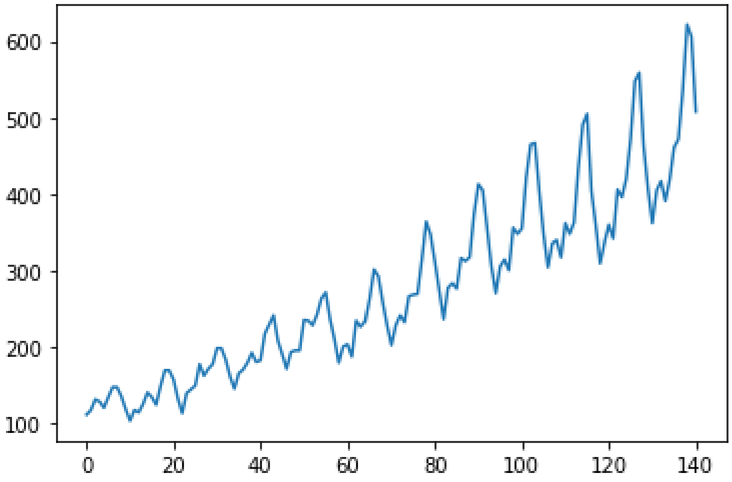
تعریف مسئله: پیش بینی سری زمانی

In [2]:

```python
import pandas
import matplotlib.pyplot as plt
dataset = pandas.read_csv('https://raw.githubusercontent.com/jbrownlee/Datas
plt.plot(dataset)
plt.show()
```



MLP رگرسیون

In [3]:

```python
import numpy
import matplotlib.pyplot as plt
import pandas
import math
from keras.models import Sequential
from keras.layers import Dense
```

```
Using TensorFlow backend.
```

In [4]:

```python
dataset.head()
```

Out[4]:

	Passengers
0	112
1	118
2	132
3	129
4	121

In [5]:

```python
dataset= dataset.values.astype('float32')
```

In [6]:

```python
# split into train and test sets
train_size = int(len(dataset) * 0.67)
test_size = len(dataset) - train_size
train, test = dataset[0:train_size,:], dataset[train_size:len(dataset),:]
print(len(train), len(test))
```

```
94 47
```

In [7]:

```python
#تبدیل آرایه ها به ماتریس دیتاست
def create_dataset(dataset, look_back=1):

    dataX, dataY = [], []

    for i in range(len(dataset)-look_back-1):

        a = dataset[i:(i+look_back), 0]

        dataX.append(a)
        dataY.append(dataset[i + look_back, 0])

    return numpy.array(dataX), numpy.array(dataY)
```

In [9]:

```python
create_dataset(dataset, look_back=1)
```

Out[9]:

```
(array([[112.],
        [118.],
        [132.],
        [129.],
        [121.],
        [135.],
        [148.],
        [148.],
        [136.],
        [119.],
        [104.],
        [118.],
        [115.],
        [126.],
        [141.],
        [135.],
        [125.],
        [149.],
        [170.],
```

آماده سازی دیتاست برای مدل سازی

In [10]:

```python
# reshape into X=t and Y=t+1
look_back = 1
trainX, trainY = create_dataset(train, look_back)
testX, testY = create_dataset(test, look_back)
```

ساخت و فیت کردن مدل MLP

In [12]:
```python
model = Sequential()
model.add(Dense(8, input_dim=look_back, activation= 'relu' ))
model.add(Dense(1))
```

In [14]:
```python
model.compile(loss= 'mean_squared_error' , optimizer= 'adam' )
model.fit(trainX, trainY, epochs=200, batch_size=2, verbose=2)
```

```
Epoch 1/200
 - 1s - loss: 528.8125
Epoch 2/200
 - 0s - loss: 512.4753
Epoch 3/200
 - 0s - loss: 516.7395
Epoch 4/200
 - 0s - loss: 526.8686
Epoch 5/200
 - 0s - loss: 512.7062
Epoch 6/200
 - 0s - loss: 511.2896
Epoch 7/200
 - 0s - loss: 512.5765
Epoch 8/200
 - 0s - loss: 512.7827
Epoch 9/200
 - 0s - loss: 509.3414
Epoch 10/200
```

In [15]:
```python
# برآورد عملکرد مدل
trainScore = model.evaluate(trainX, trainY, verbose=0)
print( 'Train Score: %.2f MSE (%.2f RMSE)' % (trainScore, math.sqrt(trainSco
testScore = model.evaluate(testX, testY, verbose=0)
print( 'Test Score: %.2f MSE (%.2f RMSE)' % (testScore, math.sqrt(testScore)
```

```
Train Score: 503.72 MSE (22.44 RMSE)
Test Score: 2037.25 MSE (45.14 RMSE)
```

ساخت و رسم پیش بینی

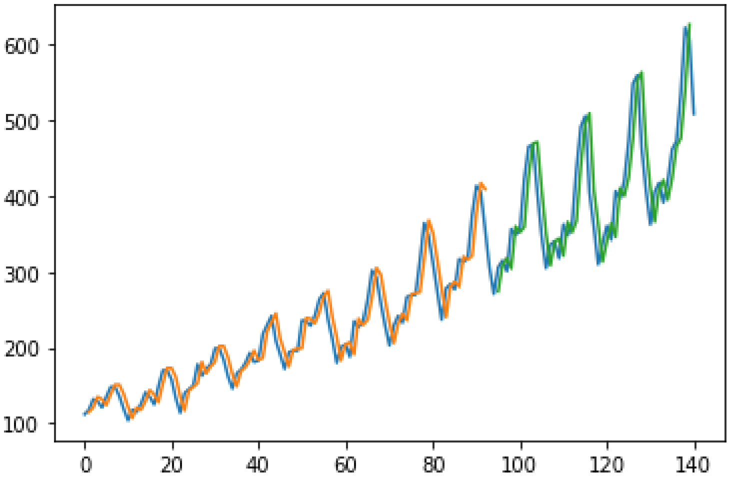
In [16]:

```
# generate predictions for training
trainPredict = model.predict(trainX)
testPredict = model.predict(testX)


# shift train predictions for plotting
trainPredictPlot = numpy.empty_like(dataset)
trainPredictPlot[:, :] = numpy.nan
trainPredictPlot[look_back:len(trainPredict)+look_back, :] = trainPredict


# shift test predictions for plotting
testPredictPlot = numpy.empty_like(dataset)
testPredictPlot[:, :] = numpy.nan
testPredictPlot[len(trainPredict)+(look_back*2)+1:len(dataset)-1, :] = testP


# plot baseline and predictions
plt.plot(dataset)
plt.plot(trainPredictPlot)
plt.plot(testPredictPlot)
plt.show()
```



Blue=Whole Dataset, Green=Training, Red=Predictions.

In [ ]:

```
```