

Making Your First Map

Fall 2023 Workshops

SCHOLARS' LAB

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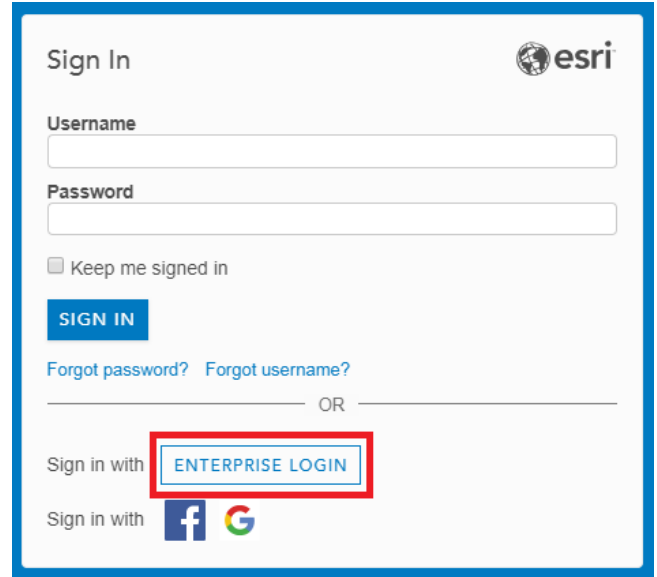
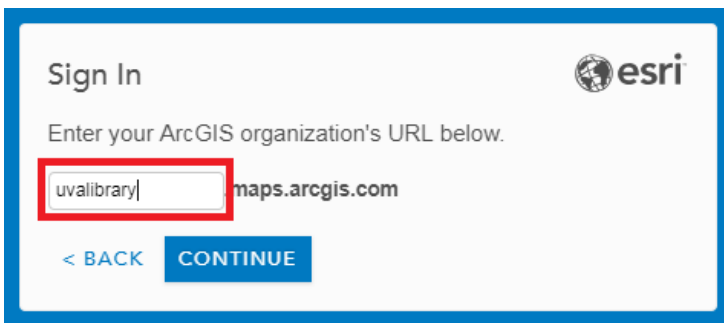

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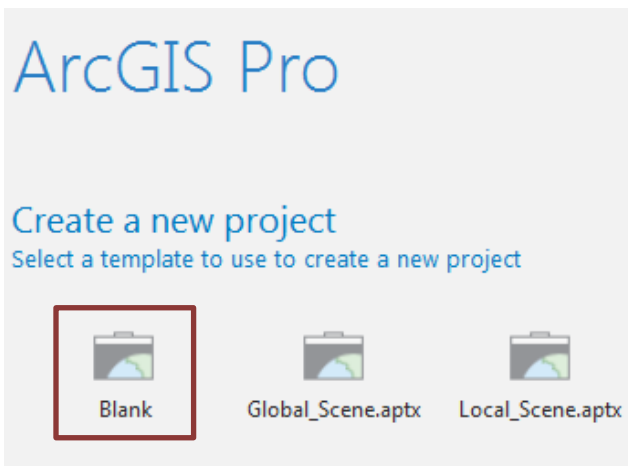
Today we'll map Charlottesville using free datasets from the City of Charlottesville and the US Census. UVA licenses ArcGIS Pro through named user accounts in ArcGIS Online. In order to use Pro, you'll first need to create an ArcGIS Online account.

<https://at.virginia.edu/2HpIpyY>

First, let's open ArcGIS Pro. Click the Start Menu button. In the search at the bottom of the Start Menu, type "**ArcGIS Pro**", and click **ArcGIS Pro** to open. You will first be prompted to login to an ArcGIS Online account to access your ArcGIS Pro license. In the sign in dialog, click **Enterprise Login**. For the organization URL, type "**uvalibrary**", and click **Continue**. Click **University of Virginia**. You will be directed to NetBadge where you will login as normal.

A screenshot of the ArcGIS Sign In dialog. It features the Esri logo in the top right. Below the title "Sign In", there are input fields for "Username" and "Password". A checkbox labeled "Keep me signed in" is present. A blue "SIGN IN" button is below the password field. Links for "Forgot password?" and "Forgot username?" are provided. Below these, there is a horizontal line with "OR" in the center. Underneath, the text "Sign in with" is followed by a red box containing the "ENTERPRISE LOGIN" button. At the bottom, there are social media icons for Facebook and Google.A screenshot of the ArcGIS Sign In dialog showing the organization URL step. The title is "Sign In" with the Esri logo. The instruction "Enter your ArcGIS organization's URL below." is at the top. Below it, a text input field contains "uvalibrary|" and is highlighted with a red box. To its right, the text "maps.arcgis.com" is displayed. At the bottom, there are two buttons: "< BACK" and "CONTINUE".A screenshot of the ArcGIS Sign In dialog showing the selection of the organization. The title is "Sign in to University of Virginia" with the Esri logo. Below the title, the word "Using" is followed by a red box containing the "UNIVERSITY OF VIRGINIA" button. Below this, there is a horizontal line with "OR" in the center. At the bottom, there is a blue button labeled "ARCGIS".

Welcome to ArcGIS Pro! If this is your first time using the software, you'll see an empty project list. In Pro, we can create projects that contain multiple maps, layouts, and even 3D scenes.



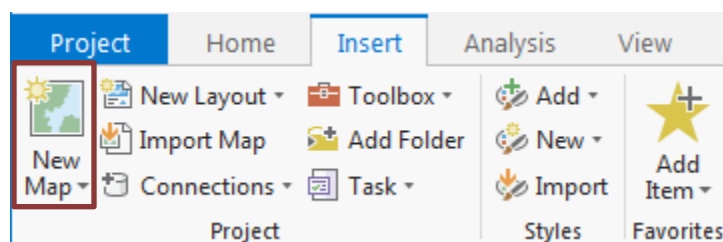
To begin, click the **Blank** template in the **Create a new project** pane. Give the new project a useful name, accepting the default location. Be sure the box for “**Create a new folder for this project**” is checked.

Making a Neighborhood Map of Charlottesville

We’re going to add data layers from ArcGIS Online. But first we need to create a map.

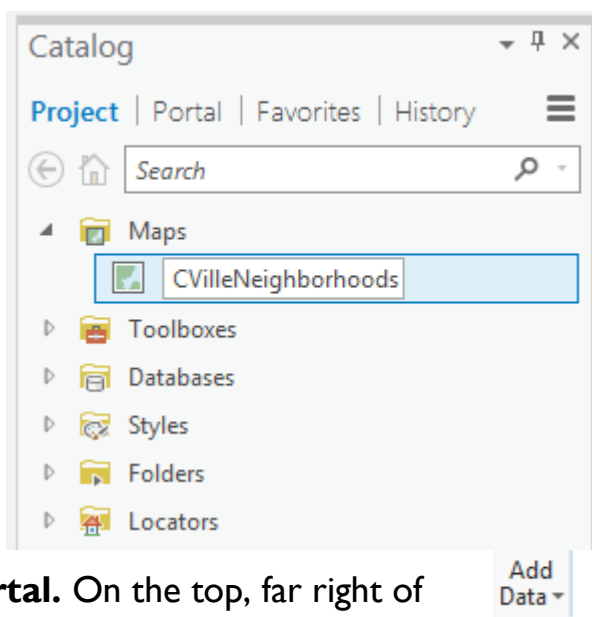
1. Click the **Insert** tab, and click **New Map**.

A new map named “Map” is added to your project and opened. Let’s give it a useful name.



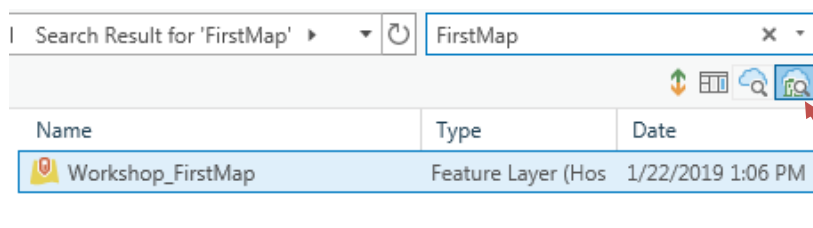
2. To the right of your project, you should see the **Catalog Pane**. If you don’t see this, click the **Insert** tab and click **Catalog Pane**. Expand the **Maps** section, right click “Map” and click **Rename**. Type “Cville Neighborhoods”.

Note: There is a Catalog Pane that appears on the right side of the project. There is also a Catalog View that appears as a window in the main area with the Cville Neighborhoods map. They function very similarly.



3. Click the **Add Data** button, on the **Map** ribbon. We want to search for layers on UVA’s ArcGIS Online site. Under **Portal** select **All Portal**. On the top, far right of the dialog, click **Search My Organization**.

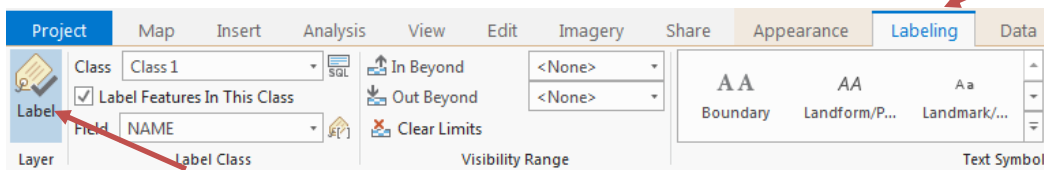
4. In the search box, type “**FirstMap**” and hit Enter. Click **Workshop_FirstMap**, and click **OK**.



This adds a feature service to your project. If you click to expand **Workshop_FirstMap**, you'll see that this service contains two layers, Census Block Points and Neighborhoods. With the proper privileges, you have the ability to manipulate ArcGIS Online layers and edit their geometries and attributes in Pro. You don't have those privileges on these layers, but you can make them your own by saving them to your project database.

First, let's label the Neighborhoods so that we can identify them.

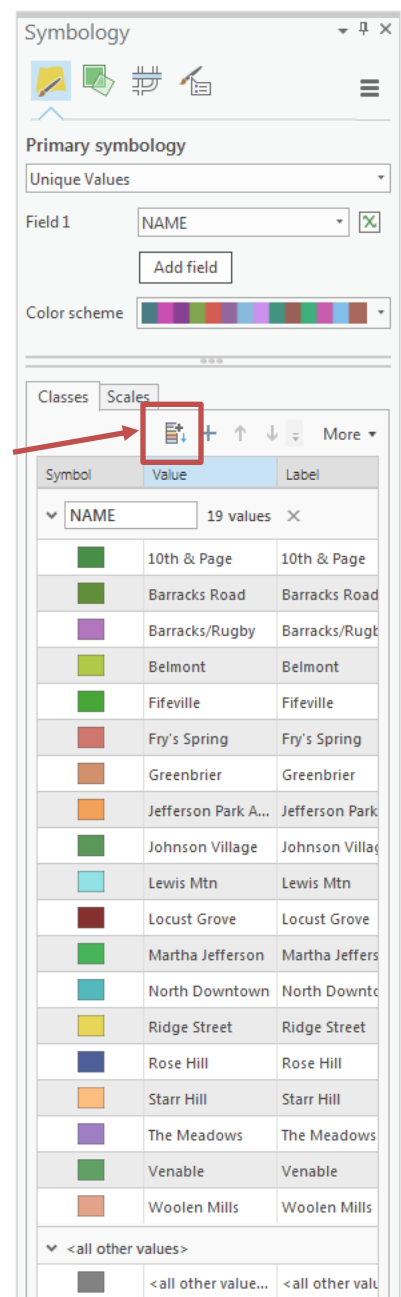
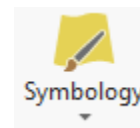
- Click on the **Neighborhoods_Cville** layer to highlight it, then click the **Labeling** tab.
- Click **Label** on the far left of the ribbon to enable the labels. Make sure **Name** is selected for the labeling **Field**.

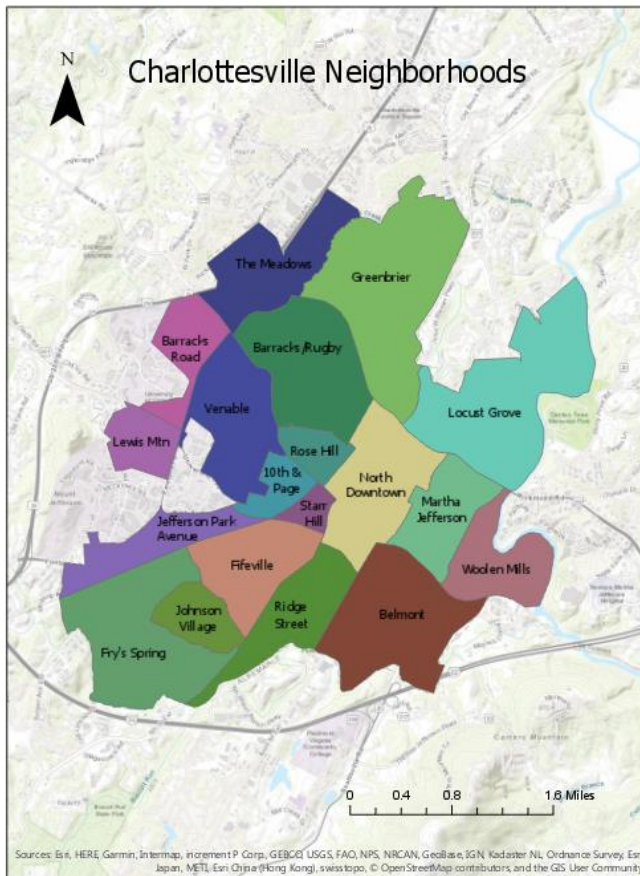


How did the GIS find the neighborhood names? Right click the Cville Neighborhoods layer and choose **Attribute Table**.

Each GIS layer can have many attributes. Our labels came from the Name attribute. These names were created by the Charlottesville GIS Analyst who built this and many other layers. Now, close the attribute table.

- Let's assign a unique color to each neighborhood. Click the Neighborhoods layer to highlight it, click the **Appearance** tab and click **Symbology**. In the Symbology dialog, change the option from **Single Symbol** to **Unique Values**. Make sure Field 1 is set to Name. Choose a Color Scheme, then click the Add All Values button to symbolize all values
- Save your work often. Click the Save button on the top left, or click Project > Save.





Next we'll get our map ready to export as a .jpg, .png or .pdf to insert in a report, presentation, or email.

9. Click the **Insert** tab. Click **New Layout**, and choose **Letter**.

10. Click **Map Frame** and select Cville Neighborhoods. This puts our map on a virtual 8.5 x 11 sheet of paper.

11. If you need to change the zoom or pan of the map, click **Activate**, then move the map to the proper position. When done, click the **Layout** tab, and click **Close Activation**.

12. Click the **Insert** tab and use the Map Surrounds section to add text, scale bar, North arrow, etc.

13. Now we're ready to export our map so

we can insert it in a presentation, report or email. Click the **Share** tab, and in the **Export** section, click **Layout**. Change Save as type: to the type of file you want to create, .jpg, .png, or .pdf are commonly used.

14. Browse to an appropriate folder and give your exported map the file name **CvilleHoodsMap**. Click Export to export your map. Use Windows to browse to the folder and open your finished map.

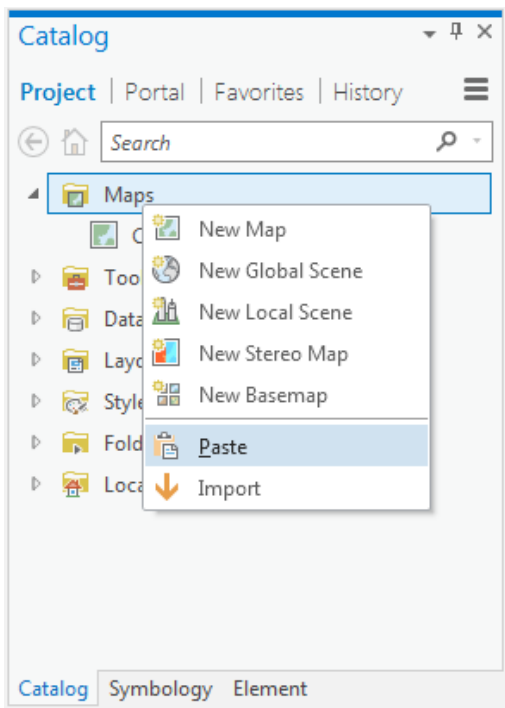
15. Click the Save button to save your map, layout and project. Close the map and layout.

Congratulations cartographer! You've just made a customized map using Geographic Information Systems software.

Making a Neighborhood Population Map - Graduated Colors

Even if using the same data, it's good practice to create a new map when representing that data in a different way. This way, you can go back and make incremental changes to your map without having to re-create it.

Since we'll be using the same data as before, let's create a copy of our Cville Neighborhoods map in the Catalog Pane or Catalog View. To view the Catalog Pane, click the **Catalog** tab on the bottom of the right-hand pane section. Or, click the **View** tab and click **Catalog Pane**.



1. In Catalog, expand **Maps**, right-click the Cville Neighborhoods map, and click **Copy**. Then, right-click **Maps** and click **Paste**.

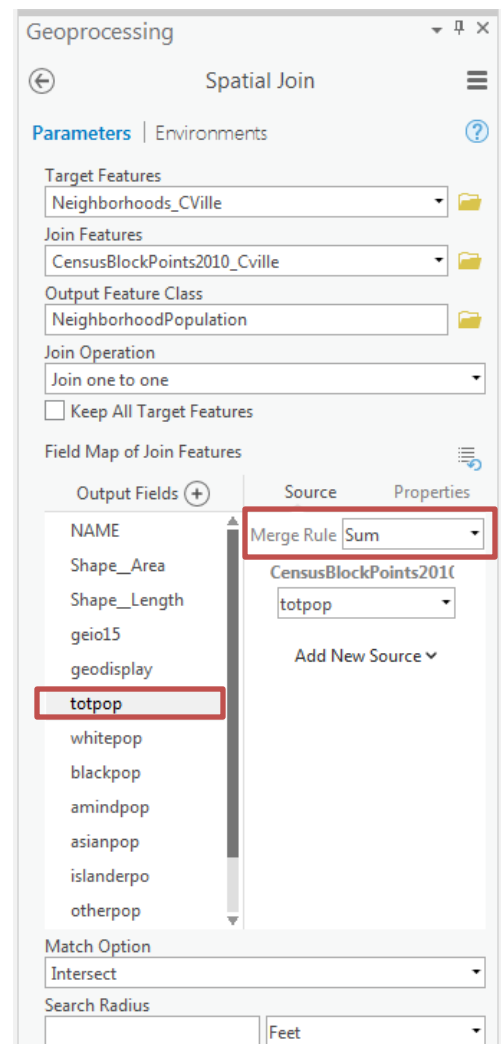
2. Rename the Map “**Cville Pop**”. Right-click the Cville Pop map and click **Open**.

Look familiar? It’s an exact copy of our Cville Neighborhoods map. Let’s change that! You’ll recall that, when we viewed the Neighborhoods attribute table, it only contained the neighborhood names, no population information. Thanks to the power of GIS, we can fix that by aggregating the block point information with the neighborhoods.

3. In the Table of Contents, click the box next to the CensusBlockPoints layer to make it visible.

These points show the center of each 2010 US Census Block. Open this layer’s attribute table to see population values. To summarize the population count from the Census Block layer into our Neighborhood layer we’ll use a powerful process unique to GIS, the **Spatial Join**.

4. Close all the attribute tables. Click the box next to CensusBlockPoints to turn off visibility of these points.
5. Right click the Neighborhoods layer and click **Joins and Relates > Spatial Join**. Set up the Join Data dialog box like the picture. We want to summarize Total Population, so be sure to select **totpop** and set **Merge Rule** to **Sum**.
6. Click **OK** to create the new layer. Once complete, the new layer is added to your map.
7. Right-click **NeighborhoodPopulation** and open the attribute table.

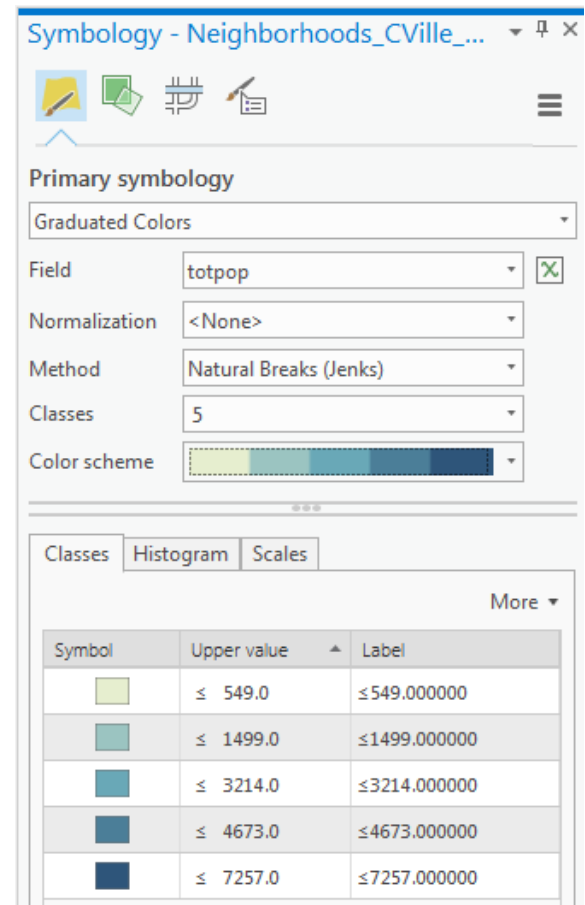


The GIS has summarized the total population for each neighborhood. Now we have the population numbers we need to make a thematic population map of the neighborhoods.

8. Turn off all layers except NeighborhoodPopulation and close all attribute tables. Right-click the new layer and click **Label**.
9. Right click NeighborhoodPopulation and click **Symbology**. Set up the Layer Symbology dialog as shown.
10. Now the neighborhoods are coded by color showing Total Population low to high.

In this case, we only got the sum of the total population field. The tool allows us to aggregate the points and attributes in a number of ways, all of which can be mapped and symbolized to visualize differences and disparities.

Feel free to add labels to this layer as before. You can also create a layout containing the typical map elements we used in the previous example. However, ArcGIS Pro allows us to take advantage of the cloud sharing capability of ArcGIS Online.



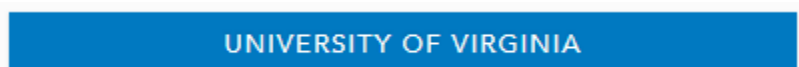
ArcGIS Online

ArcGIS Online is an excellent platform for spatial data sharing. It allows you share your data with the world, or with specific people. You can use AGOL to collaborate around spatial data, and collectively contribute to the creation and modification of data layers.

1. Right click the **NeighborhoodPopulation** layer, click **Sharing**, and click **Share as Web Layer**.
2. Enter a **Summary** of your layer, and enter at least one **Tag**.
3. Click **Publish**.

You've now published your own feature layer to ArcGIS Online. Let's view it in your Content.

1. Go to: <https://uvalibrary.maps.arcgis.com/home/signin.html>
2. Click **University of Virginia**



3. Sign in using your NetBadge credentials.
4. Click Content to view your content.
5. Click **NeighborhoodPopulation** to view information about your layer.