

# Introduction to the Live Editor

This example is an introduction to the Live Editor. In the Live Editor, you can create live scripts that show output together with the code that produced it. Add formatted text, equations, images, and hyperlinks to enhance your narrative, and share the live script with others as an interactive document.

Create a live script in the Live Editor. To create a live script, on the **Home** tab, click **New Live Script**.

## Add the Census Data

Divide your live script into sections. Sections can contain text, code, and output. MATLAB code appears with a gray background and output appears with a white background. To create a new section, go to the **Live Editor** tab and click the **Section Break** button.

Add the US Census data for 1900 to 2000.

```
years = (1900:10:2000); % Time interval
pop = [75.995 91.972 105.711 123.203 131.669 ... % Population Data
       150.697 179.323 213.212 228.505 250.633 265.422]
```

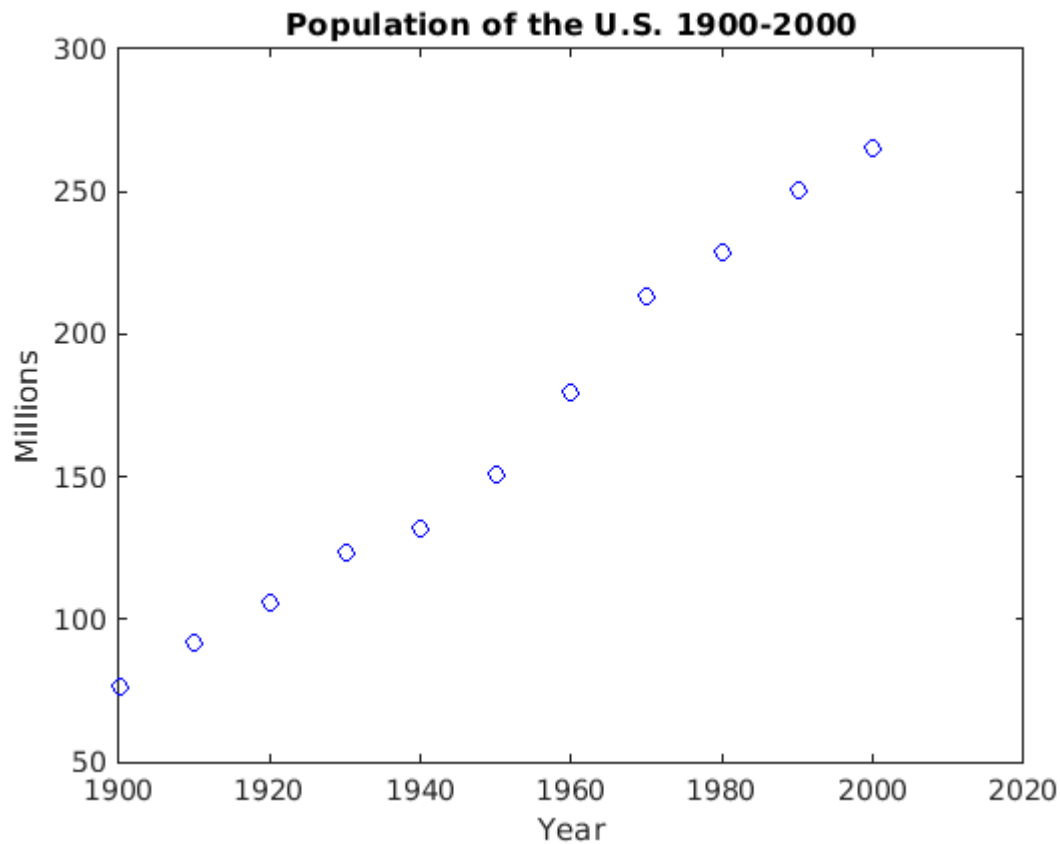
```
pop = 1x11
      75.9950   91.9720  105.7110  123.2030  131.6690  150.6970  179.3230  213.2120 ...
```

## Visualize the Population Change Over Time

Sections can be run independently. To run the code in a section, go to the **Live Editor** tab and click the **Run Section** button. You can also click the blue bar that appears when you move the mouse to the left of the section. When you run a section, output and figures appear together with the code that produced them.

Plot the population data against the year.

```
plot(years,pop,'bo'); % Plot the population data
axis([1900 2020 0 400]);
title('Population of the U.S. 1900-2000');
ylabel('Millions');
xlabel('Year')
ylim([50 300])
```



Can we predict the US population in the year 2010?

## Fitting the Data

Add supporting information to the text, including equations, images, and hyperlinks.

Let's try fitting the data with polynomials. We'll use the MATLAB [polyfit](#) function to get the coefficients.

The fit equations are:

$y = ax + b$	linear
$y = ax^2 + bx + c$	quadratic
$y = ax^3 + bx^2 + cx + d$	cubic

```
x = (years-1900)/50;
coef1 = polyfit(x,pop,1)
```

```
coef1 = 1x2
    98.9924    66.1296
```

```
coef2 = polyfit(x,pop,2)
```

```
coef2 = 1x3
    15.1014    68.7896    75.1904
```

```
coef3 = polyfit(x,pop,3)
```

```
coef3 = 1x4
   -17.1908    66.6739    29.4569    80.1414
```

## Plotting the Curves

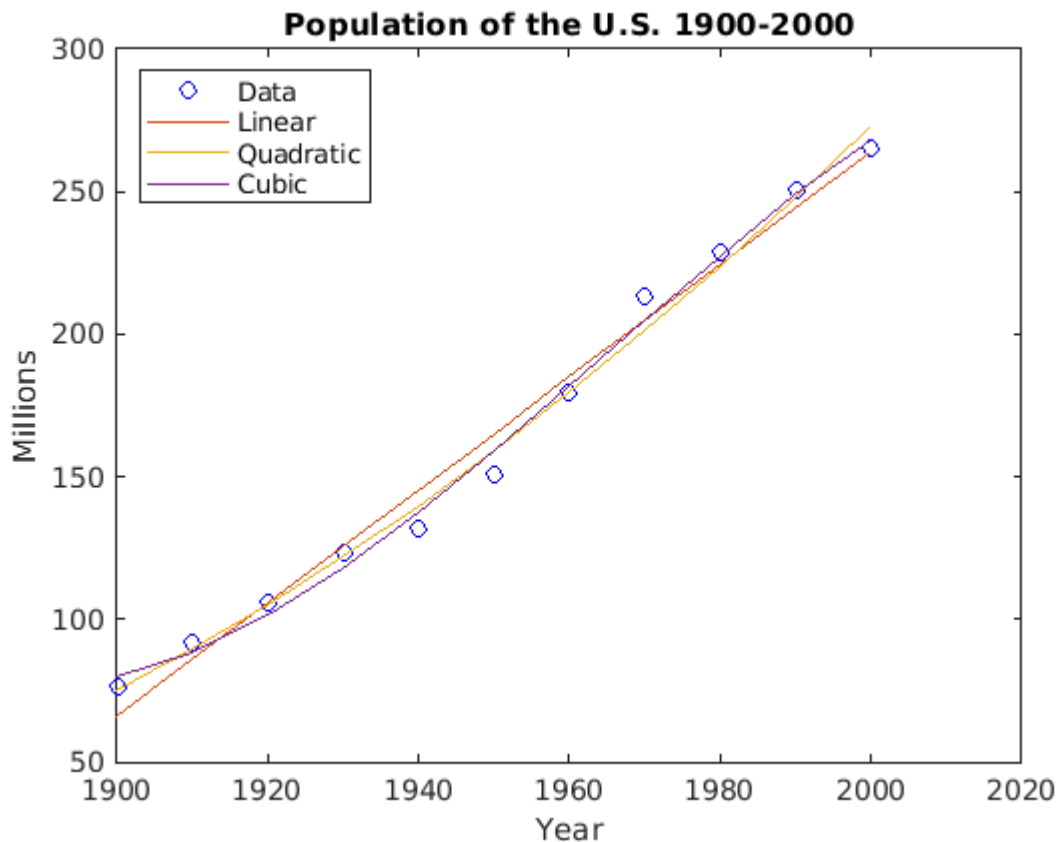
Create sections with any number of text and code lines.

We can plot the linear, quadratic, and cubic curves fitted to the data. We'll use the `polyval` function to evaluate the fitted polynomials at the points in `x`.

```
pred1 = polyval(coef1,x);  
pred2 = polyval(coef2,x);  
pred3 = polyval(coef3,x);  
[pred1; pred2; pred3]  
  
ans = 3x11  
    66.1296    85.9281   105.7266   125.5250   145.3235   165.1220   184.9205   204.7190 ...  
    75.1904    89.5524   105.1225   121.9007   139.8870   159.0814   179.4840   201.0946  
    80.1414    88.5622   101.4918   118.1050   137.5766   159.0814   181.7944   204.8904
```

Now let's plot the predicted values for each polynomial.

```
hold on  
plot(years,pred1)  
plot(years,pred2)  
plot(years,pred3)  
ylim([50 300])  
legend({'Data' 'Linear' 'Quadratic' 'Cubic'},'Location','NorthWest')  
hold off
```



## Predicting the Population

You can share your live script with other MATLAB users so that they can reproduce your results. You also can publish your results as PDF, Microsoft® Word, or HTML documents. Add controls to your live scripts to show users how important parameters affect the analysis. To add controls, go to the **Live Editor** tab, click the **Controls** button, and select from the available options.

We can now calculate the predicted population of a given year using our three equations.

```
year = 2018;  
xyear = (year-1900)/50;  
pred1 = polyval(coef1,xyear);  
pred2 = polyval(coef2,xyear);  
pred3 = polyval(coef3,xyear);  
[pred1 pred2 pred3]
```

```
ans = 1x3  
    299.7517    321.6427    295.0462
```

For the year 2010 for example, the linear and cubic fits predict similar values of about 284 million people, while the quadratic fit predicts a much higher value of about 300 million people.

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