  7.41it/
s]
1/1 [==============================] - 0s 64ms/step
 13%|████████▏                                                                 | 97/720 [00:13<01:24,  7.40it/
s]
1/1 [==============================] - 0s 64ms/step
 14%|████████▏                                                                | 98/720 [00:13<01:25,  7.26it/
s]
1/1 [==============================] - 0s 56ms/step
 14%|████████▏                                                                 | 99/720 [00:13<01:24,  7.35it/
s]
```

```
1/1 [==============================] - 0s 57ms/step
 14%|████████                                                        | 100/720 [00:13<01:24,  7.35it/
s]
1/1 [==============================] - 0s 43ms/step
 14%|████████                                                         | 101/720 [00:14<01:20,  7.73it/
s]
1/1 [==============================] - 0s 54ms/step
 14%|████████                                                         | 102/720 [00:14<01:20,  7.69it/
s]
1/1 [==============================] - 0s 75ms/step
 14%|████████                                                         | 103/720 [00:14<01:25,  7.21it/
s]
1/1 [==============================] - 0s 58ms/step
 14%|████████                                                        | 104/720 [00:14<01:25,  7.20it/
s]
1/1 [==============================] - 0s 54ms/step
 15%|████████                                                         | 105/720 [00:14<01:23,  7.35it/
s]
1/1 [==============================] - 0s 50ms/step
 15%|████████                                                         | 106/720 [00:14<01:19,  7.72it/
s]
1/1 [==============================] - 0s 46ms/step
 15%|████████                                                         | 107/720 [00:14<01:15,  8.08it/
s]
1/1 [==============================] - 0s 54ms/step
 15%|████████                                                        | 108/720 [00:14<01:14,  8.24it/
s]
1/1 [==============================] - 0s 55ms/step
 15%|████████                                                        | 109/720 [00:15<01:16,  8.04it/
s]
1/1 [==============================] - 0s 54ms/step
 15%|████████                                                         | 110/720 [00:15<01:16,  7.94it/
s]
1/1 [==============================] - 0s 67ms/step
 15%|████████                                                         | 111/720 [00:15<01:20,  7.61it/
s]
1/1 [==============================] - 0s 49ms/step
```

```
 16%|████████████                                                                 | 112/720 [00:15<01:17,  7.81it/
s]
1/1 [==============================] - 0s 50ms/step
 16%|████████████                                                                | 113/720 [00:15<01:16,  7.94it/
s]
1/1 [==============================] - 0s 41ms/step
 16%|████████████                                                                 | 114/720 [00:15<01:15,  8.06it/
s]
1/1 [==============================] - 0s 58ms/step
 16%|████████████                                                                 | 115/720 [00:15<01:15,  7.97it/
s]
1/1 [==============================] - 0s 61ms/step
 16%|████████████                                                                 | 116/720 [00:16<01:16,  7.91it/
s]
1/1 [==============================] - 0s 50ms/step
 16%|████████████                                                                | 117/720 [00:16<01:15,  8.02it/
s]
1/1 [==============================] - 0s 55ms/step
 16%|████████████                                                                | 118/720 [00:16<01:12,  8.33it/
s]
1/1 [==============================] - 0s 56ms/step
 17%|████████████                                                                 | 119/720 [00:16<01:15,  7.94it/
s]
1/1 [==============================] - 0s 55ms/step
 17%|████████████                                                                 | 120/720 [00:16<01:17,  7.70it/
s]
1/1 [==============================] - 0s 56ms/step
 17%|████████████                                                                 | 121/720 [00:16<01:17,  7.73it/
s]
1/1 [==============================] - 0s 56ms/step
 17%|████████████                                                                | 122/720 [00:16<01:18,  7.65it/
s]
1/1 [==============================] - 0s 52ms/step
 17%|████████████                                                                 | 123/720 [00:16<01:18,  7.64it/
s]
1/1 [==============================] - 0s 52ms/step
 17%|████████████                                                                 | 124/720 [00:17<01:18,  7.63it/
s]
```

```
1/1 [==============================] - 0s 49ms/step
 17%|███████████▍                                                                | 125/720 [00:17<01:14,  7.98it/
s]
1/1 [==============================] - 0s 49ms/step
 18%|███████████▌                                                                | 126/720 [00:17<01:12,  8.19it/
s]
1/1 [==============================] - 0s 51ms/step
 18%|███████████▌                                                                | 127/720 [00:17<01:12,  8.19it/
s]
1/1 [==============================] - 0s 46ms/step
 18%|███████████▌                                                                | 128/720 [00:17<01:10,  8.43it/
s]
1/1 [==============================] - 0s 55ms/step
 18%|███████████▋                                                                | 129/720 [00:17<01:11,  8.28it/
s]
1/1 [==============================] - 0s 74ms/step
 18%|███████████▋                                                                | 130/720 [00:17<01:16,  7.70it/
s]
1/1 [==============================] - 0s 56ms/step
 18%|███████████▋                                                                | 131/720 [00:17<01:16,  7.74it/
s]
1/1 [==============================] - 0s 64ms/step
 18%|███████████▊                                                                | 132/720 [00:18<01:17,  7.58it/
s]
1/1 [==============================] - 0s 54ms/step
 18%|███████████▊                                                                | 133/720 [00:18<01:16,  7.72it/
s]
1/1 [==============================] - 0s 49ms/step
 19%|███████████▊                                                                | 134/720 [00:18<01:12,  8.06it/
s]
1/1 [==============================] - 0s 55ms/step
 19%|███████████▉                                                                | 135/720 [00:18<01:12,  8.02it/
s]
1/1 [==============================] - 0s 52ms/step
 19%|███████████▉                                                                | 136/720 [00:18<01:14,  7.89it/
s]
1/1 [==============================] - 0s 57ms/step
```

```
 19%|███████▋                               | 137/720 [00:18<01:15,  7.77it/s]
1/1 [==============================] - 0s 63ms/step
 19%|███████▋                               | 138/720 [00:18<01:18,  7.40it/s]
1/1 [==============================] - 0s 63ms/step
 19%|███████▊                               | 139/720 [00:18<01:22,  7.04it/s]
1/1 [==============================] - 0s 63ms/step
 19%|███████▊                              | 140/720 [00:19<01:25,  6.77it/s]
1/1 [==============================] - 0s 60ms/step
 20%|███████▉                               | 141/720 [00:19<01:23,  6.90it/s]
1/1 [==============================] - 0s 60ms/step
 20%|███████▉                               | 142/720 [00:19<01:23,  6.96it/s]
1/1 [==============================] - 0s 56ms/step
 20%|███████▉                               | 143/720 [00:19<01:21,  7.06it/s]
1/1 [==============================] - 0s 54ms/step
 20%|████████                              | 144/720 [00:19<01:20,  7.16it/s]
1/1 [==============================] - 0s 54ms/step
 20%|████████                              | 145/720 [00:19<01:18,  7.31it/s]
1/1 [==============================] - 0s 59ms/step
 20%|████████                               | 146/720 [00:19<01:15,  7.62it/s]
1/1 [==============================] - 0s 55ms/step
 20%|████████▏                              | 147/720 [00:20<01:12,  7.93it/s]
1/1 [==============================] - 0s 57ms/step
 21%|████████▏                              | 148/720 [00:20<01:12,  7.92it/s]
1/1 [==============================] - 0s 58ms/step
 21%|████████▎                             | 149/720 [00:20<01:14,  7.65it/s]
```

```
1/1 [==============================] - 0s 47ms/step
 21%|██▏                                                | 150/720 [00:20<01:14,  7.65it/
s]
1/1 [==============================] - 0s 51ms/step
 21%|██▏                                                | 151/720 [00:20<01:16,  7.48it/
s]
1/1 [==============================] - 0s 49ms/step
 21%|██▏                                                | 152/720 [00:20<01:14,  7.67it/
s]
1/1 [==============================] - 0s 55ms/step
 21%|██▏                                               | 153/720 [00:20<01:15,  7.52it/
s]
1/1 [==============================] - 0s 55ms/step
 21%|██▏                                               | 154/720 [00:21<01:16,  7.41it/
s]
1/1 [==============================] - 0s 56ms/step
 22%|██▏                                                | 155/720 [00:21<01:16,  7.41it/
s]
1/1 [==============================] - 0s 59ms/step
 22%|██▏                                                | 156/720 [00:21<01:21,  6.91it/
s]
1/1 [==============================] - 0s 45ms/step
 22%|██▏                                                | 157/720 [00:21<01:18,  7.21it/
s]
1/1 [==============================] - 0s 71ms/step
 22%|██▏                                               | 158/720 [00:21<01:19,  7.11it/
s]
1/1 [==============================] - 0s 47ms/step
 22%|██▏                                                | 159/720 [00:21<01:15,  7.44it/
s]
1/1 [==============================] - 0s 57ms/step
 22%|██▏                                                | 160/720 [00:21<01:14,  7.51it/
s]
1/1 [==============================] - 0s 47ms/step
 22%|██▏                                                | 161/720 [00:21<01:14,  7.46it/
s]
1/1 [==============================] - 0s 52ms/step
```

```
 22%|███████████████▍                                                | 162/720 [00:22<01:11,  7.81it/
s]
1/1 [==============================] - 0s 46ms/step
 23%|███████████████▋                                                | 163/720 [00:22<01:10,  7.90it/
s]
1/1 [==============================] - 0s 44ms/step
 23%|███████████████▋                                                | 164/720 [00:22<01:07,  8.28it/
s]
1/1 [==============================] - 0s 45ms/step
 23%|███████████████▊                                                | 165/720 [00:22<01:06,  8.39it/
s]
1/1 [==============================] - 0s 52ms/step
 23%|███████████████▊                                                | 166/720 [00:22<01:06,  8.36it/
s]
1/1 [==============================] - 0s 53ms/step
 23%|███████████████▉                                                | 167/720 [00:22<01:08,  8.10it/
s]
1/1 [==============================] - 0s 54ms/step
 23%|███████████████▉                                                | 168/720 [00:22<01:08,  8.01it/
s]
1/1 [==============================] - 0s 56ms/step
 23%|████████████████                                                | 169/720 [00:22<01:09,  7.90it/
s]
1/1 [==============================] - 0s 52ms/step
 24%|████████████████                                                | 170/720 [00:23<01:09,  7.91it/
s]
1/1 [==============================] - 0s 53ms/step
 24%|████████████████▏                                               | 171/720 [00:23<01:08,  7.97it/
s]
1/1 [==============================] - 0s 62ms/step
 24%|████████████████▏                                               | 172/720 [00:23<01:09,  7.94it/
s]
1/1 [==============================] - 0s 52ms/step
 24%|████████████████▎                                               | 173/720 [00:23<01:08,  8.04it/
s]
1/1 [==============================] - 0s 47ms/step
 24%|████████████████▎                                               | 174/720 [00:23<01:04,  8.41it/
s]
```

```
1/1 [==============================] - 0s 50ms/step
 24%|████████████████▌                                                | 175/720 [00:23<01:06,  8.22it/
s]
1/1 [==============================] - 0s 54ms/step
 24%|████████████████▋                                                | 176/720 [00:23<01:07,  8.08it/
s]
1/1 [==============================] - 0s 57ms/step
 25%|████████████████▊                                                | 177/720 [00:23<01:08,  7.95it/
s]
1/1 [==============================] - 0s 60ms/step
 25%|████████████████▉                                                | 178/720 [00:24<01:08,  7.86it/
s]
1/1 [==============================] - 0s 54ms/step
 25%|█████████████████                                                | 179/720 [00:24<01:09,  7.83it/
s]
1/1 [==============================] - 0s 54ms/step
 25%|█████████████████                                                | 180/720 [00:24<01:08,  7.83it/
s]
1/1 [==============================] - 0s 58ms/step
 25%|█████████████████                                                | 181/720 [00:24<01:08,  7.87it/
s]
1/1 [==============================] - 0s 55ms/step
 25%|█████████████████▏                                               | 182/720 [00:24<01:10,  7.68it/
s]
1/1 [==============================] - 0s 53ms/step
 25%|█████████████████▏                                               | 183/720 [00:24<01:12,  7.42it/
s]
1/1 [==============================] - 0s 51ms/step
 26%|█████████████████▎                                               | 184/720 [00:24<01:10,  7.58it/
s]
1/1 [==============================] - 0s 58ms/step
 26%|█████████████████▍                                               | 185/720 [00:24<01:10,  7.61it/
s]
1/1 [==============================] - 0s 58ms/step
 26%|█████████████████▌                                               | 186/720 [00:25<01:08,  7.74it/
s]
1/1 [==============================] - 0s 54ms/step
```

```
 26%|██████████████████▌                                                | 187/720 [00:25<01:08,  7.83it/
s]
1/1 [==============================] - 0s 50ms/step
 26%|██████████████████▌                                                | 188/720 [00:25<01:05,  8.10it/
s]
1/1 [==============================] - 0s 58ms/step
 26%|██████████████████▋                                                | 189/720 [00:25<01:06,  7.94it/
s]
1/1 [==============================] - 0s 48ms/step
 26%|██████████████████▋                                                | 190/720 [00:25<01:05,  8.04it/
s]
1/1 [==============================] - 0s 54ms/step
 27%|██████████████████▋                                                | 191/720 [00:25<01:06,  8.01it/
s]
1/1 [==============================] - 0s 57ms/step
 27%|██████████████████▊                                                | 192/720 [00:25<01:07,  7.79it/
s]
1/1 [==============================] - 0s 54ms/step
 27%|██████████████████▊                                                | 193/720 [00:25<01:08,  7.67it/
s]
1/1 [==============================] - 0s 48ms/step
 27%|██████████████████▊                                                | 194/720 [00:26<01:07,  7.81it/
s]
1/1 [==============================] - 0s 51ms/step
 27%|██████████████████▉                                                | 195/720 [00:26<01:06,  7.92it/
s]
1/1 [==============================] - 0s 45ms/step
 27%|██████████████████▉                                                | 196/720 [00:26<01:03,  8.20it/
s]
1/1 [==============================] - 0s 57ms/step
 27%|██████████████████▉                                                | 197/720 [00:26<01:05,  7.96it/
s]
1/1 [==============================] - 0s 60ms/step
 28%|███████████████████                                                | 198/720 [00:26<01:07,  7.70it/
s]
1/1 [==============================] - 0s 60ms/step
 28%|███████████████████                                                | 199/720 [00:26<01:17,  6.69it/
s]
```

```
1/1 [==============================] - 0s 57ms/step
 28%|████████████████████▏                                                  | 200/720 [00:26<01:15,  6.92it/
s]
1/1 [==============================] - 0s 58ms/step
 28%|████████████████████▏                                                  | 201/720 [00:27<01:14,  6.97it/
s]
1/1 [==============================] - 0s 54ms/step
 28%|████████████████████▏                                                  | 202/720 [00:27<01:11,  7.22it/
s]
1/1 [==============================] - 0s 56ms/step
 28%|████████████████████▏                                                 | 203/720 [00:27<01:09,  7.40it/
s]
1/1 [==============================] - 0s 63ms/step
 28%|████████████████████▎                                                  | 204/720 [00:27<01:10,  7.35it/
s]
1/1 [==============================] - 0s 63ms/step
 28%|████████████████████▎                                                  | 205/720 [00:27<01:11,  7.25it/
s]
1/1 [==============================] - 0s 53ms/step
 29%|████████████████████▎                                                  | 206/720 [00:27<01:11,  7.18it/
s]
1/1 [==============================] - 0s 59ms/step
 29%|████████████████████▍                                                 | 207/720 [00:27<01:10,  7.27it/
s]
1/1 [==============================] - 0s 56ms/step
 29%|████████████████████▍                                                 | 208/720 [00:28<01:09,  7.34it/
s]
1/1 [==============================] - 0s 57ms/step
 29%|████████████████████▍                                                  | 209/720 [00:28<01:08,  7.43it/
s]
1/1 [==============================] - 0s 52ms/step
 29%|████████████████████▍                                                  | 210/720 [00:28<01:07,  7.60it/
s]
1/1 [==============================] - 0s 56ms/step
 29%|████████████████████▌                                                  | 211/720 [00:28<01:07,  7.54it/
s]
1/1 [==============================] - 0s 55ms/step
```

```
 29%|████████████████████                                                | 212/720 [00:28<01:07,  7.49it/
s]
1/1 [==============================] - 0s 57ms/step
 30%|████████████████████▏                                               | 213/720 [00:28<01:07,  7.53it/
s]
1/1 [==============================] - 0s 62ms/step
 30%|████████████████████▏                                               | 214/720 [00:28<01:15,  6.70it/
s]
1/1 [==============================] - 0s 65ms/step
 30%|████████████████████▏                                               | 215/720 [00:29<01:16,  6.63it/
s]
1/1 [==============================] - 0s 65ms/step
 30%|████████████████████                                                | 216/720 [00:29<01:18,  6.45it/
s]
1/1 [==============================] - 0s 55ms/step
 30%|████████████████████                                                | 217/720 [00:29<01:14,  6.72it/
s]
1/1 [==============================] - 0s 48ms/step
 30%|████████████████████▏                                               | 218/720 [00:29<01:12,  6.97it/
s]
1/1 [==============================] - 0s 59ms/step
 30%|████████████████████▏                                               | 219/720 [00:29<01:11,  6.98it/
s]
1/1 [==============================] - 0s 59ms/step
 31%|████████████████████▏                                               | 220/720 [00:29<01:12,  6.86it/
s]
1/1 [==============================] - 0s 56ms/step
 31%|████████████████████▏                                               | 221/720 [00:29<01:11,  6.95it/
s]
1/1 [==============================] - 0s 58ms/step
 31%|████████████████████▏                                               | 222/720 [00:30<01:12,  6.86it/
s]
1/1 [==============================] - 0s 49ms/step
 31%|████████████████████▏                                               | 223/720 [00:30<01:09,  7.12it/
s]
1/1 [==============================] - 0s 53ms/step
 31%|████████████████████▏                                               | 224/720 [00:30<01:07,  7.35it/
s]
```

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1/1 [==============================] - 0s 60ms/step
 31%|███████████████████████                                                  | 225/720 [00:30<01:07,  7.38it/
s]
1/1 [==============================] - 0s 55ms/step
 31%|███████████████████████                                                  | 226/720 [00:30<01:05,  7.55it/
s]
1/1 [==============================] - 0s 51ms/step
 32%|███████████████████████▏                                                 | 227/720 [00:30<01:03,  7.71it/
s]
1/1 [==============================] - 0s 55ms/step
 32%|███████████████████████▏                                                 | 228/720 [00:30<01:04,  7.69it/
s]
1/1 [==============================] - 0s 63ms/step
 32%|███████████████████████▏                                                 | 229/720 [00:30<01:06,  7.39it/
s]
1/1 [==============================] - 0s 53ms/step
 32%|███████████████████████▏                                                 | 230/720 [00:31<01:04,  7.54it/
s]
1/1 [==============================] - 0s 54ms/step
 32%|███████████████████████▎                                                 | 231/720 [00:31<01:04,  7.61it/
s]
1/1 [==============================] - 0s 45ms/step
 32%|███████████████████████▎                                                 | 232/720 [00:31<01:02,  7.81it/
s]
1/1 [==============================] - 0s 73ms/step
 32%|███████████████████████▎                                                 | 233/720 [00:31<01:06,  7.35it/
s]
1/1 [==============================] - 0s 64ms/step
 32%|███████████████████████▎                                                 | 234/720 [00:31<01:09,  6.98it/
s]
1/1 [==============================] - 0s 62ms/step
 33%|███████████████████████▍                                                 | 235/720 [00:31<01:10,  6.88it/
s]
1/1 [==============================] - 0s 55ms/step
 33%|███████████████████████▍                                                 | 236/720 [00:31<01:13,  6.60it/
s]
1/1 [==============================] - 0s 57ms/step
```

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 33%|███████████████████████▌                                                | 237/720 [00:32<01:10,  6.84it/
s]
1/1 [==============================] - 0s 53ms/step
 33%|███████████████████████▋                                                | 238/720 [00:32<01:09,  6.94it/
s]
1/1 [==============================] - 0s 51ms/step
 33%|███████████████████████▋                                                | 239/720 [00:32<01:06,  7.23it/
s]
1/1 [==============================] - 0s 52ms/step
 33%|███████████████████████▊                                                | 240/720 [00:32<01:04,  7.47it/
s]
1/1 [==============================] - 0s 52ms/step
 33%|███████████████████████▊                                                | 241/720 [00:32<01:03,  7.57it/
s]
1/1 [==============================] - 0s 54ms/step
 34%|███████████████████████▉                                                | 242/720 [00:32<01:02,  7.65it/
s]
1/1 [==============================] - 0s 59ms/step
 34%|███████████████████████▉                                                | 243/720 [00:32<01:03,  7.55it/
s]
1/1 [==============================] - 0s 57ms/step
 34%|████████████████████████                                                | 244/720 [00:33<01:03,  7.46it/
s]
1/1 [==============================] - 0s 57ms/step
 34%|████████████████████████                                                | 245/720 [00:33<01:04,  7.34it/
s]
1/1 [==============================] - 0s 59ms/step
 34%|████████████████████████▏                                               | 246/720 [00:33<01:06,  7.10it/
s]
1/1 [==============================] - 0s 58ms/step
 34%|████████████████████████▏                                               | 247/720 [00:33<01:06,  7.17it/
s]
1/1 [==============================] - 0s 57ms/step
 34%|████████████████████████▎                                               | 248/720 [00:33<01:05,  7.26it/
s]
1/1 [==============================] - 0s 74ms/step
 35%|████████████████████████▎                                               | 249/720 [00:33<01:10,  6.72it/
s]
```

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1/1 [==============================] - 0s 56ms/step
 35%|███████████████████████▌                                                | 250/720 [00:33<01:09,  6.79it/
s]
1/1 [==============================] - 0s 47ms/step
 35%|███████████████████████▌                                                | 251/720 [00:34<01:05,  7.18it/
s]
1/1 [==============================] - 0s 52ms/step
 35%|███████████████████████▌                                                | 252/720 [00:34<01:03,  7.40it/
s]
1/1 [==============================] - 0s 52ms/step
 35%|███████████████████████▌                                                | 253/720 [00:34<01:01,  7.66it/
s]
1/1 [==============================] - 0s 50ms/step
 35%|███████████████████████▋                                                | 254/720 [00:34<00:58,  7.91it/
s]
1/1 [==============================] - 0s 61ms/step
 35%|███████████████████████▋                                                | 255/720 [00:34<00:59,  7.81it/
s]
1/1 [==============================] - 0s 52ms/step
 36%|███████████████████████▋                                                | 256/720 [00:34<00:59,  7.81it/
s]
1/1 [==============================] - 0s 62ms/step
 36%|███████████████████████▊                                                | 257/720 [00:34<01:02,  7.39it/
s]
1/1 [==============================] - 0s 91ms/step
 36%|███████████████████████▊                                                | 258/720 [00:34<01:06,  6.91it/
s]
1/1 [==============================] - 0s 54ms/step
 36%|███████████████████████▊                                                | 259/720 [00:35<01:04,  7.13it/
s]
1/1 [==============================] - 0s 51ms/step
 36%|███████████████████████▊                                                | 260/720 [00:35<01:03,  7.24it/
s]
1/1 [==============================] - 0s 51ms/step
 36%|███████████████████████▉                                                | 261/720 [00:35<01:01,  7.50it/
s]
1/1 [==============================] - 0s 49ms/step
```

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 36%|████████████████████████                                          | 262/720 [00:35<00:59,  7.73it/
s]
1/1 [==============================] - 0s 55ms/step
 37%|████████████████████████▏                                         | 263/720 [00:35<00:59,  7.71it/
s]
1/1 [==============================] - 0s 53ms/step
 37%|████████████████████████▎                                         | 264/720 [00:35<00:58,  7.76it/
s]
1/1 [==============================] - 0s 53ms/step
 37%|████████████████████████▍                                         | 265/720 [00:35<00:58,  7.76it/
s]
1/1 [==============================] - 0s 62ms/step
 37%|████████████████████████▍                                         | 266/720 [00:35<01:00,  7.52it/
s]
1/1 [==============================] - 0s 53ms/step
 37%|████████████████████████▌                                         | 267/720 [00:36<00:59,  7.59it/
s]
1/1 [==============================] - 0s 59ms/step
 37%|████████████████████████▋                                         | 268/720 [00:36<01:01,  7.34it/
s]
1/1 [==============================] - 0s 55ms/step
 37%|████████████████████████▋                                         | 269/720 [00:36<01:01,  7.35it/
s]
1/1 [==============================] - 0s 54ms/step
 38%|████████████████████████▊                                         | 270/720 [00:36<01:01,  7.34it/
s]
1/1 [==============================] - 0s 55ms/step
 38%|████████████████████████▊                                         | 271/720 [00:36<01:00,  7.46it/
s]
1/1 [==============================] - 0s 65ms/step
 38%|████████████████████████▉                                         | 272/720 [00:36<01:01,  7.33it/
s]
1/1 [==============================] - 0s 57ms/step
 38%|████████████████████████▉                                         | 273/720 [00:36<01:00,  7.39it/
s]
1/1 [==============================] - 0s 53ms/step
 38%|█████████████████████████                                         | 274/720 [00:37<01:00,  7.39it/
s]
```

```
1/1 [==============================] - 0s 56ms/step
 38%|████████████████████████████                                                | 275/720 [00:37<00:59,  7.45it/
s]
1/1 [==============================] - 0s 54ms/step
 38%|████████████████████████████▏                                               | 276/720 [00:37<00:58,  7.56it/
s]
1/1 [==============================] - 0s 50ms/step
 38%|████████████████████████████▎                                               | 277/720 [00:37<00:57,  7.67it/
s]
1/1 [==============================] - 0s 55ms/step
 39%|████████████████████████████▍                                               | 278/720 [00:37<00:57,  7.70it/
s]
1/1 [==============================] - 0s 54ms/step
 39%|████████████████████████████▌                                               | 279/720 [00:37<00:57,  7.74it/
s]
1/1 [==============================] - 0s 60ms/step
 39%|████████████████████████████▌                                               | 280/720 [00:37<00:59,  7.42it/
s]
1/1 [==============================] - 0s 64ms/step
 39%|████████████████████████████▋                                               | 281/720 [00:38<00:59,  7.33it/
s]
1/1 [==============================] - 0s 54ms/step
 39%|████████████████████████████▊                                               | 282/720 [00:38<00:59,  7.40it/
s]
1/1 [==============================] - 0s 50ms/step
 39%|████████████████████████████▉                                               | 283/720 [00:38<00:57,  7.60it/
s]
1/1 [==============================] - 0s 51ms/step
 39%|█████████████████████████████                                               | 284/720 [00:38<01:00,  7.25it/
s]
1/1 [==============================] - 0s 56ms/step
 40%|█████████████████████████████▏                                              | 285/720 [00:38<00:58,  7.44it/
s]
1/1 [==============================] - 0s 56ms/step
 40%|█████████████████████████████▏                                              | 286/720 [00:38<00:58,  7.47it/
s]
1/1 [==============================] - 0s 54ms/step
```

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 40%|████████████████████████████▍                                | 287/720 [00:38<00:59,  7.30it/
s]
1/1 [==============================] - 0s 52ms/step
 40%|████████████████████████████▍                                | 288/720 [00:38<00:57,  7.47it/
s]
1/1 [==============================] - 0s 52ms/step
 40%|████████████████████████████▍                                | 289/720 [00:39<00:57,  7.54it/
s]
1/1 [==============================] - 0s 61ms/step
 40%|████████████████████████████▌                                | 290/720 [00:39<00:58,  7.31it/
s]
1/1 [==============================] - 0s 55ms/step
 40%|████████████████████████████▌                                | 291/720 [00:39<00:59,  7.25it/
s]
1/1 [==============================] - 0s 58ms/step
 41%|████████████████████████████▌                                | 292/720 [00:39<00:59,  7.21it/
s]
1/1 [==============================] - 0s 55ms/step
 41%|████████████████████████████▋                                | 293/720 [00:39<00:58,  7.28it/
s]
1/1 [==============================] - 0s 57ms/step
 41%|████████████████████████████▋                                | 294/720 [00:39<00:58,  7.32it/
s]
1/1 [==============================] - 0s 50ms/step
 41%|████████████████████████████▋                                | 295/720 [00:39<00:56,  7.50it/
s]
1/1 [==============================] - 0s 51ms/step
 41%|████████████████████████████▊                                | 296/720 [00:40<00:55,  7.59it/
s]
1/1 [==============================] - 0s 56ms/step
 41%|████████████████████████████▊                                | 297/720 [00:40<00:56,  7.54it/
s]
1/1 [==============================] - 0s 56ms/step
 41%|████████████████████████████▊                                | 298/720 [00:40<00:55,  7.58it/
s]
1/1 [==============================] - 0s 53ms/step
 42%|████████████████████████████▉                                | 299/720 [00:40<00:54,  7.73it/
s]
```

```
1/1 [==============================] - 0s 50ms/step
 42%|████████████████████████████████                                                | 300/720 [00:40<00:53,  7.91it/
s]
1/1 [==============================] - 0s 57ms/step
 42%|████████████████████████████████                                                | 301/720 [00:40<00:53,  7.89it/
s]
1/1 [==============================] - 0s 58ms/step
 42%|████████████████████████████████                                                | 302/720 [00:40<00:54,  7.65it/
s]
1/1 [==============================] - 0s 64ms/step
 42%|████████████████████████████████                                                | 303/720 [00:40<00:58,  7.16it/
s]
1/1 [==============================] - 0s 70ms/step
 42%|████████████████████████████████                                                | 304/720 [00:41<00:59,  6.98it/
s]
1/1 [==============================] - 0s 56ms/step
 42%|████████████████████████████████                                                | 305/720 [00:41<00:58,  7.07it/
s]
1/1 [==============================] - 0s 52ms/step
 42%|████████████████████████████████                                                | 306/720 [00:41<00:57,  7.25it/
s]
1/1 [==============================] - 0s 53ms/step
 43%|████████████████████████████████                                                | 307/720 [00:41<00:54,  7.52it/
s]
1/1 [==============================] - 0s 56ms/step
 43%|████████████████████████████████                                                | 308/720 [00:41<00:54,  7.50it/
s]
1/1 [==============================] - 0s 56ms/step
 43%|████████████████████████████████                                                | 309/720 [00:41<00:54,  7.59it/
s]
1/1 [==============================] - 0s 70ms/step
 43%|████████████████████████████████                                                | 310/720 [00:41<00:55,  7.38it/
s]
1/1 [==============================] - 0s 57ms/step
 43%|████████████████████████████████                                                | 311/720 [00:42<00:54,  7.54it/
s]
1/1 [==============================] - 0s 52ms/step
```

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 43%|████████████████████████████▍                                | 312/720 [00:42<00:52,  7.74it/
s]
1/1 [==============================] - 0s 60ms/step
 43%|████████████████████████████▍                                | 313/720 [00:42<00:52,  7.81it/
s]
1/1 [==============================] - 0s 52ms/step
 44%|████████████████████████████▌                                | 314/720 [00:42<00:54,  7.48it/
s]
1/1 [==============================] - 0s 55ms/step
 44%|████████████████████████████▋                               | 315/720 [00:42<00:55,  7.32it/
s]
1/1 [==============================] - 0s 51ms/step
 44%|████████████████████████████▋                               | 316/720 [00:42<00:52,  7.64it/
s]
1/1 [==============================] - 0s 52ms/step
 44%|████████████████████████████▋                                | 317/720 [00:42<00:52,  7.69it/
s]
1/1 [==============================] - 0s 53ms/step
 44%|████████████████████████████▋                                | 318/720 [00:42<00:51,  7.77it/
s]
1/1 [==============================] - 0s 64ms/step
 44%|████████████████████████████▋                                | 319/720 [00:43<00:52,  7.64it/
s]
1/1 [==============================] - 0s 68ms/step
 44%|████████████████████████████▊                               | 320/720 [00:43<00:54,  7.36it/
s]
1/1 [==============================] - 0s 60ms/step
 45%|████████████████████████████▊                                | 321/720 [00:43<00:55,  7.25it/
s]
1/1 [==============================] - 0s 52ms/step
 45%|████████████████████████████▉                                | 322/720 [00:43<00:54,  7.32it/
s]
1/1 [==============================] - 0s 57ms/step
 45%|████████████████████████████▉                                | 323/720 [00:43<00:53,  7.37it/
s]
1/1 [==============================] - 0s 57ms/step
 45%|████████████████████████████▉                               | 324/720 [00:43<00:54,  7.30it/
s]
```

```
1/1 [==============================] - 0s 54ms/step
 45%|████████████████████████████████                                | 325/720 [00:43<00:53,  7.34it/
s]
1/1 [==============================] - 0s 50ms/step
 45%|████████████████████████████████▏                               | 326/720 [00:44<00:53,  7.38it/
s]
1/1 [==============================] - 0s 54ms/step
 45%|████████████████████████████████▏                               | 327/720 [00:44<00:53,  7.30it/
s]
1/1 [==============================] - 0s 49ms/step
 46%|████████████████████████████████▎                               | 328/720 [00:44<00:54,  7.20it/
s]
1/1 [==============================] - 0s 51ms/step
 46%|████████████████████████████████▍                               | 329/720 [00:44<00:52,  7.46it/
s]
1/1 [==============================] - 0s 56ms/step
 46%|████████████████████████████████▍                               | 330/720 [00:44<00:51,  7.55it/
s]
1/1 [==============================] - 0s 52ms/step
 46%|████████████████████████████████▌                               | 331/720 [00:44<00:50,  7.63it/
s]
1/1 [==============================] - 0s 63ms/step
 46%|████████████████████████████████▌                               | 332/720 [00:44<00:53,  7.27it/
s]
1/1 [==============================] - 0s 57ms/step
 46%|████████████████████████████████▋                               | 333/720 [00:44<00:52,  7.37it/
s]
1/1 [==============================] - 0s 60ms/step
 46%|████████████████████████████████▋                               | 334/720 [00:45<00:52,  7.34it/
s]
1/1 [==============================] - 0s 68ms/step
 47%|████████████████████████████████▊                               | 335/720 [00:45<00:53,  7.13it/
s]
1/1 [==============================] - 0s 50ms/step
 47%|████████████████████████████████▊                               | 336/720 [00:45<00:51,  7.39it/
s]
1/1 [==============================] - 0s 49ms/step
```

```
 47%|████████████████████████████████▉                                | 337/720 [00:45<00:51,  7.46it/
s]
1/1 [==============================] - 0s 55ms/step
 47%|█████████████████████████████████                                | 338/720 [00:45<00:50,  7.49it/
s]
1/1 [==============================] - 0s 56ms/step
 47%|█████████████████████████████████▏                               | 339/720 [00:45<00:50,  7.57it/
s]
1/1 [==============================] - 0s 59ms/step
 47%|█████████████████████████████████▎                               | 340/720 [00:45<00:50,  7.51it/
s]
1/1 [==============================] - 0s 63ms/step
 47%|█████████████████████████████████▍                               | 341/720 [00:46<00:52,  7.27it/
s]
1/1 [==============================] - 0s 53ms/step
 48%|█████████████████████████████████▌                               | 342/720 [00:46<00:51,  7.30it/
s]
1/1 [==============================] - 0s 52ms/step
 48%|█████████████████████████████████▋                               | 343/720 [00:46<00:52,  7.18it/
s]
1/1 [==============================] - 0s 59ms/step
 48%|█████████████████████████████████▊                               | 344/720 [00:46<00:51,  7.24it/
s]
1/1 [==============================] - 0s 56ms/step
 48%|█████████████████████████████████▉                               | 345/720 [00:46<00:51,  7.28it/
s]
1/1 [==============================] - 0s 61ms/step
 48%|██████████████████████████████████                               | 346/720 [00:46<00:52,  7.18it/
s]
1/1 [==============================] - 0s 59ms/step
 48%|██████████████████████████████████▏                              | 347/720 [00:46<00:52,  7.11it/
s]
1/1 [==============================] - 0s 57ms/step
 48%|██████████████████████████████████▎                              | 348/720 [00:47<00:53,  6.94it/
s]
1/1 [==============================] - 0s 59ms/step
 48%|██████████████████████████████████▍                              | 349/720 [00:47<00:53,  6.94it/
s]
```

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1/1 [==============================] - 0s 55ms/step
 49%|████████████████████████████████████▍                                  | 350/720 [00:47<00:53,  6.96it/
s]
1/1 [==============================] - 0s 60ms/step
 49%|████████████████████████████████████                                   | 351/720 [00:47<00:53,  6.90it/
s]
1/1 [==============================] - 0s 60ms/step
 49%|████████████████████████████████████                                   | 352/720 [00:47<00:53,  6.89it/
s]
1/1 [==============================] - 0s 52ms/step
 49%|████████████████████████████████████▏                                  | 353/720 [00:47<00:50,  7.21it/
s]
1/1 [==============================] - 0s 57ms/step
 49%|████████████████████████████████████▏                                  | 354/720 [00:47<00:50,  7.20it/
s]
1/1 [==============================] - 0s 53ms/step
 49%|████████████████████████████████████▎                                  | 355/720 [00:48<00:49,  7.32it/
s]
1/1 [==============================] - 0s 60ms/step
 49%|████████████████████████████████████▍                                  | 356/720 [00:48<00:49,  7.29it/
s]
1/1 [==============================] - 0s 61ms/step
 50%|████████████████████████████████████▍                                  | 357/720 [00:48<00:50,  7.24it/
s]
1/1 [==============================] - 0s 49ms/step
 50%|████████████████████████████████████▌                                  | 358/720 [00:48<00:47,  7.58it/
s]
1/1 [==============================] - 0s 48ms/step
 50%|████████████████████████████████████▌                                  | 359/720 [00:48<00:46,  7.76it/
s]
1/1 [==============================] - 0s 101ms/step
 50%|████████████████████████████████████▋                                  | 360/720 [00:48<00:53,  6.69it/
s]
1/1 [==============================] - 0s 62ms/step
 50%|████████████████████████████████████▋                                  | 361/720 [00:48<00:53,  6.69it/
s]
1/1 [==============================] - 0s 64ms/step
```

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 50%|████████████████████████████████████▌                                  | 362/720 [00:49<00:52,  6.76it/
s]
1/1 [==============================] - 0s 53ms/step
 50%|████████████████████████████████████▋                                  | 363/720 [00:49<00:51,  6.94it/
s]
1/1 [==============================] - 0s 57ms/step
 51%|████████████████████████████████████▊                                  | 364/720 [00:49<00:50,  7.06it/
s]
1/1 [==============================] - 0s 50ms/step
 51%|████████████████████████████████████▉                                  | 365/720 [00:49<00:48,  7.27it/
s]
1/1 [==============================] - 0s 48ms/step
 51%|█████████████████████████████████████                                  | 366/720 [00:49<00:46,  7.60it/
s]
1/1 [==============================] - 0s 52ms/step
 51%|█████████████████████████████████████▏                                 | 367/720 [00:49<00:45,  7.71it/
s]
1/1 [==============================] - 0s 48ms/step
 51%|█████████████████████████████████████▎                                 | 368/720 [00:49<00:44,  7.95it/
s]
1/1 [==============================] - 0s 52ms/step
 51%|█████████████████████████████████████▍                                 | 369/720 [00:49<00:45,  7.78it/
s]
1/1 [==============================] - 0s 51ms/step
 51%|█████████████████████████████████████▍                                 | 370/720 [00:50<00:45,  7.78it/
s]
1/1 [==============================] - 0s 55ms/step
 52%|█████████████████████████████████████▌                                 | 371/720 [00:50<00:47,  7.43it/
s]
1/1 [==============================] - 0s 53ms/step
 52%|█████████████████████████████████████▋                                 | 372/720 [00:50<00:47,  7.27it/
s]
1/1 [==============================] - 0s 57ms/step
 52%|█████████████████████████████████████▊                                 | 373/720 [00:50<00:47,  7.36it/
s]
1/1 [==============================] - 0s 55ms/step
 52%|█████████████████████████████████████▉                                 | 374/720 [00:50<00:46,  7.42it/
s]
```

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1/1 [==============================] - 0s 53ms/step
 52%|████████████████████████████████████▌                                  | 375/720 [00:50<00:46,  7.47it/
s]
1/1 [==============================] - 0s 53ms/step
 52%|████████████████████████████████████▋                                  | 376/720 [00:50<00:46,  7.45it/
s]
1/1 [==============================] - 0s 59ms/step
 52%|████████████████████████████████████▊                                  | 377/720 [00:51<00:46,  7.43it/
s]
1/1 [==============================] - 0s 59ms/step
 52%|████████████████████████████████████▉                                  | 378/720 [00:51<00:46,  7.32it/
s]
1/1 [==============================] - 0s 58ms/step
 53%|█████████████████████████████████████                                  | 379/720 [00:51<00:46,  7.31it/
s]
1/1 [==============================] - 0s 56ms/step
 53%|█████████████████████████████████████▏                                 | 380/720 [00:51<00:45,  7.41it/
s]
1/1 [==============================] - 0s 45ms/step
 53%|█████████████████████████████████████▎                                 | 381/720 [00:51<00:44,  7.64it/
s]
1/1 [==============================] - 0s 53ms/step
 53%|█████████████████████████████████████▍                                 | 382/720 [00:51<00:44,  7.65it/
s]
1/1 [==============================] - 0s 49ms/step
 53%|█████████████████████████████████████▌                                 | 383/720 [00:51<00:44,  7.65it/
s]
1/1 [==============================] - 0s 56ms/step
 53%|█████████████████████████████████████▋                                 | 384/720 [00:51<00:43,  7.65it/
s]
1/1 [==============================] - 0s 58ms/step
 53%|█████████████████████████████████████▊                                 | 385/720 [00:52<00:43,  7.63it/
s]
1/1 [==============================] - 0s 57ms/step
 54%|█████████████████████████████████████▉                                 | 386/720 [00:52<00:43,  7.63it/
s]
1/1 [==============================] - 0s 60ms/step
```

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 54%|████████████████████████████████████████                                | 387/720 [00:52<00:44,  7.51it/
s]
1/1 [==============================] - 0s 44ms/step
 54%|████████████████████████████████████████                                | 388/720 [00:52<00:43,  7.71it/
s]
1/1 [==============================] - 0s 45ms/step
 54%|████████████████████████████████████████                                | 389/720 [00:52<00:42,  7.87it/
s]
1/1 [==============================] - 0s 60ms/step
 54%|████████████████████████████████████████                                | 390/720 [00:52<00:42,  7.84it/
s]
1/1 [==============================] - 0s 53ms/step
 54%|████████████████████████████████████████                                | 391/720 [00:52<00:42,  7.72it/
s]
1/1 [==============================] - 0s 56ms/step
 54%|████████████████████████████████████████                                | 392/720 [00:52<00:43,  7.63it/
s]
1/1 [==============================] - 0s 62ms/step
 55%|████████████████████████████████████████                                | 393/720 [00:53<00:43,  7.46it/
s]
1/1 [==============================] - 0s 64ms/step
 55%|████████████████████████████████████████                                | 394/720 [00:53<00:44,  7.38it/
s]
1/1 [==============================] - 0s 51ms/step
 55%|████████████████████████████████████████                                | 395/720 [00:53<00:47,  6.91it/
s]
1/1 [==============================] - 0s 57ms/step
 55%|████████████████████████████████████████                                | 396/720 [00:53<00:46,  6.90it/
s]
1/1 [==============================] - 0s 57ms/step
 55%|████████████████████████████████████████                                | 397/720 [00:53<00:45,  7.09it/
s]
1/1 [==============================] - 0s 48ms/step
 55%|████████████████████████████████████████                                | 398/720 [00:53<00:43,  7.40it/
s]
1/1 [==============================] - 0s 66ms/step
 55%|████████████████████████████████████████                                | 399/720 [00:54<00:49,  6.51it/
s]
```

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1/1 [==============================] - 0s 57ms/step
 56%|████████████████████████████████████████▌                                | 400/720 [00:54<00:47,  6.77it/
s]
1/1 [==============================] - 0s 58ms/step
 56%|████████████████████████████████████████▋                                | 401/720 [00:54<00:46,  6.88it/
s]
1/1 [==============================] - 0s 53ms/step
 56%|████████████████████████████████████████▊                                | 402/720 [00:54<00:45,  6.98it/
s]
1/1 [==============================] - 0s 53ms/step
 56%|████████████████████████████████████████▉                                | 403/720 [00:54<00:45,  7.03it/
s]
1/1 [==============================] - 0s 62ms/step
 56%|█████████████████████████████████████████                                | 404/720 [00:54<00:45,  7.01it/
s]
1/1 [==============================] - 0s 63ms/step
 56%|█████████████████████████████████████████                                | 405/720 [00:54<00:45,  6.96it/
s]
1/1 [==============================] - 0s 70ms/step
 56%|█████████████████████████████████████████                                | 406/720 [00:55<00:48,  6.53it/
s]
1/1 [==============================] - 0s 55ms/step
 57%|█████████████████████████████████████████▏                               | 407/720 [00:55<00:46,  6.68it/
s]
1/1 [==============================] - 0s 54ms/step
 57%|█████████████████████████████████████████▎                               | 408/720 [00:55<00:44,  7.01it/
s]
1/1 [==============================] - 0s 51ms/step
 57%|█████████████████████████████████████████▍                               | 409/720 [00:55<00:43,  7.18it/
s]
1/1 [==============================] - 0s 62ms/step
 57%|█████████████████████████████████████████▍                               | 410/720 [00:55<00:42,  7.23it/
s]
1/1 [==============================] - 0s 61ms/step
 57%|█████████████████████████████████████████▌                               | 411/720 [00:55<00:42,  7.25it/
s]
1/1 [==============================] - 0s 55ms/step
```

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 57%|████████████████████████████████████▊                                 | 412/720 [00:55<00:41,  7.39it/
s]
1/1 [==============================] - 0s 62ms/step
 57%|████████████████████████████████████▉                                 | 413/720 [00:56<00:44,  6.84it/
s]
1/1 [==============================] - 0s 61ms/step
 57%|████████████████████████████████████▉                                 | 414/720 [00:56<00:44,  6.91it/
s]
1/1 [==============================] - 0s 51ms/step
 58%|█████████████████████████████████████                                 | 415/720 [00:56<00:42,  7.17it/
s]
1/1 [==============================] - 0s 49ms/step
 58%|█████████████████████████████████████                                 | 416/720 [00:56<00:40,  7.48it/
s]
1/1 [==============================] - 0s 55ms/step
 58%|█████████████████████████████████████▏                                | 417/720 [00:56<00:40,  7.56it/
s]
1/1 [==============================] - 0s 58ms/step
 58%|█████████████████████████████████████▏                                | 418/720 [00:56<00:42,  7.11it/
s]
1/1 [==============================] - 0s 67ms/step
 58%|█████████████████████████████████████▎                                | 419/720 [00:56<00:43,  6.93it/
s]
1/1 [==============================] - 0s 76ms/step
 58%|█████████████████████████████████████▎                                | 420/720 [00:57<00:45,  6.67it/
s]
1/1 [==============================] - 0s 53ms/step
 58%|█████████████████████████████████████▍                                | 421/720 [00:57<00:43,  6.82it/
s]
1/1 [==============================] - 0s 59ms/step
 59%|█████████████████████████████████████▍                                | 422/720 [00:57<00:42,  6.98it/
s]
1/1 [==============================] - 0s 61ms/step
 59%|█████████████████████████████████████▌                                | 423/720 [00:57<00:42,  7.00it/
s]
1/1 [==============================] - 0s 62ms/step
 59%|█████████████████████████████████████▌                                | 424/720 [00:57<00:41,  7.10it/
s]
```

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1/1 [==============================] - 0s 65ms/step
 59%|████████████████████████████████████████████▌                                | 425/720 [00:57<00:42,  6.92it/
s]
1/1 [==============================] - 0s 62ms/step
 59%|████████████████████████████████████████████▋                                | 426/720 [00:57<00:42,  6.88it/
s]
1/1 [==============================] - 0s 50ms/step
 59%|████████████████████████████████████████████▊                                | 427/720 [00:58<00:41,  7.06it/
s]
1/1 [==============================] - 0s 67ms/step
 59%|████████████████████████████████████████████▉                               | 428/720 [00:58<00:42,  6.91it/
s]
1/1 [==============================] - 0s 65ms/step
 60%|█████████████████████████████████████████████                                | 429/720 [00:58<00:43,  6.63it/
s]
1/1 [==============================] - 0s 57ms/step
 60%|█████████████████████████████████████████████▏                               | 430/720 [00:58<00:42,  6.87it/
s]
1/1 [==============================] - 0s 60ms/step
 60%|█████████████████████████████████████████████▎                               | 431/720 [00:58<00:41,  7.00it/
s]
1/1 [==============================] - 0s 49ms/step
 60%|█████████████████████████████████████████████▍                              | 432/720 [00:58<00:39,  7.35it/
s]
1/1 [==============================] - 0s 54ms/step
 60%|█████████████████████████████████████████████▌                              | 433/720 [00:58<00:38,  7.47it/
s]
1/1 [==============================] - 0s 54ms/step
 60%|█████████████████████████████████████████████▋                               | 434/720 [00:58<00:37,  7.57it/
s]
1/1 [==============================] - 0s 57ms/step
 60%|█████████████████████████████████████████████▊                               | 435/720 [00:59<00:37,  7.58it/
s]
1/1 [==============================] - 0s 62ms/step
 61%|█████████████████████████████████████████████▉                               | 436/720 [00:59<00:38,  7.43it/
s]
1/1 [==============================] - 0s 55ms/step
```

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 61%|████████████████████████████████████████████████                | 437/720 [00:59<00:38,  7.41it/
s]
1/1 [==============================] - 0s 61ms/step
 61%|████████████████████████████████████████████████▏               | 438/720 [00:59<00:38,  7.36it/
s]
1/1 [==============================] - 0s 61ms/step
 61%|████████████████████████████████████████████████▏               | 439/720 [00:59<00:38,  7.31it/
s]
1/1 [==============================] - 0s 79ms/step
 61%|████████████████████████████████████████████████▎               | 440/720 [00:59<00:40,  6.93it/
s]
1/1 [==============================] - 0s 50ms/step
 61%|████████████████████████████████████████████████                | 441/720 [00:59<00:40,  6.90it/
s]
1/1 [==============================] - 0s 59ms/step
 61%|████████████████████████████████████████████████                | 442/720 [01:00<00:39,  7.08it/
s]
1/1 [==============================] - 0s 54ms/step
 62%|████████████████████████████████████████████████▏               | 443/720 [01:00<00:38,  7.16it/
s]
1/1 [==============================] - 0s 57ms/step
 62%|████████████████████████████████████████████████▏               | 444/720 [01:00<00:38,  7.23it/
s]
1/1 [==============================] - 0s 47ms/step
 62%|████████████████████████████████████████████████▎               | 445/720 [01:00<00:36,  7.56it/
s]
1/1 [==============================] - 0s 55ms/step
 62%|████████████████████████████████████████████████▏               | 446/720 [01:00<00:35,  7.63it/
s]
1/1 [==============================] - 0s 53ms/step
 62%|████████████████████████████████████████████████▎               | 447/720 [01:00<00:37,  7.30it/
s]
1/1 [==============================] - 0s 50ms/step
 62%|████████████████████████████████████████████████▎               | 448/720 [01:00<00:36,  7.42it/
s]
1/1 [==============================] - 0s 58ms/step
 62%|████████████████████████████████████████████████▍               | 449/720 [01:01<00:39,  6.85it/
s]
```

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1/1 [==============================] - 0s 60ms/step
 62%|████████████████████████████████████████████████████                                | 450/720 [01:01<00:38,  6.97it/
s]
1/1 [==============================] - 0s 59ms/step
 63%|████████████████████████████████████████████████████                                | 451/720 [01:01<00:37,  7.12it/
s]
1/1 [==============================] - 0s 62ms/step
 63%|████████████████████████████████████████████████████▏                               | 452/720 [01:01<00:38,  6.91it/
s]
1/1 [==============================] - 0s 54ms/step
 63%|████████████████████████████████████████████████████▏                               | 453/720 [01:01<00:37,  7.05it/
s]
1/1 [==============================] - 0s 67ms/step
 63%|████████████████████████████████████████████████████▎                               | 454/720 [01:01<00:37,  7.02it/
s]
1/1 [==============================] - 0s 56ms/step
 63%|████████████████████████████████████████████████████                                | 455/720 [01:01<00:37,  7.16it/
s]
1/1 [==============================] - 0s 58ms/step
 63%|████████████████████████████████████████████████████▍                               | 456/720 [01:02<00:36,  7.17it/
s]
1/1 [==============================] - 0s 62ms/step
 63%|████████████████████████████████████████████████████▍                               | 457/720 [01:02<00:36,  7.16it/
s]
1/1 [==============================] - 0s 57ms/step
 64%|████████████████████████████████████████████████████▌                               | 458/720 [01:02<00:36,  7.17it/
s]
1/1 [==============================] - 0s 67ms/step
 64%|████████████████████████████████████████████████████                                | 459/720 [01:02<00:36,  7.12it/
s]
1/1 [==============================] - 0s 59ms/step
 64%|████████████████████████████████████████████████████                                | 460/720 [01:02<00:37,  6.97it/
s]
1/1 [==============================] - 0s 62ms/step
 64%|████████████████████████████████████████████████████▏                               | 461/720 [01:02<00:36,  7.01it/
s]
1/1 [==============================] - 0s 54ms/step
```

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 64%|████████████████████████████████████████████████▋                | 462/720 [01:02<00:35,  7.22it/
s]
1/1 [==============================] - 0s 61ms/step
 64%|████████████████████████████████████████████████▊                | 463/720 [01:03<00:35,  7.23it/
s]
1/1 [==============================] - 0s 60ms/step
 64%|████████████████████████████████████████████████▊                | 464/720 [01:03<00:36,  7.10it/
s]
1/1 [==============================] - 0s 75ms/step
 65%|████████████████████████████████████████████████▉                | 465/720 [01:03<00:39,  6.45it/
s]
1/1 [==============================] - 0s 79ms/step
 65%|████████████████████████████████████████████████▉                | 466/720 [01:03<00:41,  6.11it/
s]
1/1 [==============================] - 0s 58ms/step
 65%|█████████████████████████████████████████████████                | 467/720 [01:03<00:39,  6.34it/
s]
1/1 [==============================] - 0s 56ms/step
 65%|█████████████████████████████████████████████████                | 468/720 [01:03<00:38,  6.55it/
s]
1/1 [==============================] - 0s 56ms/step
 65%|█████████████████████████████████████████████████                | 469/720 [01:03<00:36,  6.78it/
s]
1/1 [==============================] - 0s 55ms/step
 65%|█████████████████████████████████████████████████▏               | 470/720 [01:04<00:35,  6.95it/
s]
1/1 [==============================] - 0s 54ms/step
 65%|█████████████████████████████████████████████████▏               | 471/720 [01:04<00:35,  7.09it/
s]
1/1 [==============================] - 0s 58ms/step
 66%|█████████████████████████████████████████████████▏               | 472/720 [01:04<00:34,  7.16it/
s]
1/1 [==============================] - 0s 60ms/step
 66%|█████████████████████████████████████████████████▎               | 473/720 [01:04<00:34,  7.10it/
s]
1/1 [==============================] - 0s 53ms/step
 66%|█████████████████████████████████████████████████▎               | 474/720 [01:04<00:33,  7.31it/
s]
```

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1/1 [==============================] - 0s 63ms/step
 66%|████████████████████████████████████████████████▊                | 475/720 [01:04<00:34,  7.10it/
s]
1/1 [==============================] - 0s 64ms/step
 66%|████████████████████████████████████████████████▊                | 476/720 [01:04<00:34,  7.02it/
s]
1/1 [==============================] - 0s 59ms/step
 66%|████████████████████████████████████████████████▉                | 477/720 [01:05<00:34,  7.06it/
s]
1/1 [==============================] - 0s 59ms/step
 66%|████████████████████████████████████████████████▉                | 478/720 [01:05<00:34,  7.09it/
s]
1/1 [==============================] - 0s 67ms/step
 67%|█████████████████████████████████████████████████                | 479/720 [01:05<00:34,  6.98it/
s]
1/1 [==============================] - 0s 61ms/step
 67%|█████████████████████████████████████████████████                | 480/720 [01:05<00:34,  6.92it/
s]
1/1 [==============================] - 0s 63ms/step
 67%|█████████████████████████████████████████████████▏               | 481/720 [01:05<00:34,  6.93it/
s]
1/1 [==============================] - 0s 53ms/step
 67%|█████████████████████████████████████████████████▏               | 482/720 [01:05<00:33,  7.10it/
s]
1/1 [==============================] - 0s 56ms/step
 67%|█████████████████████████████████████████████████▏               | 483/720 [01:05<00:33,  7.11it/
s]
1/1 [==============================] - 0s 49ms/step
 67%|█████████████████████████████████████████████████▎               | 484/720 [01:06<00:32,  7.24it/
s]
1/1 [==============================] - 0s 61ms/step
 67%|█████████████████████████████████████████████████▎               | 485/720 [01:06<00:33,  6.96it/
s]
1/1 [==============================] - 0s 65ms/step
 68%|█████████████████████████████████████████████████▍               | 486/720 [01:06<00:33,  6.93it/
s]
1/1 [==============================] - 0s 62ms/step
```

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 68%|████████████████████████████████████████████████████                | 487/720 [01:06<00:34,  6.84it/
s]
1/1 [==============================] - 0s 62ms/step
 68%|████████████████████████████████████████████████████                | 488/720 [01:06<00:33,  6.86it/
s]
1/1 [==============================] - 0s 66ms/step
 68%|████████████████████████████████████████████████████                | 489/720 [01:06<00:34,  6.77it/
s]
1/1 [==============================] - 0s 63ms/step
 68%|████████████████████████████████████████████████████                | 490/720 [01:06<00:34,  6.71it/
s]
1/1 [==============================] - 0s 53ms/step
 68%|████████████████████████████████████████████████████                | 491/720 [01:07<00:33,  6.93it/
s]
1/1 [==============================] - 0s 67ms/step
 68%|████████████████████████████████████████████████████                | 492/720 [01:07<00:33,  6.83it/
s]
1/1 [==============================] - 0s 54ms/step
 68%|████████████████████████████████████████████████████                | 493/720 [01:07<00:34,  6.61it/
s]
1/1 [==============================] - 0s 59ms/step
 69%|████████████████████████████████████████████████████                | 494/720 [01:07<00:33,  6.76it/
s]
1/1 [==============================] - 0s 54ms/step
 69%|████████████████████████████████████████████████████                | 495/720 [01:07<00:32,  7.02it/
s]
1/1 [==============================] - 0s 57ms/step
 69%|████████████████████████████████████████████████████                | 496/720 [01:07<00:31,  7.18it/
s]
1/1 [==============================] - 0s 56ms/step
 69%|████████████████████████████████████████████████████                | 497/720 [01:07<00:30,  7.31it/
s]
1/1 [==============================] - 0s 61ms/step
 69%|████████████████████████████████████████████████████                | 498/720 [01:08<00:31,  7.08it/
s]
1/1 [==============================] - 0s 67ms/step
 69%|████████████████████████████████████████████████████                | 499/720 [01:08<00:32,  6.90it/
s]
```

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1/1 [==============================] - 0s 72ms/step
 69%|██████████████████████████████████████████████████████                | 500/720 [01:08<00:33,  6.64it/
s]
1/1 [==============================] - 0s 54ms/step
 70%|██████████████████████████████████████████████████████▏               | 501/720 [01:08<00:31,  6.89it/
s]
1/1 [==============================] - 0s 56ms/step
 70%|██████████████████████████████████████████████████████▏               | 502/720 [01:08<00:30,  7.10it/
s]
1/1 [==============================] - 0s 62ms/step
 70%|██████████████████████████████████████████████████████▎               | 503/720 [01:08<00:30,  7.02it/
s]
1/1 [==============================] - 0s 59ms/step
 70%|██████████████████████████████████████████████████████                | 504/720 [01:08<00:30,  7.03it/
s]
1/1 [==============================] - 0s 52ms/step
 70%|██████████████████████████████████████████████████████                | 505/720 [01:09<00:29,  7.33it/
s]
1/1 [==============================] - 0s 58ms/step
 70%|██████████████████████████████████████████████████████▏               | 506/720 [01:09<00:28,  7.43it/
s]
1/1 [==============================] - 0s 58ms/step
 70%|██████████████████████████████████████████████████████▏               | 507/720 [01:09<00:28,  7.42it/
s]
1/1 [==============================] - 0s 61ms/step
 71%|██████████████████████████████████████████████████████▏               | 508/720 [01:09<00:29,  7.28it/
s]
1/1 [==============================] - 0s 58ms/step
 71%|██████████████████████████████████████████████████████▎               | 509/720 [01:09<00:29,  7.15it/
s]
1/1 [==============================] - 0s 62ms/step
 71%|██████████████████████████████████████████████████████▎               | 510/720 [01:09<00:30,  6.83it/
s]
1/1 [==============================] - 0s 61ms/step
 71%|██████████████████████████████████████████████████████▍               | 511/720 [01:09<00:33,  6.26it/
s]
1/1 [==============================] - 0s 60ms/step
```

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 71%|███████████████████████████████████████████████▊                | 512/720 [01:10<00:32,  6.46it/
s]
1/1 [==============================] - 0s 65ms/step
 71%|███████████████████████████████████████████████▉                | 513/720 [01:10<00:31,  6.62it/
s]
1/1 [==============================] - 0s 60ms/step
 71%|███████████████████████████████████████████████▉                | 514/720 [01:10<00:30,  6.75it/
s]
1/1 [==============================] - 0s 56ms/step
 72%|████████████████████████████████████████████████                | 515/720 [01:10<00:29,  7.01it/
s]
1/1 [==============================] - 0s 50ms/step
 72%|████████████████████████████████████████████████                | 516/720 [01:10<00:27,  7.42it/
s]
1/1 [==============================] - 0s 47ms/step
 72%|████████████████████████████████████████████████▏               | 517/720 [01:10<00:26,  7.79it/
s]
1/1 [==============================] - 0s 56ms/step
 72%|████████████████████████████████████████████████▏               | 518/720 [01:10<00:26,  7.73it/
s]
1/1 [==============================] - 0s 56ms/step
 72%|████████████████████████████████████████████████▎               | 519/720 [01:11<00:27,  7.31it/
s]
1/1 [==============================] - 0s 59ms/step
 72%|████████████████████████████████████████████████▎               | 520/720 [01:11<00:27,  7.19it/
s]
1/1 [==============================] - 0s 51ms/step
 72%|████████████████████████████████████████████████▍               | 521/720 [01:11<00:27,  7.24it/
s]
1/1 [==============================] - 0s 59ms/step
 72%|████████████████████████████████████████████████▍               | 522/720 [01:11<00:27,  7.16it/
s]
1/1 [==============================] - 0s 53ms/step
 73%|████████████████████████████████████████████████▌               | 523/720 [01:11<00:26,  7.52it/
s]
1/1 [==============================] - 0s 56ms/step
 73%|████████████████████████████████████████████████▌               | 524/720 [01:11<00:25,  7.55it/
s]
```

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1/1 [==============================] - 0s 56ms/step
 73%|███████████████████████████████████████████████████████▌                | 525/720 [01:11<00:25,  7.59it/
s]
1/1 [==============================] - 0s 82ms/step
 73%|███████████████████████████████████████████████████████▋                | 526/720 [01:12<00:27,  7.04it/
s]
1/1 [==============================] - 0s 55ms/step
 73%|███████████████████████████████████████████████████████▊                | 527/720 [01:12<00:26,  7.37it/
s]
1/1 [==============================] - 0s 51ms/step
 73%|███████████████████████████████████████████████████████▉                | 528/720 [01:12<00:25,  7.61it/
s]
1/1 [==============================] - 0s 57ms/step
 73%|████████████████████████████████████████████████████████                | 529/720 [01:12<00:25,  7.61it/
s]
1/1 [==============================] - 0s 58ms/step
 74%|████████████████████████████████████████████████████████▏               | 530/720 [01:12<00:25,  7.55it/
s]
1/1 [==============================] - 0s 55ms/step
 74%|████████████████████████████████████████████████████████▎               | 531/720 [01:12<00:24,  7.66it/
s]
1/1 [==============================] - 0s 57ms/step
 74%|████████████████████████████████████████████████████████▍               | 532/720 [01:12<00:24,  7.65it/
s]
1/1 [==============================] - 0s 53ms/step
 74%|████████████████████████████████████████████████████████▌               | 533/720 [01:12<00:24,  7.60it/
s]
1/1 [==============================] - 0s 54ms/step
 74%|████████████████████████████████████████████████████████▋               | 534/720 [01:13<00:24,  7.63it/
s]
1/1 [==============================] - 0s 59ms/step
 74%|████████████████████████████████████████████████████████▊               | 535/720 [01:13<00:24,  7.44it/
s]
1/1 [==============================] - 0s 46ms/step
 74%|████████████████████████████████████████████████████████▉               | 536/720 [01:13<00:23,  7.72it/
s]
1/1 [==============================] - 0s 55ms/step
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 75%|███████████████████████████████████████████████████████▉                 | 537/720 [01:13<00:23,  7.88it/
s]
1/1 [==============================] - 0s 57ms/step
 75%|███████████████████████████████████████████████████████▉                 | 538/720 [01:13<00:23,  7.76it/
s]
1/1 [==============================] - 0s 49ms/step
 75%|███████████████████████████████████████████████████████▉                 | 539/720 [01:13<00:22,  7.97it/
s]
1/1 [==============================] - 0s 56ms/step
 75%|████████████████████████████████████████████████████████                 | 540/720 [01:13<00:23,  7.76it/
s]
1/1 [==============================] - 0s 57ms/step
 75%|████████████████████████████████████████████████████████                 | 541/720 [01:13<00:23,  7.56it/
s]
1/1 [==============================] - 0s 100ms/step
 75%|████████████████████████████████████████████████████████▏                | 542/720 [01:14<00:28,  6.27it/
s]
1/1 [==============================] - 0s 54ms/step
 75%|████████████████████████████████████████████████████████▏                | 543/720 [01:14<00:26,  6.64it/
s]
1/1 [==============================] - 0s 52ms/step
 76%|████████████████████████████████████████████████████████▏                | 544/720 [01:14<00:27,  6.49it/
s]
1/1 [==============================] - 0s 56ms/step
 76%|████████████████████████████████████████████████████████▎                | 545/720 [01:14<00:25,  6.85it/
s]
1/1 [==============================] - 0s 54ms/step
 76%|████████████████████████████████████████████████████████▎                | 546/720 [01:14<00:24,  7.21it/
s]
1/1 [==============================] - 0s 56ms/step
 76%|████████████████████████████████████████████████████████▍                | 547/720 [01:14<00:23,  7.38it/
s]
1/1 [==============================] - 0s 56ms/step
 76%|████████████████████████████████████████████████████████▍                | 548/720 [01:14<00:22,  7.59it/
s]
1/1 [==============================] - 0s 55ms/step
 76%|████████████████████████████████████████████████████████▌                | 549/720 [01:15<00:22,  7.73it/
s]
```

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1/1 [==============================] - 0s 52ms/step
 76%|████████████████████████████████████████████████████████████▌                 | 550/720 [01:15<00:21,  7.90it/
s]
1/1 [==============================] - 0s 54ms/step
 77%|████████████████████████████████████████████████████████████▋                 | 551/720 [01:15<00:21,  7.90it/
s]
1/1 [==============================] - 0s 61ms/step
 77%|████████████████████████████████████████████████████████████▋                 | 552/720 [01:15<00:22,  7.44it/
s]
1/1 [==============================] - 0s 60ms/step
 77%|████████████████████████████████████████████████████████████▊                 | 553/720 [01:15<00:22,  7.41it/
s]
1/1 [==============================] - 0s 61ms/step
 77%|████████████████████████████████████████████████████████████▌                 | 554/720 [01:15<00:22,  7.28it/
s]
1/1 [==============================] - 0s 61ms/step
 77%|████████████████████████████████████████████████████████████▊                 | 555/720 [01:15<00:23,  7.13it/
s]
1/1 [==============================] - 0s 61ms/step
 77%|████████████████████████████████████████████████████████████▊                 | 556/720 [01:16<00:23,  7.05it/
s]
1/1 [==============================] - 0s 63ms/step
 77%|████████████████████████████████████████████████████████████▉                 | 557/720 [01:16<00:23,  7.00it/
s]
1/1 [==============================] - 0s 64ms/step
 78%|█████████████████████████████████████████████████████████████▏                | 558/720 [01:16<00:23,  6.89it/
s]
1/1 [==============================] - 0s 56ms/step
 78%|█████████████████████████████████████████████████████████████▏                | 559/720 [01:16<00:22,  7.19it/
s]
1/1 [==============================] - 0s 48ms/step
 78%|█████████████████████████████████████████████████████████████▎                | 560/720 [01:16<00:21,  7.50it/
s]
1/1 [==============================] - 0s 56ms/step
 78%|█████████████████████████████████████████████████████████████▎                | 561/720 [01:16<00:21,  7.55it/
s]
1/1 [==============================] - 0s 59ms/step
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 78%|████████████████████████████████████████████████████▉                | 562/720 [01:16<00:21,  7.45it/
s]
1/1 [==============================] - 0s 60ms/step
 78%|████████████████████████████████████████████████████▉                | 563/720 [01:17<00:22,  6.94it/
s]
1/1 [==============================] - 0s 55ms/step
 78%|█████████████████████████████████████████████████████                | 564/720 [01:17<00:22,  7.04it/
s]
1/1 [==============================] - 0s 62ms/step
 78%|█████████████████████████████████████████████████████▏               | 565/720 [01:17<00:21,  7.06it/
s]
1/1 [==============================] - 0s 64ms/step
 79%|█████████████████████████████████████████████████████▏               | 566/720 [01:17<00:21,  7.03it/
s]
1/1 [==============================] - 0s 63ms/step
 79%|█████████████████████████████████████████████████████▎               | 567/720 [01:17<00:22,  6.83it/
s]
1/1 [==============================] - 0s 54ms/step
 79%|█████████████████████████████████████████████████████▎               | 568/720 [01:17<00:21,  7.05it/
s]
1/1 [==============================] - 0s 54ms/step
 79%|█████████████████████████████████████████████████████▍               | 569/720 [01:17<00:20,  7.22it/
s]
1/1 [==============================] - 0s 62ms/step
 79%|█████████████████████████████████████████████████████▍               | 570/720 [01:18<00:20,  7.17it/
s]
1/1 [==============================] - 0s 60ms/step
 79%|█████████████████████████████████████████████████████▌               | 571/720 [01:18<00:20,  7.14it/
s]
1/1 [==============================] - 0s 58ms/step
 79%|█████████████████████████████████████████████████████▌               | 572/720 [01:18<00:20,  7.05it/
s]
1/1 [==============================] - 0s 62ms/step
 80%|█████████████████████████████████████████████████████▋               | 573/720 [01:18<00:20,  7.05it/
s]
1/1 [==============================] - 0s 60ms/step
 80%|█████████████████████████████████████████████████████▋               | 574/720 [01:18<00:20,  7.03it/
s]
```

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1/1 [==============================] - 0s 56ms/step
 80%|████████████████████████████████████████████████████████████▊              | 575/720 [01:18<00:20,  7.17it/
s]
1/1 [==============================] - 0s 63ms/step
 80%|████████████████████████████████████████████████████████████               | 576/720 [01:18<00:20,  6.95it/
s]
1/1 [==============================] - 0s 54ms/step
 80%|████████████████████████████████████████████████████████████               | 577/720 [01:19<00:20,  7.09it/
s]
1/1 [==============================] - 0s 53ms/step
 80%|████████████████████████████████████████████████████████████▏              | 578/720 [01:19<00:19,  7.29it/
s]
1/1 [==============================] - 0s 61ms/step
 80%|████████████████████████████████████████████████████████████▎              | 579/720 [01:19<00:19,  7.13it/
s]
1/1 [==============================] - 0s 61ms/step
 81%|████████████████████████████████████████████████████████████▍              | 580/720 [01:19<00:19,  7.15it/
s]
1/1 [==============================] - 0s 60ms/step
 81%|████████████████████████████████████████████████████████████▌              | 581/720 [01:19<00:18,  7.38it/
s]
1/1 [==============================] - 0s 54ms/step
 81%|████████████████████████████████████████████████████████████▋              | 582/720 [01:19<00:18,  7.58it/
s]
1/1 [==============================] - 0s 53ms/step
 81%|████████████████████████████████████████████████████████████▊              | 583/720 [01:19<00:17,  7.79it/
s]
1/1 [==============================] - 0s 58ms/step
 81%|████████████████████████████████████████████████████████████▉              | 584/720 [01:19<00:17,  7.77it/
s]
1/1 [==============================] - 0s 55ms/step
 81%|█████████████████████████████████████████████████████████████              | 585/720 [01:20<00:17,  7.78it/
s]
1/1 [==============================] - 0s 60ms/step
 81%|█████████████████████████████████████████████████████████████              | 586/720 [01:20<00:17,  7.68it/
s]
1/1 [==============================] - 0s 61ms/step
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 82%|████████████████████████████████████████████████████████████▌               | 587/720 [01:20<00:17,  7.67it/
s]
1/1 [==============================] - 0s 45ms/step
 82%|████████████████████████████████████████████████████████████▌               | 588/720 [01:20<00:16,  7.95it/
s]
1/1 [==============================] - 0s 59ms/step
 82%|████████████████████████████████████████████████████████████▌               | 589/720 [01:20<00:16,  7.83it/
s]
1/1 [==============================] - 0s 53ms/step
 82%|████████████████████████████████████████████████████████████▋               | 590/720 [01:20<00:16,  7.79it/
s]
1/1 [==============================] - 0s 52ms/step
 82%|████████████████████████████████████████████████████████████▋               | 591/720 [01:20<00:16,  7.85it/
s]
1/1 [==============================] - 0s 56ms/step
 82%|████████████████████████████████████████████████████████████▋               | 592/720 [01:20<00:16,  7.72it/
s]
1/1 [==============================] - 0s 58ms/step
 82%|████████████████████████████████████████████████████████████▊               | 593/720 [01:21<00:17,  7.21it/
s]
1/1 [==============================] - 0s 50ms/step
 82%|████████████████████████████████████████████████████████████▊               | 594/720 [01:21<00:17,  7.11it/
s]
1/1 [==============================] - 0s 57ms/step
 83%|████████████████████████████████████████████████████████████▊               | 595/720 [01:21<00:17,  7.09it/
s]
1/1 [==============================] - 0s 59ms/step
 83%|████████████████████████████████████████████████████████████▉               | 596/720 [01:21<00:17,  7.10it/
s]
1/1 [==============================] - 0s 66ms/step
 83%|████████████████████████████████████████████████████████████▉               | 597/720 [01:21<00:17,  6.89it/
s]
1/1 [==============================] - 0s 72ms/step
 83%|████████████████████████████████████████████████████████████▉               | 598/720 [01:21<00:18,  6.70it/
s]
1/1 [==============================] - 0s 66ms/step
 83%|█████████████████████████████████████████████████████████████               | 599/720 [01:22<00:18,  6.67it/
s]
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1/1 [==============================] - 0s 65ms/step
 83%|████████████████████████████████████████████████████████████▊              | 600/720 [01:22<00:17,  6.67it/
s]
1/1 [==============================] - 0s 56ms/step
 83%|████████████████████████████████████████████████████████████▉              | 601/720 [01:22<00:17,  6.94it/
s]
1/1 [==============================] - 0s 56ms/step
 84%|█████████████████████████████████████████████████████████████              | 602/720 [01:22<00:16,  7.02it/
s]
1/1 [==============================] - 0s 52ms/step
 84%|█████████████████████████████████████████████████████████████▏             | 603/720 [01:22<00:16,  7.28it/
s]
1/1 [==============================] - 0s 54ms/step
 84%|█████████████████████████████████████████████████████████████▏             | 604/720 [01:22<00:15,  7.46it/
s]
1/1 [==============================] - 0s 51ms/step
 84%|█████████████████████████████████████████████████████████████▎             | 605/720 [01:22<00:15,  7.64it/
s]
1/1 [==============================] - 0s 54ms/step
 84%|█████████████████████████████████████████████████████████████▍             | 606/720 [01:22<00:14,  7.67it/
s]
1/1 [==============================] - 0s 53ms/step
 84%|█████████████████████████████████████████████████████████████▍             | 607/720 [01:23<00:14,  7.66it/
s]
1/1 [==============================] - 0s 61ms/step
 84%|█████████████████████████████████████████████████████████████▌             | 608/720 [01:23<00:15,  7.44it/
s]
1/1 [==============================] - 0s 65ms/step
 85%|█████████████████████████████████████████████████████████████▋             | 609/720 [01:23<00:15,  7.18it/
s]
1/1 [==============================] - 0s 53ms/step
 85%|█████████████████████████████████████████████████████████████▋             | 610/720 [01:23<00:14,  7.44it/
s]
1/1 [==============================] - 0s 64ms/step
 85%|█████████████████████████████████████████████████████████████▊             | 611/720 [01:23<00:14,  7.36it/
s]
1/1 [==============================] - 0s 53ms/step
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 85%|████████████████████████████████████████████████████████████▉          | 612/720 [01:23<00:14,  7.52it/
s]
1/1 [==============================] - 0s 54ms/step
 85%|████████████████████████████████████████████████████████████▉          | 613/720 [01:23<00:14,  7.56it/
s]
1/1 [==============================] - 0s 55ms/step
 85%|████████████████████████████████████████████████████████████▉          | 614/720 [01:24<00:13,  7.65it/
s]
1/1 [==============================] - 0s 56ms/step
 85%|████████████████████████████████████████████████████████████▉          | 615/720 [01:24<00:13,  7.89it/
s]
1/1 [==============================] - 0s 64ms/step
 86%|████████████████████████████████████████████████████████████▉          | 616/720 [01:24<00:13,  7.67it/
s]
1/1 [==============================] - 0s 56ms/step
 86%|████████████████████████████████████████████████████████████▉          | 617/720 [01:24<00:13,  7.62it/
s]
1/1 [==============================] - 0s 56ms/step
 86%|████████████████████████████████████████████████████████████▉          | 618/720 [01:24<00:13,  7.66it/
s]
1/1 [==============================] - 0s 64ms/step
 86%|████████████████████████████████████████████████████████████▉          | 619/720 [01:24<00:13,  7.45it/
s]
1/1 [==============================] - 0s 59ms/step
 86%|████████████████████████████████████████████████████████████▉          | 620/720 [01:24<00:13,  7.33it/
s]
1/1 [==============================] - 0s 61ms/step
 86%|████████████████████████████████████████████████████████████▉          | 621/720 [01:24<00:13,  7.28it/
s]
1/1 [==============================] - 0s 57ms/step
 86%|████████████████████████████████████████████████████████████▉          | 622/720 [01:25<00:13,  7.28it/
s]
1/1 [==============================] - 0s 62ms/step
 87%|████████████████████████████████████████████████████████████▉          | 623/720 [01:25<00:13,  7.15it/
s]
1/1 [==============================] - 0s 65ms/step
 87%|████████████████████████████████████████████████████████████▉          | 624/720 [01:25<00:13,  6.91it/
s]
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1/1 [==============================] - 0s 50ms/step
 87%|████████████████████████████████████████████████████████████▉          | 625/720 [01:25<00:13,  7.00it/
s]
1/1 [==============================] - 0s 50ms/step
 87%|████████████████████████████████████████████████████████████▉          | 626/720 [01:25<00:12,  7.38it/
s]
1/1 [==============================] - 0s 65ms/step
 87%|████████████████████████████████████████████████████████████▉          | 627/720 [01:25<00:12,  7.27it/
s]
1/1 [==============================] - 0s 55ms/step
 87%|████████████████████████████████████████████████████████████▉          | 628/720 [01:25<00:12,  7.34it/
s]
1/1 [==============================] - 0s 58ms/step
 87%|████████████████████████████████████████████████████████████▉          | 629/720 [01:26<00:12,  7.35it/
s]
1/1 [==============================] - 0s 62ms/step
 88%|████████████████████████████████████████████████████████████▉          | 630/720 [01:26<00:12,  7.22it/
s]
1/1 [==============================] - 0s 58ms/step
 88%|████████████████████████████████████████████████████████████▉          | 631/720 [01:26<00:12,  7.17it/
s]
1/1 [==============================] - 0s 69ms/step
 88%|████████████████████████████████████████████████████████████▉          | 632/720 [01:26<00:12,  7.06it/
s]
1/1 [==============================] - 0s 55ms/step
 88%|████████████████████████████████████████████████████████████▉          | 633/720 [01:26<00:11,  7.30it/
s]
1/1 [==============================] - 0s 48ms/step
 88%|████████████████████████████████████████████████████████████▉          | 634/720 [01:26<00:11,  7.52it/
s]
1/1 [==============================] - 0s 56ms/step
 88%|████████████████████████████████████████████████████████████▉          | 635/720 [01:26<00:11,  7.56it/
s]
1/1 [==============================] - 0s 58ms/step
 88%|████████████████████████████████████████████████████████████▉          | 636/720 [01:27<00:11,  7.39it/
s]
1/1 [==============================] - 0s 52ms/step
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 88%|████████████████████████████████████████████████████████████▉          | 637/720 [01:27<00:11,  7.42it/
s]
1/1 [==============================] - 0s 103ms/step
 89%|████████████████████████████████████████████████████████████▉          | 638/720 [01:27<00:12,  6.72it/
s]
1/1 [==============================] - 0s 55ms/step
 89%|█████████████████████████████████████████████████████████████          | 639/720 [01:27<00:11,  7.04it/
s]
1/1 [==============================] - 0s 54ms/step
 89%|█████████████████████████████████████████████████████████████          | 640/720 [01:27<00:11,  7.17it/
s]
1/1 [==============================] - 0s 56ms/step
 89%|█████████████████████████████████████████████████████████████▏         | 641/720 [01:27<00:10,  7.26it/
s]
1/1 [==============================] - 0s 49ms/step
 89%|█████████████████████████████████████████████████████████████▏         | 642/720 [01:27<00:10,  7.47it/
s]
1/1 [==============================] - 0s 52ms/step
 89%|█████████████████████████████████████████████████████████████▏         | 643/720 [01:27<00:10,  7.66it/
s]
1/1 [==============================] - 0s 48ms/step
 89%|█████████████████████████████████████████████████████████████▎         | 644/720 [01:28<00:09,  7.97it/
s]
1/1 [==============================] - 0s 67ms/step
 90%|█████████████████████████████████████████████████████████████▍         | 645/720 [01:28<00:09,  7.74it/
s]
1/1 [==============================] - 0s 44ms/step
 90%|█████████████████████████████████████████████████████████████▍         | 646/720 [01:28<00:09,  8.05it/
s]
1/1 [==============================] - 0s 50ms/step
 90%|█████████████████████████████████████████████████████████████▍         | 647/720 [01:28<00:09,  7.97it/
s]
1/1 [==============================] - 0s 53ms/step
 90%|█████████████████████████████████████████████████████████████▌         | 648/720 [01:28<00:09,  7.57it/
s]
1/1 [==============================] - 0s 59ms/step
 90%|█████████████████████████████████████████████████████████████▌         | 649/720 [01:28<00:10,  6.99it/
s]
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1/1 [==============================] - 0s 50ms/step
 90%|████████████████████████████████████████████████████████████████████████████▉         | 650/720 [01:28<00:09,  7.24it/
s]
1/1 [==============================] - 0s 51ms/step
 90%|████████████████████████████████████████████████████████████████████████████▉         | 651/720 [01:29<00:09,  7.39it/
s]
1/1 [==============================] - 0s 48ms/step
 91%|████████████████████████████████████████████████████████████████████████████▉         | 652/720 [01:29<00:09,  7.48it/
s]
1/1 [==============================] - 0s 60ms/step
 91%|████████████████████████████████████████████████████████████████████████████▉        | 653/720 [01:29<00:08,  7.46it/
s]
1/1 [==============================] - 0s 52ms/step
 91%|████████████████████████████████████████████████████████████████████████████▉         | 654/720 [01:29<00:08,  7.52it/
s]
1/1 [==============================] - 0s 56ms/step
 91%|████████████████████████████████████████████████████████████████████████████▉         | 655/720 [01:29<00:08,  7.56it/
s]
1/1 [==============================] - 0s 50ms/step
 91%|████████████████████████████████████████████████████████████████████████████▉         | 656/720 [01:29<00:08,  7.62it/
s]
1/1 [==============================] - 0s 51ms/step
 91%|████████████████████████████████████████████████████████████████████████████▉        | 657/720 [01:29<00:08,  7.65it/
s]
1/1 [==============================] - 0s 58ms/step
 91%|████████████████████████████████████████████████████████████████████████████▉        | 658/720 [01:29<00:08,  7.66it/
s]
1/1 [==============================] - 0s 45ms/step
 92%|████████████████████████████████████████████████████████████████████████████▉         | 659/720 [01:30<00:07,  7.74it/
s]
1/1 [==============================] - 0s 56ms/step
 92%|████████████████████████████████████████████████████████████████████████████▉         | 660/720 [01:30<00:07,  7.59it/
s]
1/1 [==============================] - 0s 65ms/step
 92%|████████████████████████████████████████████████████████████████████████████▉         | 661/720 [01:30<00:07,  7.43it/
s]
1/1 [==============================] - 0s 47ms/step
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 92%|█████████████████████████████████████         | 662/720 [01:30<00:07,  7.78it/
s]
1/1 [==============================] - 0s 70ms/step
 92%|█████████████████████████████████████▏        | 663/720 [01:30<00:07,  7.61it/
s]
1/1 [==============================] - 0s 56ms/step
 92%|█████████████████████████████████████▏        | 664/720 [01:30<00:07,  7.45it/
s]
1/1 [==============================] - 0s 57ms/step
 92%|█████████████████████████████████████▏        | 665/720 [01:30<00:07,  7.41it/
s]
1/1 [==============================] - 0s 55ms/step
 92%|█████████████████████████████████████         | 666/720 [01:31<00:07,  7.51it/
s]
1/1 [==============================] - 0s 55ms/step
 93%|█████████████████████████████████████         | 667/720 [01:31<00:06,  7.66it/
s]
1/1 [==============================] - 0s 54ms/step
 93%|█████████████████████████████████████▏        | 668/720 [01:31<00:06,  7.79it/
s]
1/1 [==============================] - 0s 50ms/step
 93%|█████████████████████████████████████▏        | 669/720 [01:31<00:06,  7.68it/
s]
1/1 [==============================] - 0s 56ms/step
 93%|█████████████████████████████████████▏        | 670/720 [01:31<00:06,  7.60it/
s]
1/1 [==============================] - 0s 48ms/step
 93%|█████████████████████████████████████         | 671/720 [01:31<00:06,  7.14it/
s]
1/1 [==============================] - 0s 49ms/step
 93%|█████████████████████████████████████▎        | 672/720 [01:31<00:06,  7.11it/
s]
1/1 [==============================] - 0s 53ms/step
 93%|█████████████████████████████████████▎        | 673/720 [01:31<00:06,  7.24it/
s]
1/1 [==============================] - 0s 59ms/step
 94%|█████████████████████████████████████▍        | 674/720 [01:32<00:06,  7.33it/
s]
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1/1 [==============================] - 0s 56ms/step
 94%|███████████████████████████████████          | 675/720 [01:32<00:06,  6.95it/
s]
1/1 [==============================] - 0s 56ms/step
 94%|███████████████████████████████████          | 676/720 [01:32<00:06,  7.11it/
s]
1/1 [==============================] - 0s 61ms/step
 94%|███████████████████████████████████▏         | 677/720 [01:32<00:06,  7.16it/
s]
1/1 [==============================] - 0s 62ms/step
 94%|███████████████████████████████████▎         | 678/720 [01:32<00:05,  7.12it/
s]
1/1 [==============================] - 0s 51ms/step
 94%|███████████████████████████████████▍         | 679/720 [01:32<00:05,  7.35it/
s]
1/1 [==============================] - 0s 56ms/step
 94%|███████████████████████████████████▏         | 680/720 [01:32<00:05,  7.46it/
s]
1/1 [==============================] - 0s 51ms/step
 95%|███████████████████████████████████▌         | 681/720 [01:33<00:05,  7.51it/
s]
1/1 [==============================] - 0s 50ms/step
 95%|███████████████████████████████████▋         | 682/720 [01:33<00:05,  7.56it/
s]
1/1 [==============================] - 0s 57ms/step
 95%|███████████████████████████████████▊         | 683/720 [01:33<00:04,  7.61it/
s]
1/1 [==============================] - 0s 49ms/step
 95%|████████████████████████████████████         | 684/720 [01:33<00:04,  7.76it/
s]
1/1 [==============================] - 0s 57ms/step
 95%|████████████████████████████████████         | 685/720 [01:33<00:04,  7.71it/
s]
1/1 [==============================] - 0s 59ms/step
 95%|████████████████████████████████████▏        | 686/720 [01:33<00:04,  7.49it/
s]
1/1 [==============================] - 0s 54ms/step
```

```
 95%|████████████████████████████████████████████████████████████▉     | 687/720 [01:33<00:04,  7.55it/
s]
1/1 [==============================] - 0s 53ms/step
 96%|████████████████████████████████████████████████████████████▉     | 688/720 [01:33<00:04,  7.60it/
s]
1/1 [==============================] - 0s 62ms/step
 96%|████████████████████████████████████████████████████████████▉     | 689/720 [01:34<00:04,  7.35it/
s]
1/1 [==============================] - 0s 54ms/step
 96%|████████████████████████████████████████████████████████████▉     | 690/720 [01:34<00:04,  7.50it/
s]
1/1 [==============================] - 0s 55ms/step
 96%|████████████████████████████████████████████████████████████▉     | 691/720 [01:34<00:03,  7.49it/
s]
1/1 [==============================] - 0s 62ms/step
 96%|████████████████████████████████████████████████████████████▉     | 692/720 [01:34<00:03,  7.32it/
s]
1/1 [==============================] - 0s 48ms/step
 96%|████████████████████████████████████████████████████████████▉     | 693/720 [01:34<00:03,  7.48it/
s]
1/1 [==============================] - 0s 52ms/step
 96%|████████████████████████████████████████████████████████████▉     | 694/720 [01:34<00:03,  7.37it/
s]
1/1 [==============================] - 0s 64ms/step
 97%|████████████████████████████████████████████████████████████▉     | 695/720 [01:34<00:03,  7.35it/
s]
1/1 [==============================] - 0s 56ms/step
 97%|████████████████████████████████████████████████████████████▉     | 696/720 [01:35<00:03,  7.40it/
s]
1/1 [==============================] - 0s 61ms/step
 97%|████████████████████████████████████████████████████████████▉     | 697/720 [01:35<00:03,  7.30it/
s]
1/1 [==============================] - 0s 50ms/step
 97%|████████████████████████████████████████████████████████████▉     | 698/720 [01:35<00:02,  7.44it/
s]
1/1 [==============================] - 0s 54ms/step
 97%|████████████████████████████████████████████████████████████▉     | 699/720 [01:35<00:02,  7.39it/
s]
```

```
1/1 [==============================] - 0s 58ms/step
 97%|███████████████████████████████████████▌ | 700/720 [01:35<00:02,  7.27it/
s]
1/1 [==============================] - 0s 59ms/step
 97%|███████████████████████████████████████▋ | 701/720 [01:35<00:02,  7.28it/
s]
1/1 [==============================] - 0s 54ms/step
 98%|███████████████████████████████████████ | 702/720 [01:35<00:02,  7.33it/
s]
1/1 [==============================] - 0s 59ms/step
 98%|███████████████████████████████████████ | 703/720 [01:36<00:02,  7.40it/
s]
1/1 [==============================] - 0s 50ms/step
 98%|███████████████████████████████████████▏ | 704/720 [01:36<00:02,  7.63it/
s]
1/1 [==============================] - 0s 50ms/step
 98%|███████████████████████████████████████▎ | 705/720 [01:36<00:01,  7.64it/
s]
1/1 [==============================] - 0s 46ms/step
 98%|███████████████████████████████████████▍ | 706/720 [01:36<00:01,  7.88it/
s]
1/1 [==============================] - 0s 50ms/step
 98%|████████████████████████████████████████ | 707/720 [01:36<00:01,  8.04it/
s]
1/1 [==============================] - 0s 44ms/step
 98%|███████████████████████████████████████▋ | 708/720 [01:36<00:01,  7.77it/
s]
1/1 [==============================] - 0s 58ms/step
 98%|███████████████████████████████████████▊ | 709/720 [01:36<00:01,  7.41it/
s]
1/1 [==============================] - 0s 48ms/step
 99%|███████████████████████████████████████▉ | 710/720 [01:36<00:01,  7.61it/
s]
1/1 [==============================] - 0s 47ms/step
 99%|████████████████████████████████████████ | 711/720 [01:37<00:01,  7.76it/
s]
1/1 [==============================] - 0s 51ms/step
```

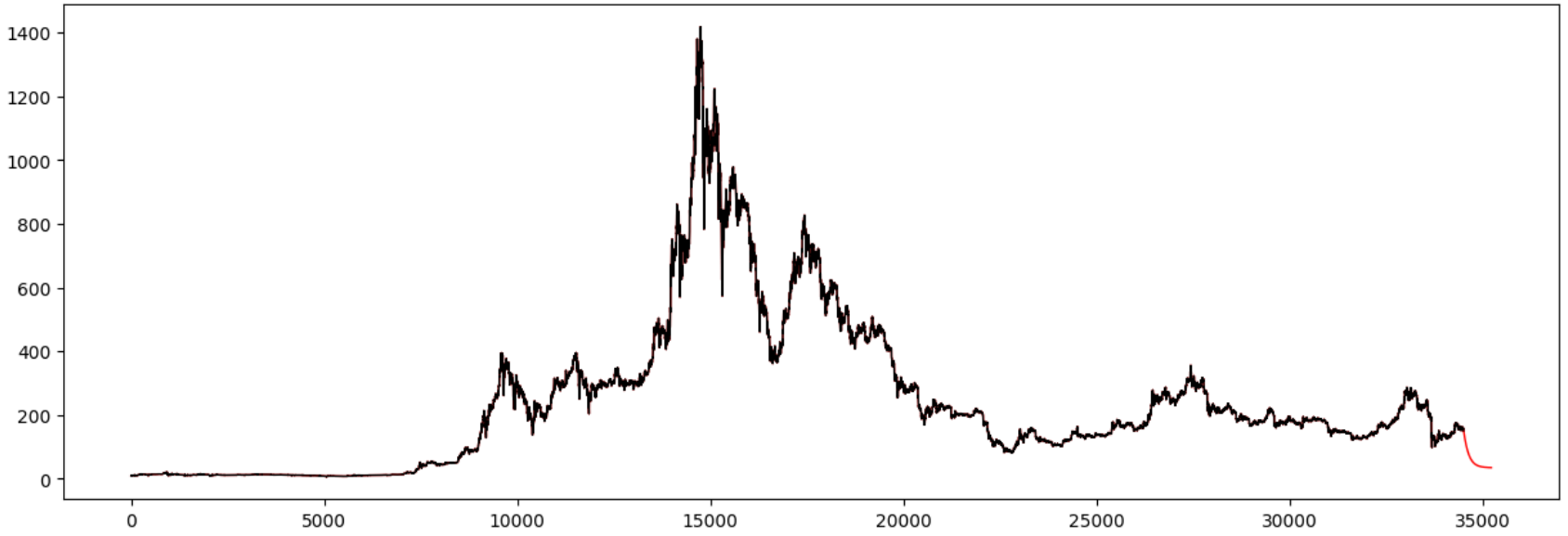
```
 99%|███████████████████████████████████████████████████████████████████████████████ | 712/720 [01:37<00:01,  7.85it/s]
1/1 [==============================] - 0s 47ms/step
 99%|███████████████████████████████████████████████████████████████████████████████▏| 713/720 [01:37<00:00,  7.93it/s]
1/1 [==============================] - 0s 49ms/step
 99%|███████████████████████████████████████████████████████████████████████████████▎| 714/720 [01:37<00:00,  7.97it/s]
1/1 [==============================] - 0s 59ms/step
 99%|███████████████████████████████████████████████████████████████████████████████▍| 715/720 [01:37<00:00,  7.63it/s]
1/1 [==============================] - 0s 58ms/step
 99%|███████████████████████████████████████████████████████████████████████████████▌| 716/720 [01:37<00:00,  7.42it/s]
1/1 [==============================] - 0s 58ms/step
100%|███████████████████████████████████████████████████████████████████████████████▋| 717/720 [01:37<00:00,  7.26it/s]
1/1 [==============================] - 0s 60ms/step
100%|███████████████████████████████████████████████████████████████████████████████▊| 718/720 [01:37<00:00,  7.36it/s]
1/1 [==============================] - 0s 64ms/step
100%|███████████████████████████████████████████████████████████████████████████████▉| 719/720 [01:38<00:00,  7.21it/s]
1/1 [==============================] - 0s 60ms/step
100%|████████████████████████████████████████████████████████████████████████████████| 720/720 [01:38<00:00,  7.33it/s]
```

In [31]:

```
new = sc.inverse_transform(np.array(new).reshape(-1,1))
```

In [32]:

```
out = []
out = np.append(df.Close.values,new)
plt.figure(figsize=(15,5))
plt.plot(out,linewidth=1,color='red')
plt.plot(df.Close.values,linewidth=1,color='black')
plt.show()
```



In [33]:
```
len(out),len(df.Close)
```

Out[33]: (35217, 34497)

Saving the model

In [34]:
```
import pickle


model.save('model.h5')
filename = 'scaler.pkl'
f = open(filename, 'wb')
pickle.dump(sc,f )
f.close()
```

```
C:\Users\amith\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\engine\training.py:3103: UserWarni
ng: You are saving your model as an HDF5 file via `model.save()`. This file format is considered legacy. We recommend
using instead the native Keras format, e.g. `model.save('my_model.keras')`.
  saving_api.save_model(
```

In [35]:
```
with open('window.npy', 'wb') as f:
    np.save(f, windows_sc)
with open('target.npy', 'wb') as f:
    np.save(f, target_sc)
```

In [ ]:

In [ ]:

In [ ]: