

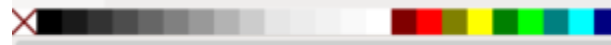
## **We will be making an ASU keychain file for laser cutting!**

### Set Up Document

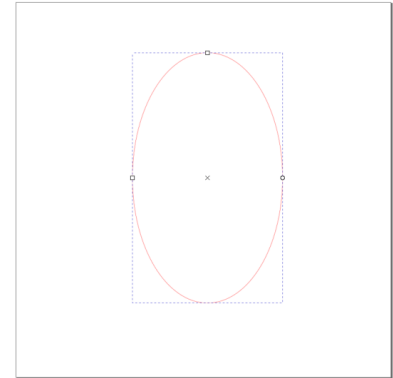
1. Open Inkscape
2. Click “New Document” if one does not already pop up
3. To change the size of the canvas you are drawing on...
  - a. Go to “File” → “Document Properties”
  - b. You can change it to a specific page size or customize it in “Custom Size”
4. Change the dimensions of the canvas to 150 x 150 mm
  - a. The max dimensions for the laser cutter are 32 x 18 inches
  - b. Usually helpful to make your canvas the size of the laser cutter or your wood
5. Exit “Document Properties”
6. Click “View” → “Display Mode” → “Visible Hairlines”
  - a. This allows us to see the lines that we will create

### Make circles and align

1. Set up the colors for your circle
  - a. We want the stroke (i.e., border) to be red and the fill (i.e., inside) to have no fill
2. Hover over the colors at the bottom row and you will see that you have 2 options.
  - a. Click to set fill
  - b. Shift + Click to set stroke
3. Click on the very left tile in the bottom row - it has a white background with an X
  - a. This is the “no fill” option
4. Hold down shift and click on the red tile in the bottom row
  - a. Make sure to select the correct red!
5. Click on “Circle” button on the left hand side (see pic to right)
6. In the top right corner, you should see it say “Fill: None” and “Stroke: (red square)”
7. Now we will create our circle! Click anywhere in the canvas and hold and drag to create a circle
  - a. It doesn’t matter what size, we will change that next
  - b. It should have a red outline with no color on the inside
8. Before de-selecting the circle, we will adjust the dimensions of it. In the top left corner, change the value in Rx to 30 mm and Ry to 50 mm
  - a. Keep in mind this will change the radii of the circle/ellipse so the actual height and widths are double these numbers



9. Change the width of the red border by going to “Object” → “Fill and Stroke”
  - a. This pulls up a menu on the right hand side. Click on “Stroke style” at the top of this menu
  - b. We want the width to be a value of 0.001 in
  - c. This is what will be cut by the laser!

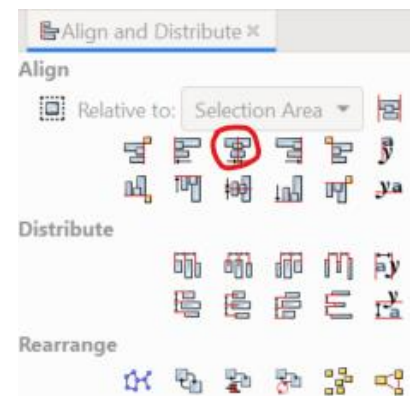


10. Your ellipse should now look like the figure to the right:
11. Now we will make a circle for the hole in the keychain
12. Again, click on the ‘circle’ button if you do not have that

- a. Try to put your circle close to the top-center of the old circle
  - b. Change the radius (Rx and Ry) to 4 mm
  - c. This smaller circle should have the same properties as the larger ellipse you drew before but double check
13. Now click on the ‘select’ button in the top left corner (see right) and click in the empty space outside of the canvas
14. We want to select both circles and align them. Click and drag from the empty space on the canvas to select both circles
15. Now go to “Object” → “Align and Distribute”

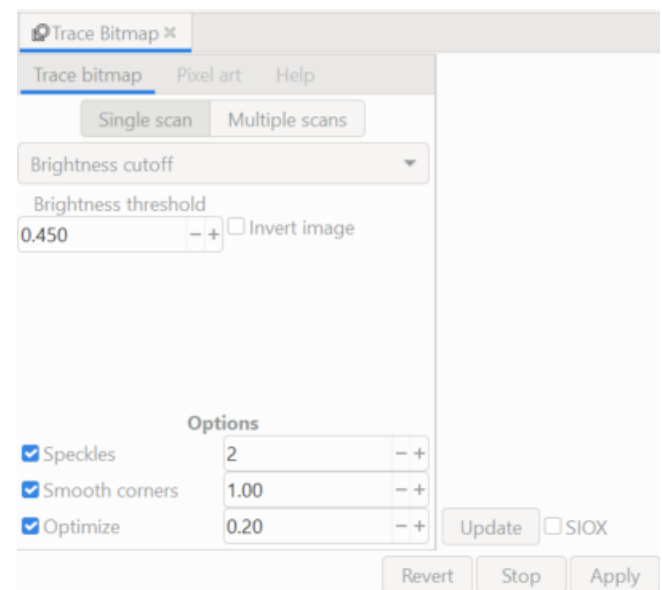


- a. We have a lot of options here but we want to align the center of the circles on a vertical axis (see pic to right). Click this button.
16. If you need to adjust the position of your small circle, make sure it is the only object selected and use arrow keys to move it up/down.



### Add black/white image to keychain

1. Now we want to find an image to raster onto your keychain
2. Ideally we want images to be large, high resolution, black and white, with no background
3. Google image search “asu logo”
  - a. One results come up, click “Tools” and do the following:
    - i. Change “Size” to “Large”
    - ii. Change “Color” to “Black and White”
  - b. Click on Sparky or Pitchfork logo (I use Sparky)
    - i. Right click on the enlarged image and click “Copy Image”
4. Go back to inkscape, right click on the canvas and select “Paste”
5. Image will be very large, scale down to fit the bottom of your keychain
6. Hold down “Control” and select the bottom left “arrows” of the pic to make your image smaller
  - a. Holding down “Control” keeps the aspect ratio the same
7. The raster should be fine now but we can ensure it is black/white by doing “trace bitmap”
8. Right click on Sparky and select “Trace
9. We will do a single scan at a “Brightness threshold” of 0.450
10. Click “Update” and you will see a preview of the image to the right
11. If you need to change your brightness threshold, feel free and click “Update” to see new previews
12. Once you are happy with the result, click “Apply”
13. When this happens, it creates a COPY of the previous image with the new settings. Be sure to move your new image away and delete the old one



### Add vector text to keychain



1. Click the text button on the left hand side and click on the canvas
2. Select the font you want to use in the top left corner
3. Type out your words and select the text. We want to change the fill to “No fill” and stroke to “blue”
4. Make sure that the width of the blue stroke is 0.001 in

#### Add color image to keychain

1. Delete sparky and go back to google image search
2. Google image search “asu logo”
  - a. One results come up, click “Tools” and do the following:
    - i. Change “Size” to “Large”
3. Click the Pitchfork + ASU image (was my 3rd result)
  - i. Right click on the enlarged image and click “Copy Image”
4. Go back to inkscape, right click on the canvas and select “Paste”
5. Image will be very large, scale down to fit the bottom of your keychain
6. Hold down “Control” and select the bottom left “arrows” of the pic to make your image smaller
  - a. Holding down “Control” keeps the aspect ratio the same
7. Right click on Sparky and select “Trace Bitmap”
8. We will do a single scan at a “Brightness threshold” of 0.450
9. Click “Update” and you will see a preview of the image to the right
10. If you need to change your brightness threshold to improve, feel free and click “Update” to see new previews
11. Once you are happy with the result, click “Apply”
12. When this happens, it creates a COPY of the previous image with the new settings. Be sure to move your new image away and delete the old one



#### Add more detailed color image to keychain

13. Delete ASU logo and go back to google image search



14. Google image search "sparky mascot"
  - a. One results come up, click "Tools" and do the following:
    - i. Change "Size" to "Large"
15. Click a Sparky image ideally with a white background
  - i. Right click on the enlarged image and click "Copy Image"
16. Go back to inkscape, right click on the canvas and select "Paste"
17. Image will be very large, scale down to fit the bottom of your keychain
18. Hold down "Control" and select the bottom left "arrows" of the pic to make your image smaller
  - a. Holding down "Control" keeps the aspect ratio the same
19. Right click on Sparky and select "Trace Bitmap"
20. We will do "multiple scans" now!
21. Select "Multiple scans" and set the scan number to "5" and press "Update"
  - a. Sometimes the "Update" pic here doesn't do a good preview so you maybe need to just "Apply" and see how it looks
22. If you need to change your # of steps to improve, feel free but if you select a lot of steps (>8) it will take a longggg time
23. Once you are happy with the result, click "Apply"
24. When this happens, it creates a COPY of the previous image with the new settings. Be sure to move your new image away and delete the old one
25. This creates a grayscale image so that the raster will laser to different depths to give the impression of different colors
26. We will want to rotate our new image. Click on our grayscale Sparky, select "Object" at the top then "Rotate 90° CW". Move Sparky to your desired location

### Exporting

1. Once you are happy with your design, we will need to export an .svg file to take to the laser cutter
2. Click "File" → "Save as..." and then give it a name and save as an .svg file

### Making a box

1. Go to one of the following websites:

- a. <https://en.makercase.com/>
  - b. <https://www.festi.info/boxes.py/?language=en>
2. Enter the parameters you want for your box and download an .svg file to your computer
3. Go to file on computer, and open it using Inkscape
4. Be sure to make hairlines visible! (View → Display Mode → Visible Hairlines)
5. Select all objects and ensure that they have the correct values for stroke (0.001 in), color (red), etc