Diamond

Write code

(Regression-FastTree)

In this session

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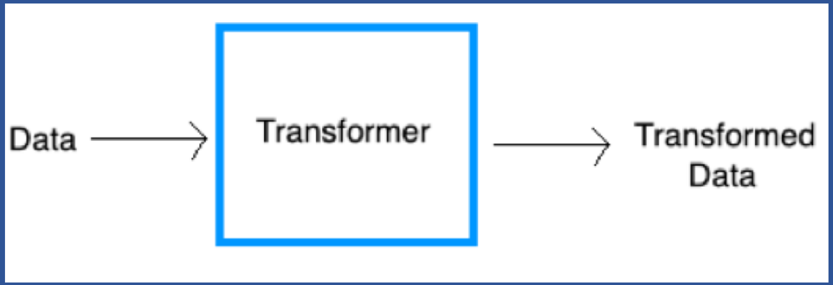
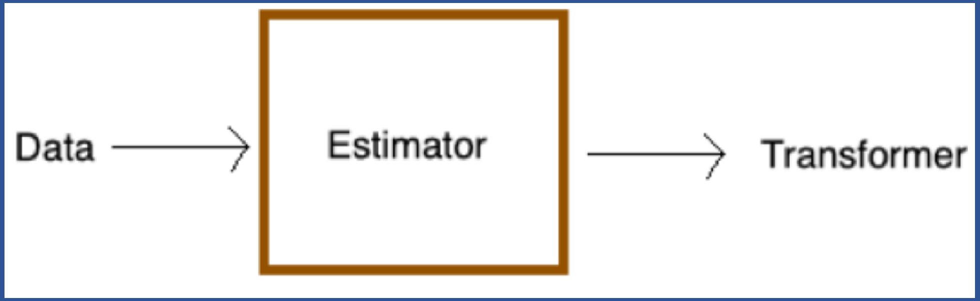
Data, Transformers, and Estimators

Data = tabular dataset

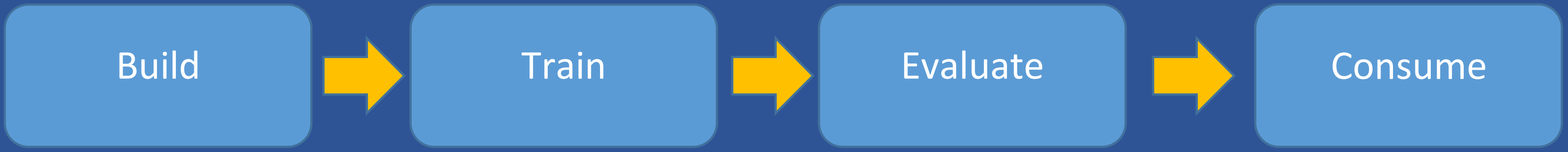
Transformer = transform dataset to compatible format

Estimator = user for create Transformers





Work flow

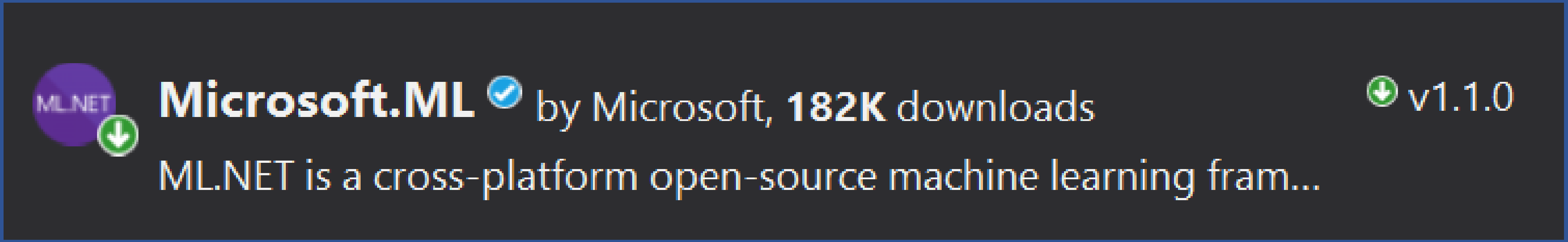


Write C# program to predict diamond price

Create new .NET CORE console app project name = “DiamondLarge”

Add NuGet Package

- Microsoft.ML
- Microsoft.ML.Fast


Microsoft.ML by Microsoft, **182K** downloads v1.1.0
ML.NET is a cross-platform open-source machine learning fram...

Prepare data

Put Data Set in to D:\ml folder

Train Data Set

https://raw.githubusercontent.com/laploy/ML.NET/master/Diamond%20Large/diamonds-Large-Train.csv

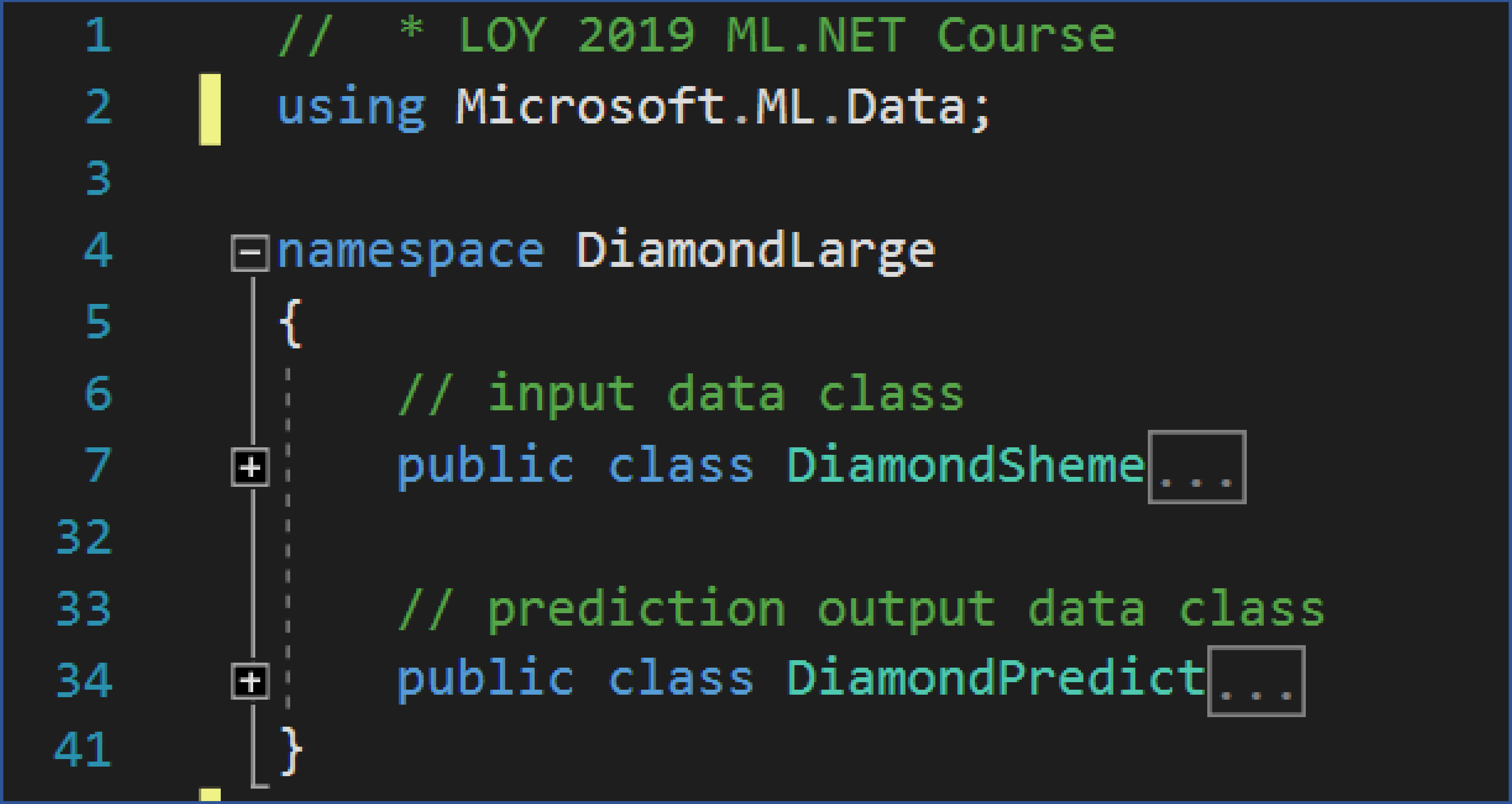
Score Data Set

https://github.com/laploy/ML.NET/blob/master/Diamond%20Large/diamonds-Large-Score.csv

Test Data Set

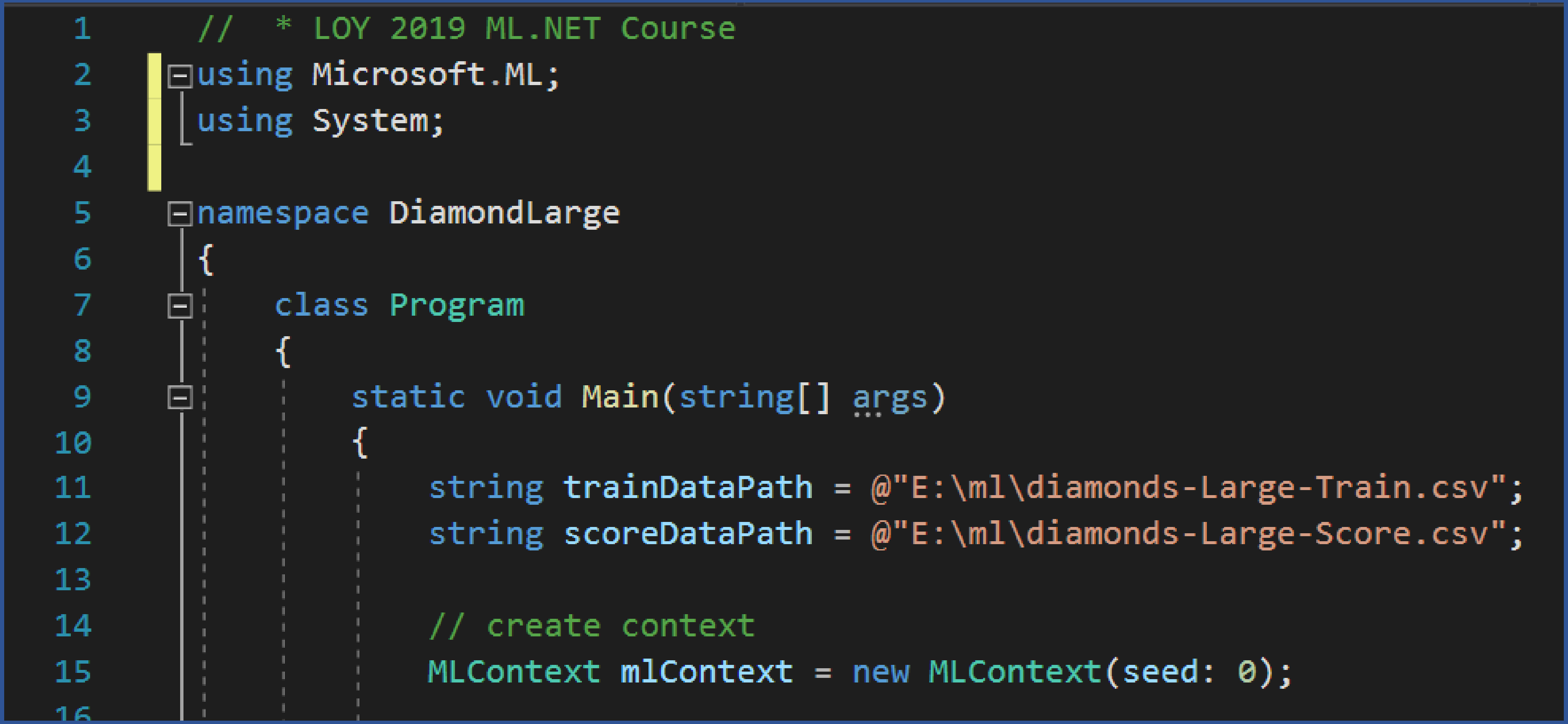
https://github.com/laploy/ML.NET/blob/master/Diamond%20Large/diamonds-Large-Test.csv

Create data set input/output scheme



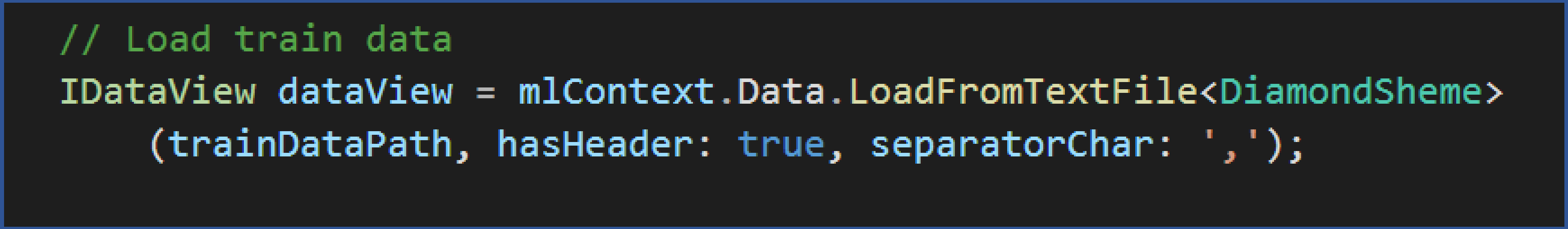
```
//  * LOY 2019 ML.NET Course
using Microsoft.ML.Data;

namespace DiamondLarge
{
    // input data class
    public class DiamondSheme...

    // prediction output data class
    public class DiamondPredict...
}
```

Create ML context



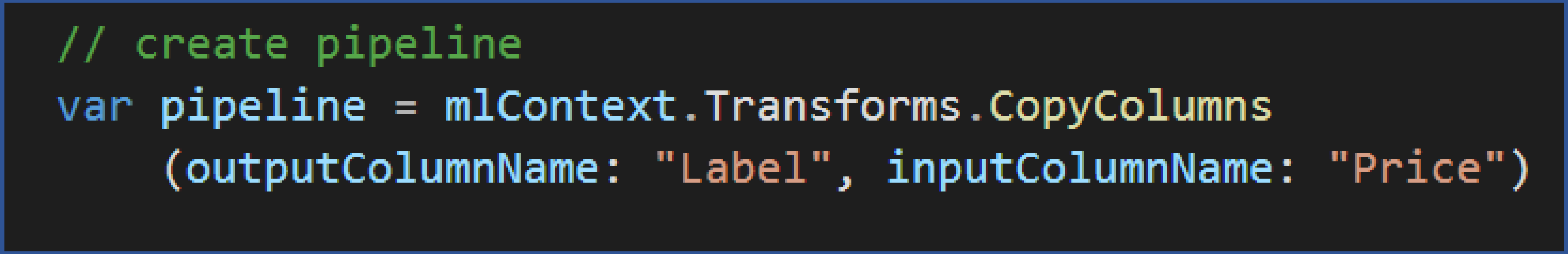
```
//  * LOY 2019 ML.NET Course
using Microsoft.ML;
using System;

namespace DiamondLarge
{
    class Program
    {
        static void Main(string[] args)
        {
            string trainDataPath = @"E:\ml\diamonds-Large-Train.csv";
            string scoreDataPath = @"E:\ml\diamonds-Large-Score.csv";

            // create context
            MLContext mlContext = new MLContext(seed: 0);
```

Load train data set



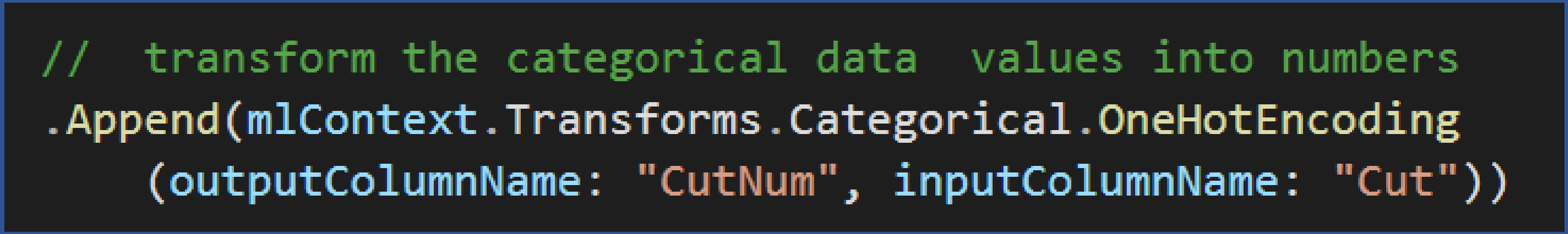
```
// Load train data
IDataView dataView = mlContext.Data.LoadFromTextFile<DiamondSheme>
    (trainDataPath, hasHeader: true, separatorChar: ',');
```

Create pipeline



```
// create pipeline
var pipeline = mlContext.Transforms.CopyColumns
    (outputColumnName: "Label", inputColumnName: "Price")
```

Transform data to numbers

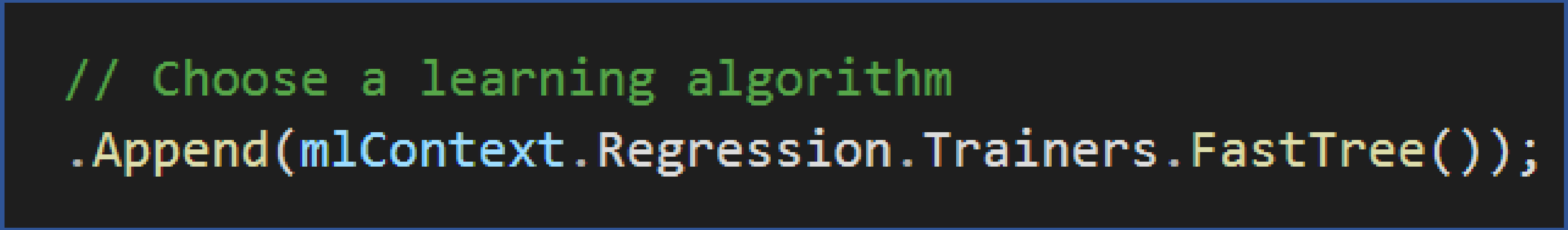


```
//  transform the categorical data  values into numbers
.Append(mlContext.Transforms.Categorical.OneHotEncoding
    (outputColumnName: "CutNum", inputColumnName: "Cut"))
```

Drop non-feature

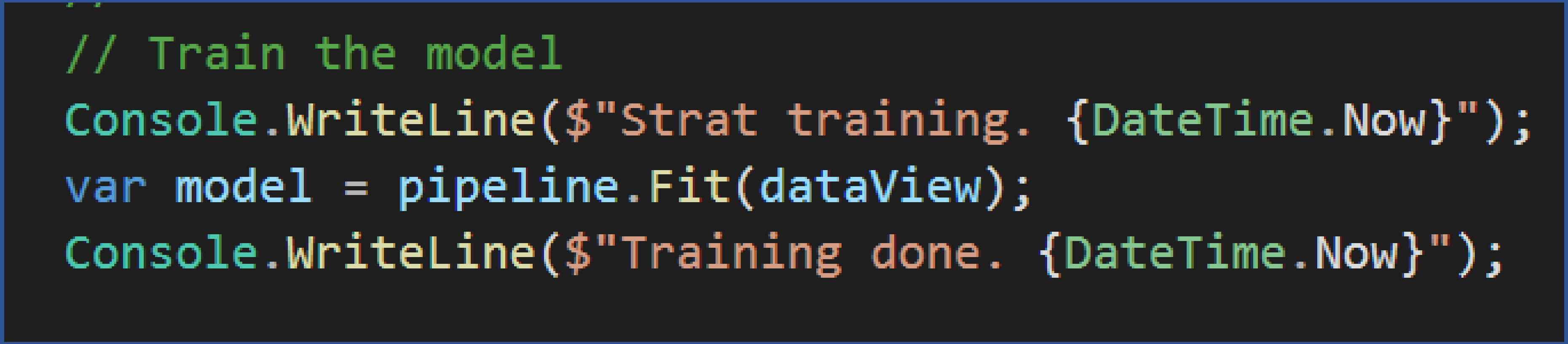
```
// combines all of the feature columns into the Features column
.Append(mlContext.Transforms.Concatenate
    ("Features", "Carat", "CutNum", "ColorNum", "ClearityNum", "Depth",
    "Table", "LengthX", "WidthY", "DepthZ"))
```

Choose a learning algorithm



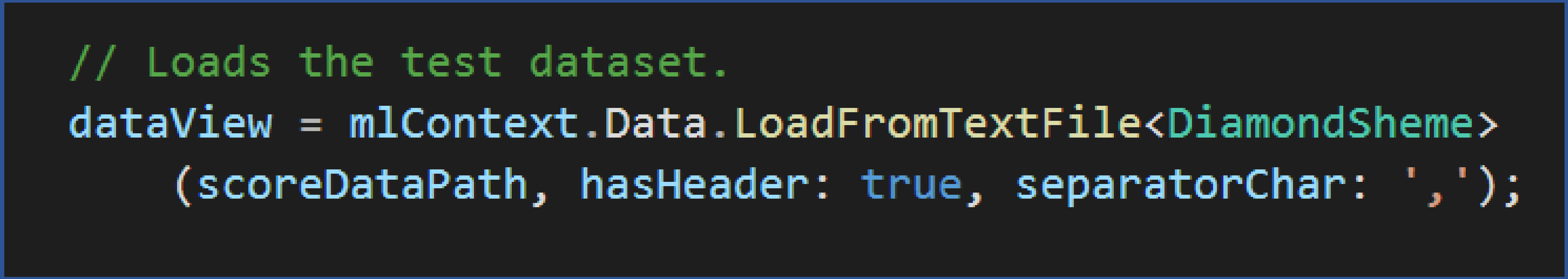
```
// Choose a learning algorithm
.Append(mlContext.Regression.Trainers.FastTree());
```

Train the model



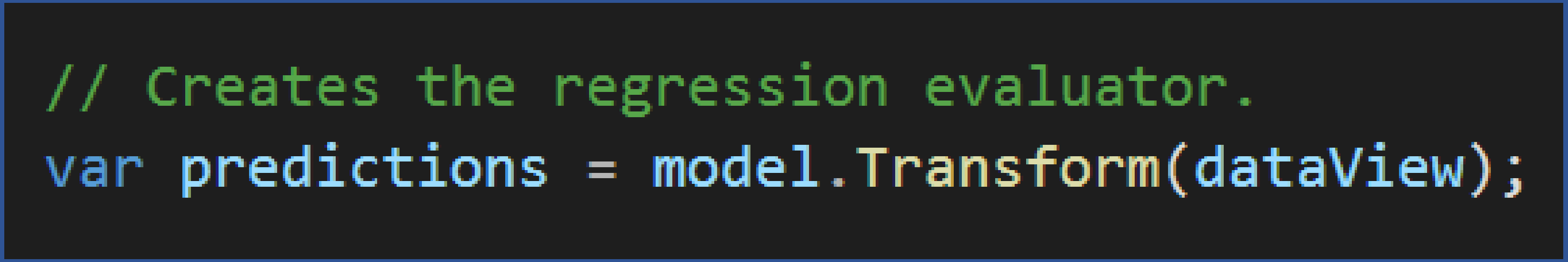
```
// Train the model
Console.WriteLine($"Strat training. {DateTime.Now}");
var model = pipeline.Fit(dataView);
Console.WriteLine($"Training done. {DateTime.Now}");
```

Loads the test dataset



```
// Loads the test dataset.
dataView = mlContext.Data.LoadFromTextFile<DiamondSheme>
    (scoreDataPath, hasHeader: true, separatorChar: ',');
```

Creates the regression evaluator



```
// Creates the regression evaluator.
var predictions = model.Transform(dataView);
```

Evaluates the model and creates metrics

```
// Evaluates the model and creates metrics.
var metrics = mlContext.Regression.Evaluate(predictions, "Label", "Score");

Console.WriteLine();
Console.WriteLine($"*************************************************");
Console.WriteLine($"* Model quality metrics evaluation ");
Console.WriteLine($"*------------------------------------------------");

// RSquared is another evaluation metric of the regression models.
// RSquared takes values between 0 and 1.The closer its value is to 1, the better the model is
Console.WriteLine($"* RSquared Score: {metrics.RSquared:0.##}");

// RMS is one of the evaluation metrics of the regression model.
// The lower it is, the better the model is
Console.WriteLine($"* Root Mean Squared Error: {metrics.RootMeanSquaredError:#.##}");
```

Make Prediction

```
// create engine
var predictionFunction = mlContext.Model.CreatePredictionEngine
    <DiamondSheme, DiamondPredict>(model);

// make one test diamond data we want to predict
var myPredict = new DiamondSheme()
{
    Id = "34973",
    Carat = 0.83f,
    Cut = "Very Good",
    Color = "G",
    Clearity = "SI2",
    Depth = 63.1f,
    Table = 61f,
    Price = 2259f,
    LengthX = 5.96f,
    WidthY = 5.92f,
    DepthZ = 3.75f
};

// make prediction
var prediction = predictionFunction.Predict(myPredict);
```

What's next ?

Create and save ML model