

LASER CUTTER PROJECT: DESIGN A LASER CUT SNOWFLAKE ORNAMENT



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What you need to know:

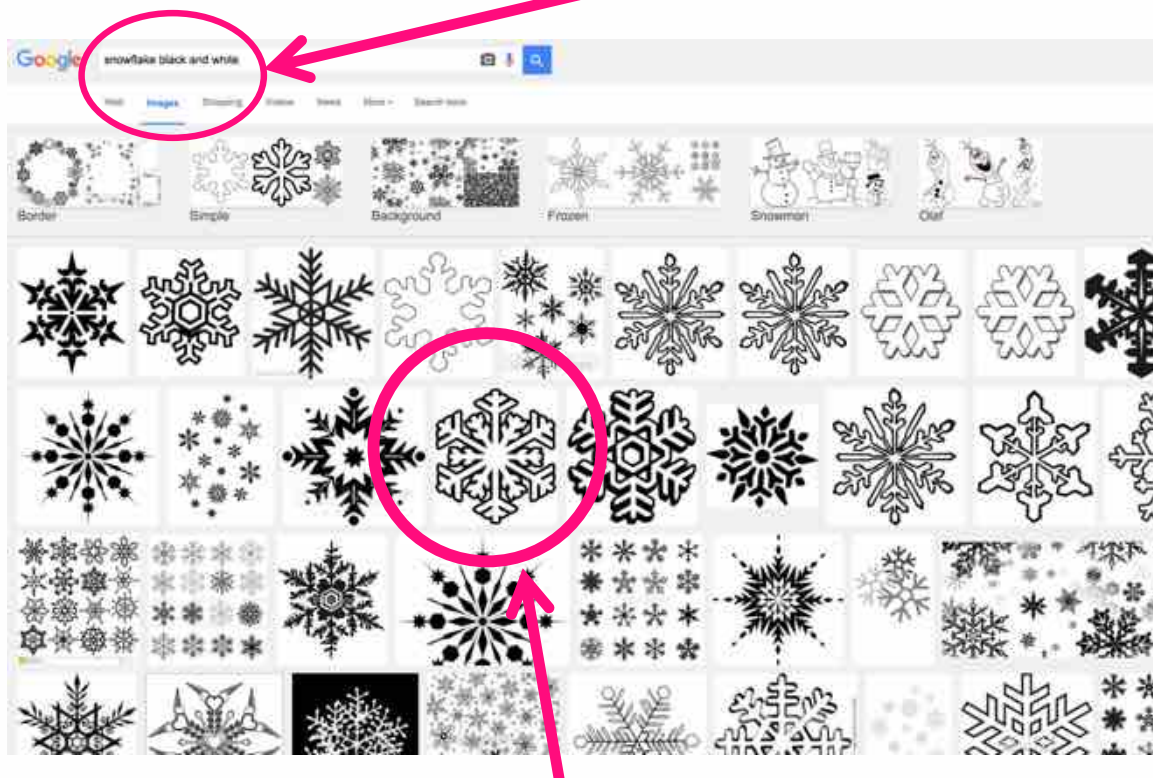
Basic computer knowledge

What you need:

- Computer
- Inkscape
- Internet
- 2 contrasting pieces of either felt, craft plywood, cardboard, or acrylic plastic Material

Part 1: Finding an Image for the Design

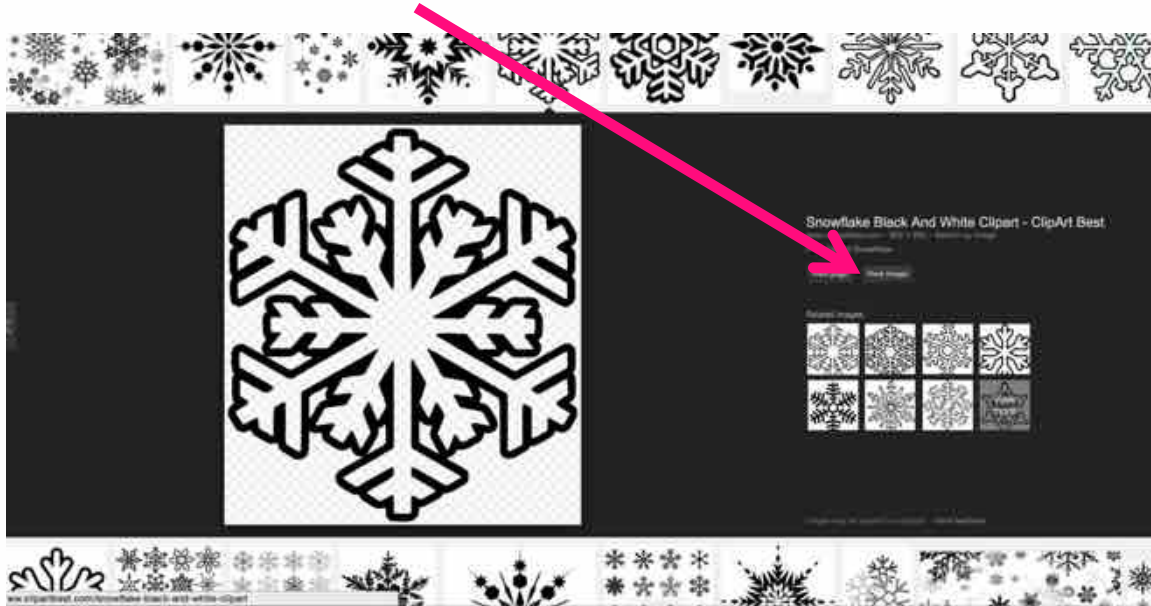
1. Open your internet browser and search for a black and white snowflake image



2. Choose an image and click on it

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3. Click 'View Image'



4. Right click on the image and select 'Save as' to save it to your computer as a .jpg or .png file



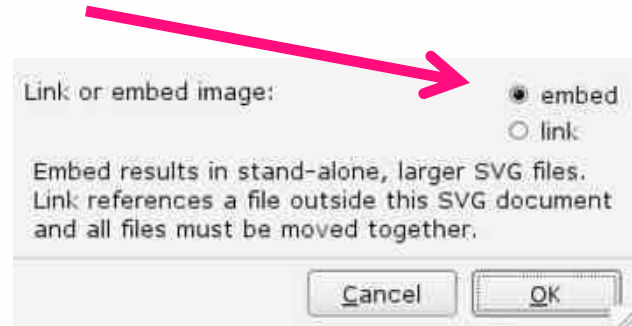
Note: remember where you save it because you'll need to find it later!

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Part 2: Vector preparation

1. Open your image file in Inkscape

Note: if you get a pop-up asking if you want to link or embed image, select embed and click OK



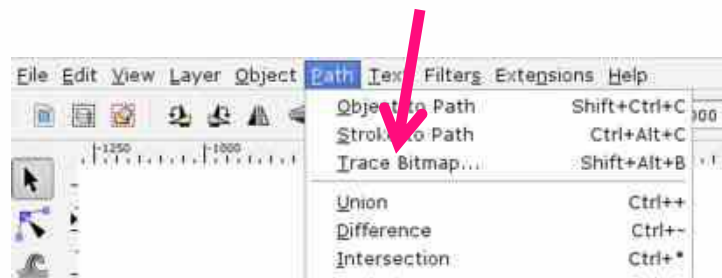
2. Create Bitmap Outline

a. Click on your image to select it



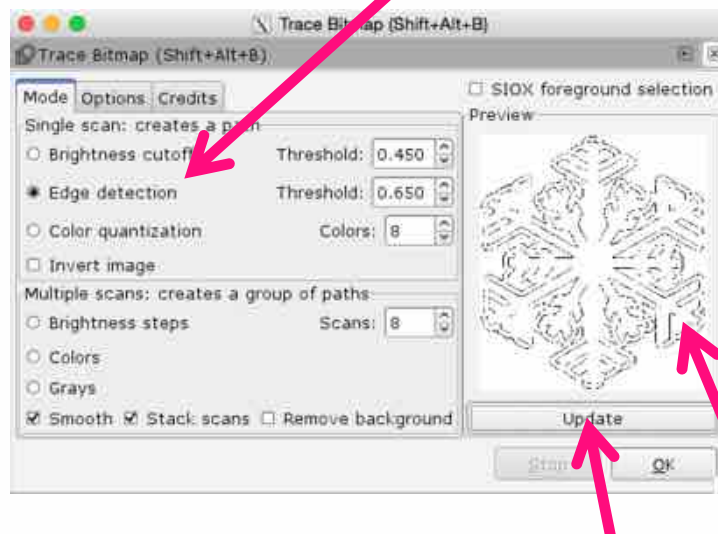
Note: you'll know it's selected when you see it surrounded by a box with arrows on the corners

b. Navigate to Path -> Trace Bitmap



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- i. In the Mode tab, select 'Edge Detection'

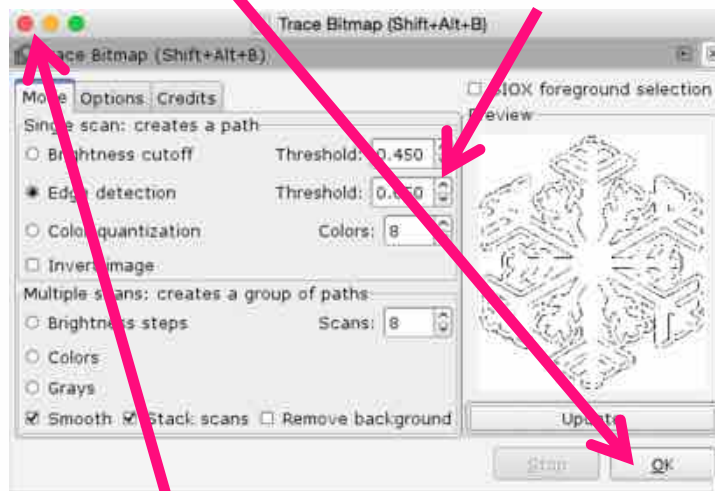


- ii. You can preview your outline by clicking 'Update'

Note: Generally this preview won't look great, but the bitmap will be fine. Feel free to proceed.

- iii. Click 'OK'

Note: For more advanced users, the threshold value can be changed to create a more accurate bitmap. However, the default value generally works well.



- iv. Close the Trace Bitmap window

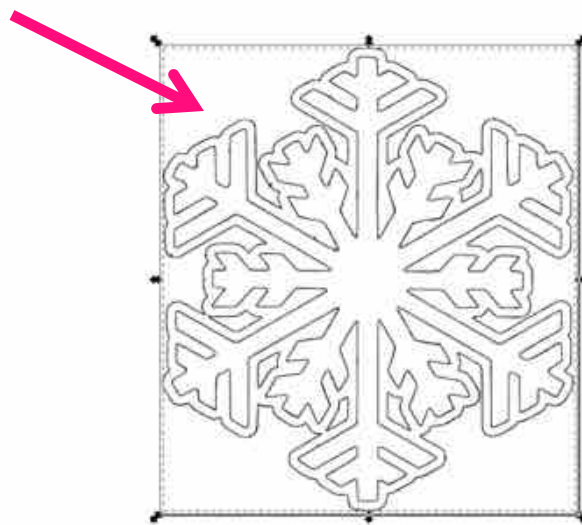
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c. Delete original image, leaving only the outline

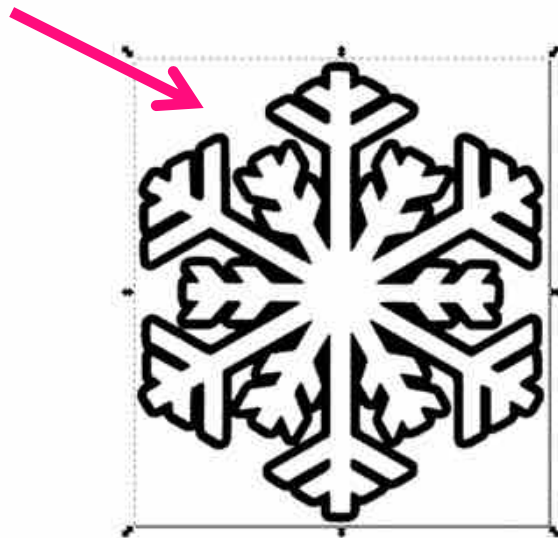
Note: The image and bitmap outline are perfectly aligned, so if you have trouble deleting the correct one, try this:

i. Click on image, copy it (Edit -> Copy) and delete it (Edit -> Delete)

ii. If the outline remains, skip ahead to Step 3



iii. If your original jpeg remains, click on it and delete it.

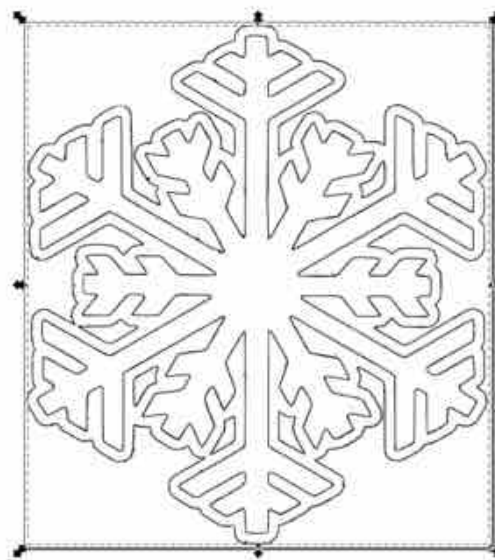


1. Paste the copied outline using Edit -> Paste in Place

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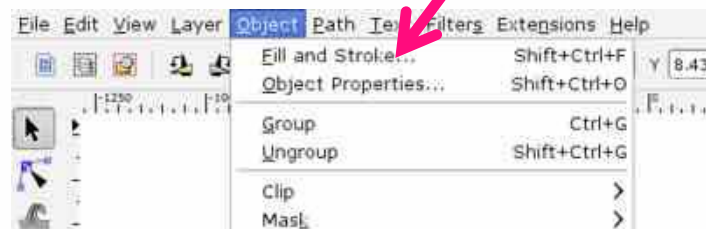
3. Separate Lines into Individual Vectors

- Click on the outline of your image to select it



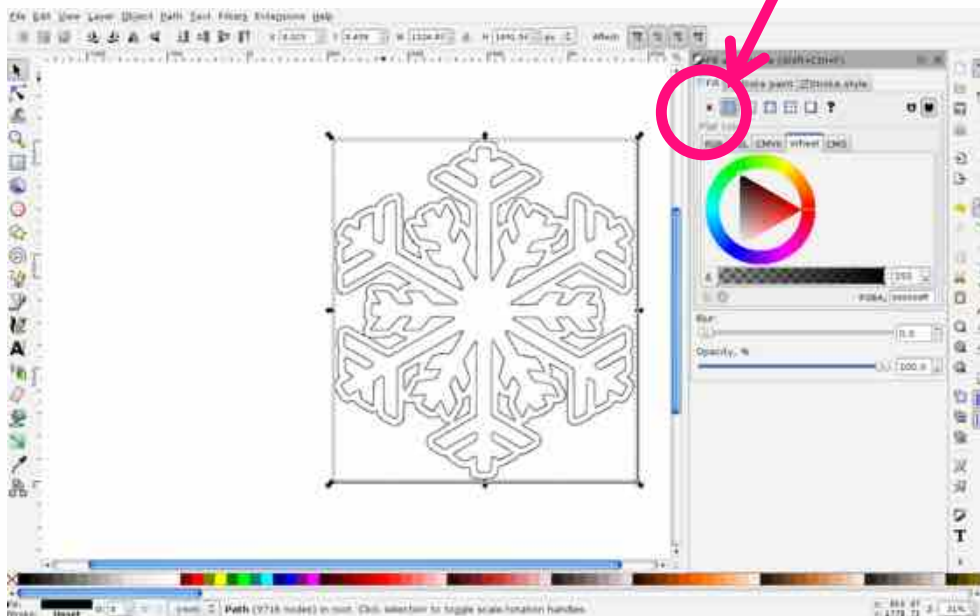
Note: Remember to look for the border with arrows to indicate the image is selected.

- Navigate to Object -> Fill and Stroke



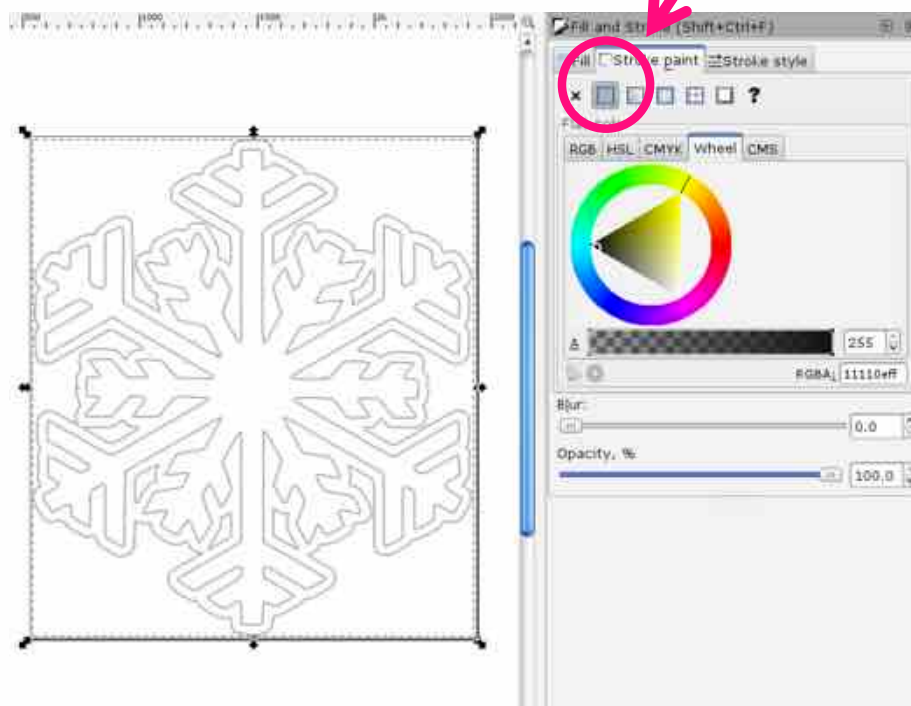
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i. In the Fill tab, select the 'X' in the top left



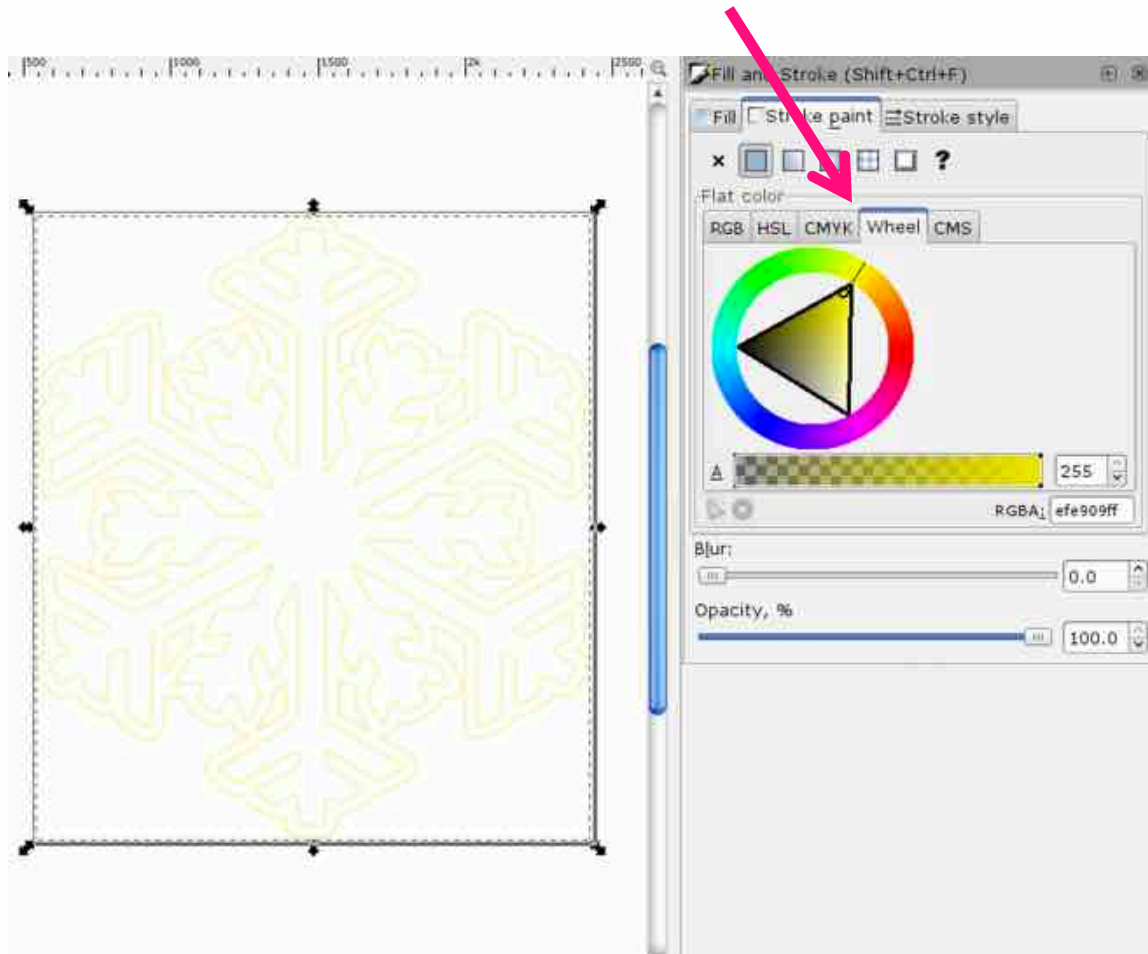
Note: Your
image will
seem to
disappear –
Don't Panic!

ii. In the Stroke Paint tab, select the solid rectangle adjacent to the 'X' in the top left



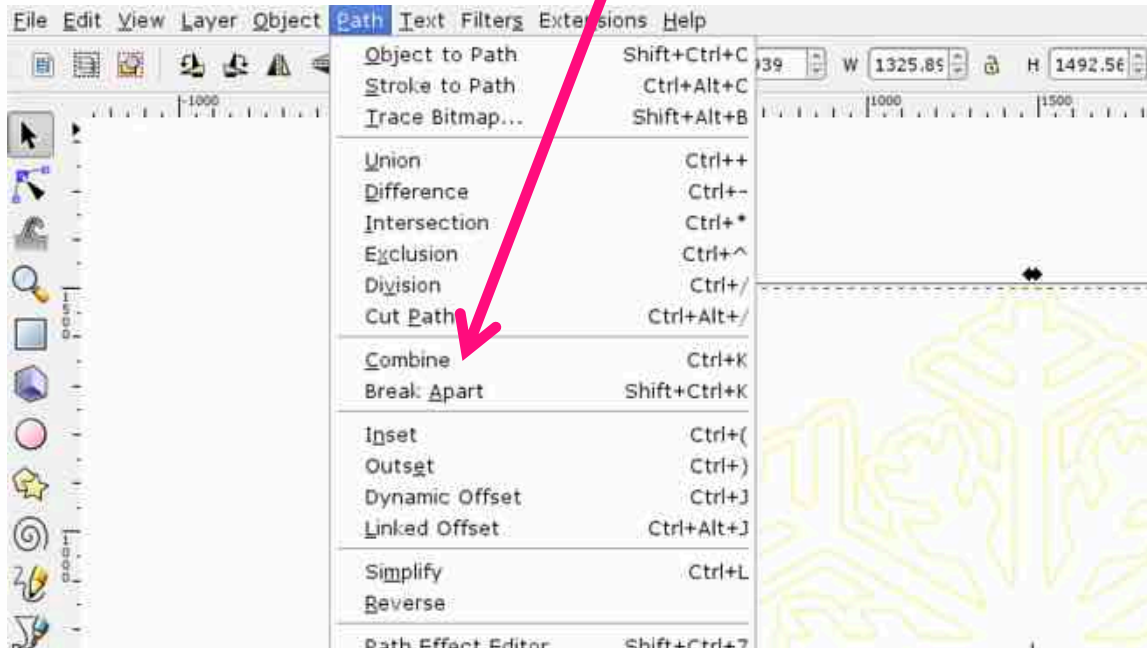
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- iii. Change the stroke line color to yellow by clicking on the yellow section of the color wheel and then clicking on the yellow corner of the triangle

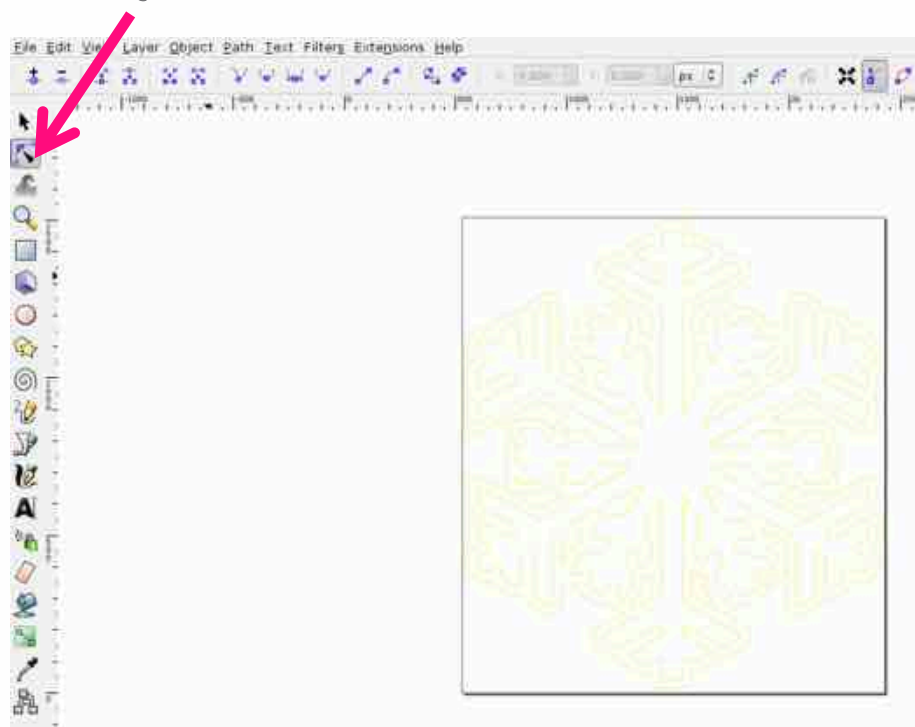


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c. Navigate to Path -> Break Apart

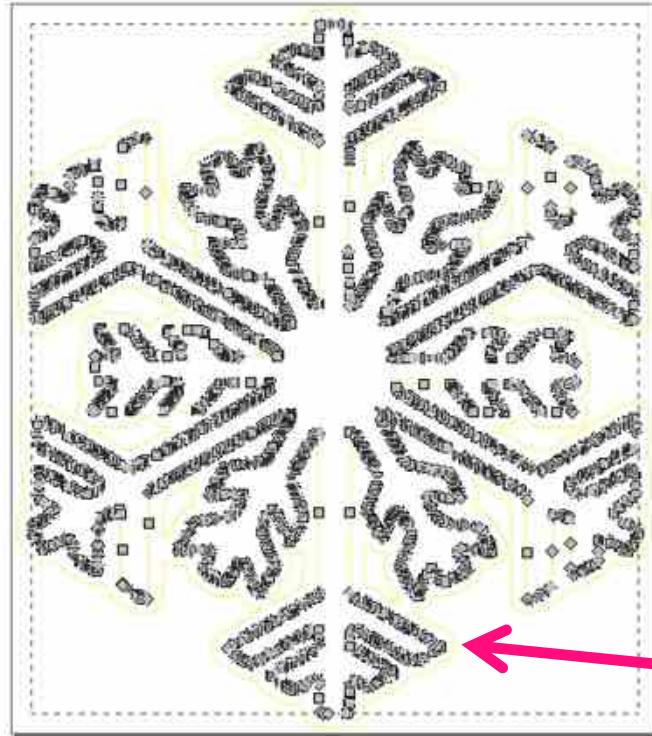


4. Designate which vectors the laser should cut by selecting 'Edit Paths by Node'



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a. Click on the inside line you want the laser to cut



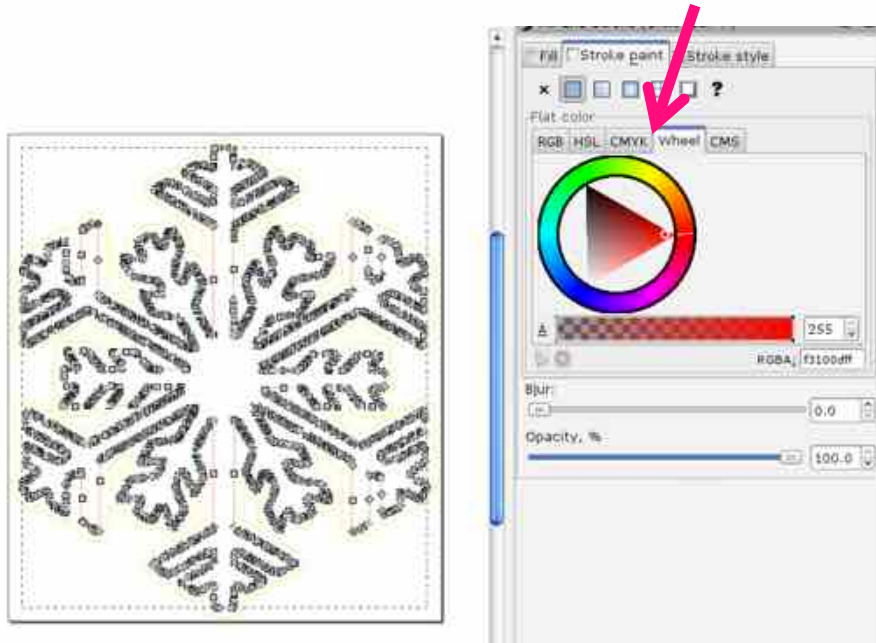
Note: All the individual nodes will be visible as gray boxes

Note: If you are having trouble selecting a single line, try this:

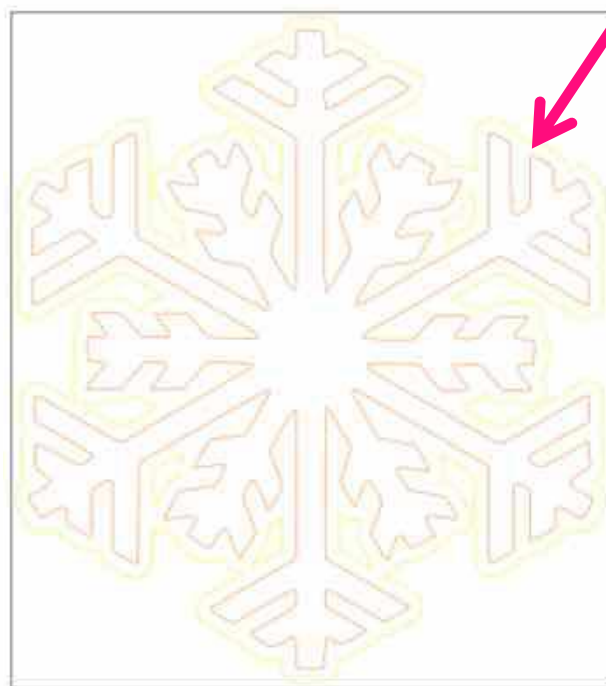
- click away from the image to de-select it
- hover over the line you want to select
- click on the line to select it

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b. Change the stroke color to something darker, like red.



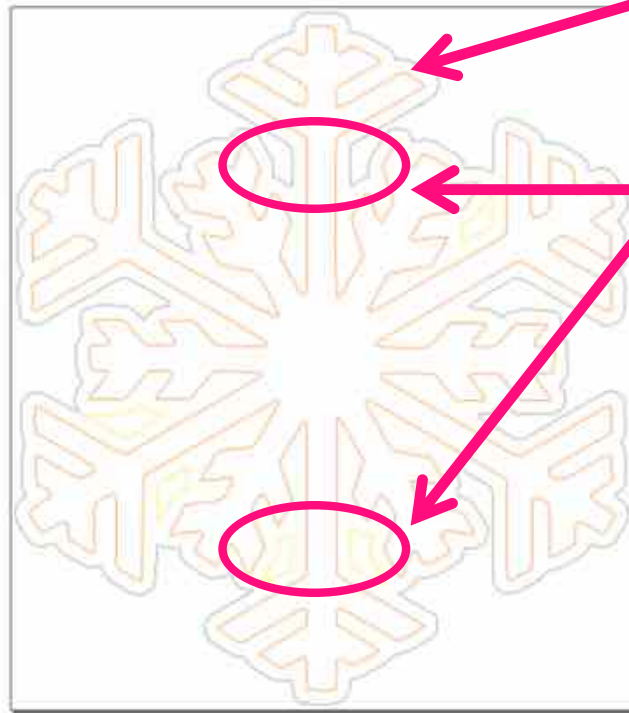
c. Click away from the line to unselect it and see the color change



Note: For our snowflake ornament, we need the inner snowflake line to be one color (red) and the outer border to be another color (blue)

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- d. Select the outer line and change the stroke color to dark blue



Note: Notice that our blue outline isn't symmetrical.

This is because of inaccuracies in the edge detection. We could solve this problem by going back and adjusting the threshold value when creating a bitmap

-OR-

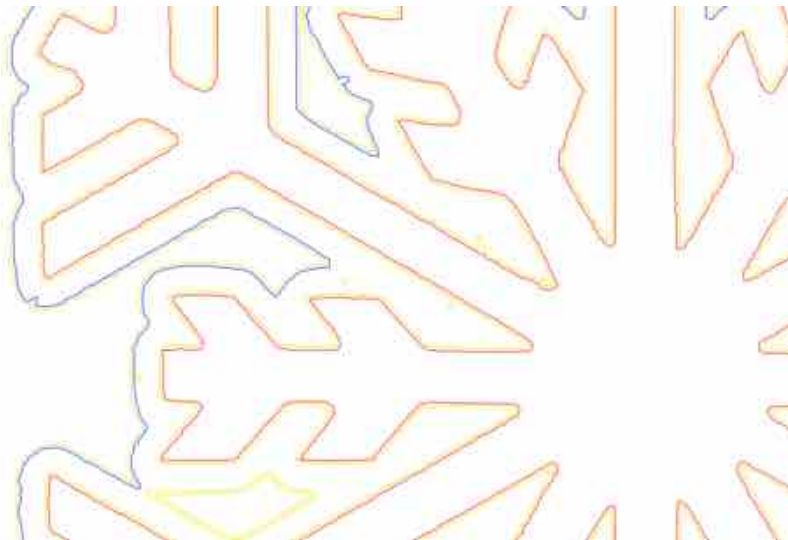
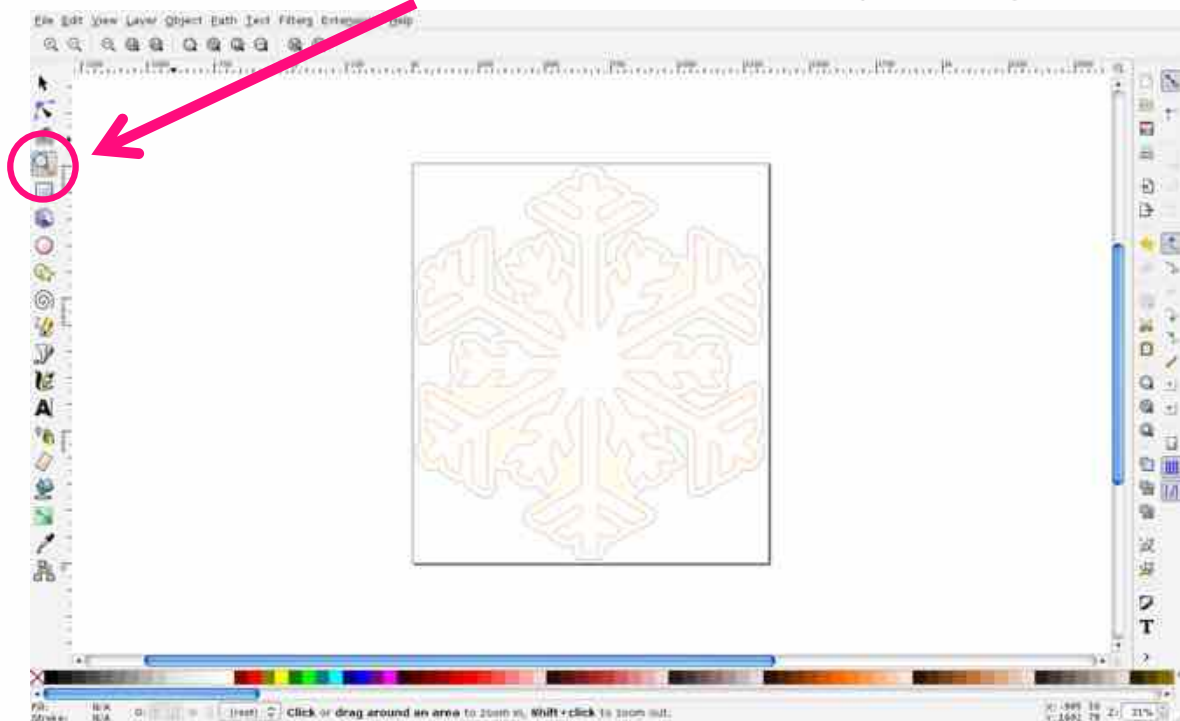
We can adjust the line here by deleting the points we don't want to include

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Note: If your outline is already symmetrical, skip step e

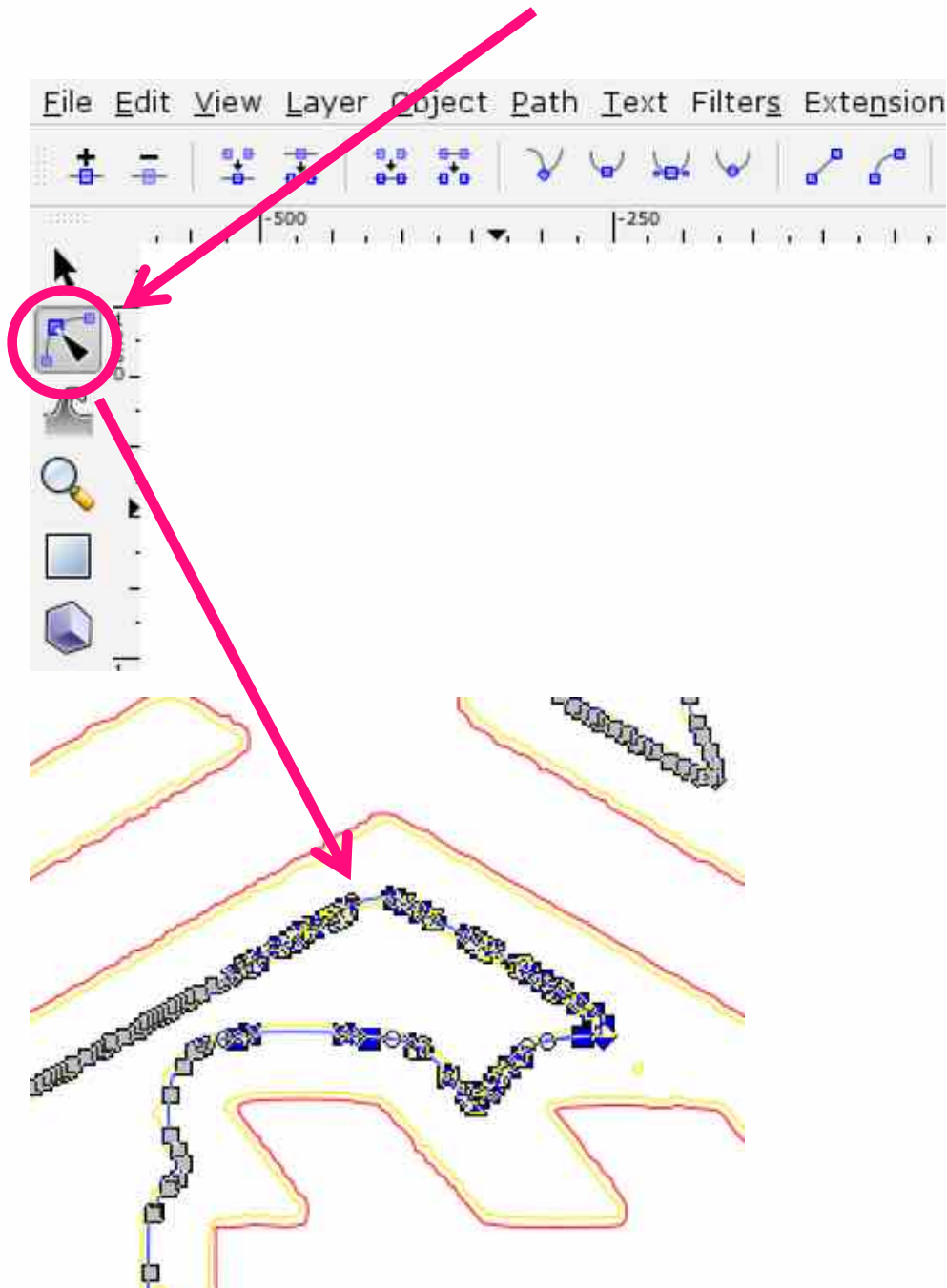
e. Delete the points we don't want to include

i. Use the Zoom tool to zoom in on your design



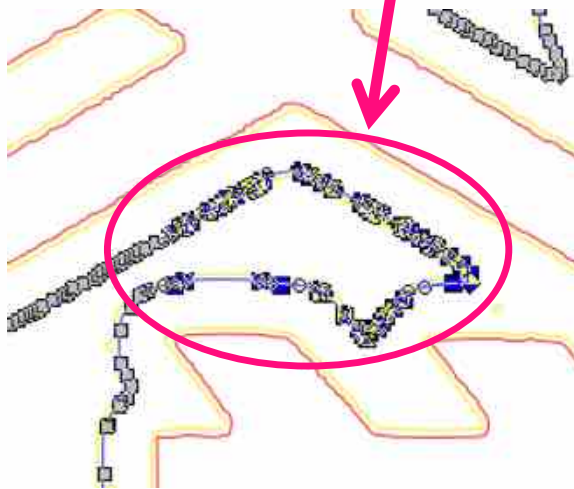
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ii. Using the Edit by Node tool, select the blue line



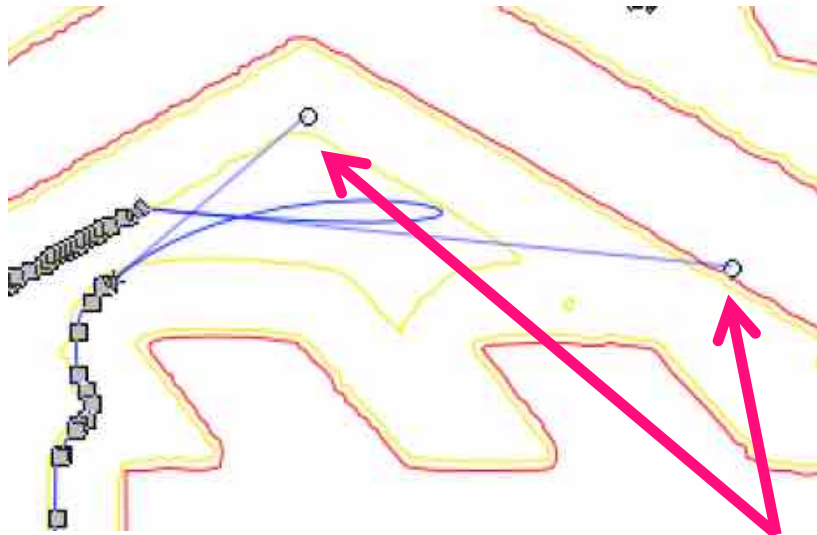
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- iii. While the blue line is selected, select the points you want to delete by dragging a box around them



- iv. Press Delete to remove those points

Note: The line may look a little weird, but we'll fix that

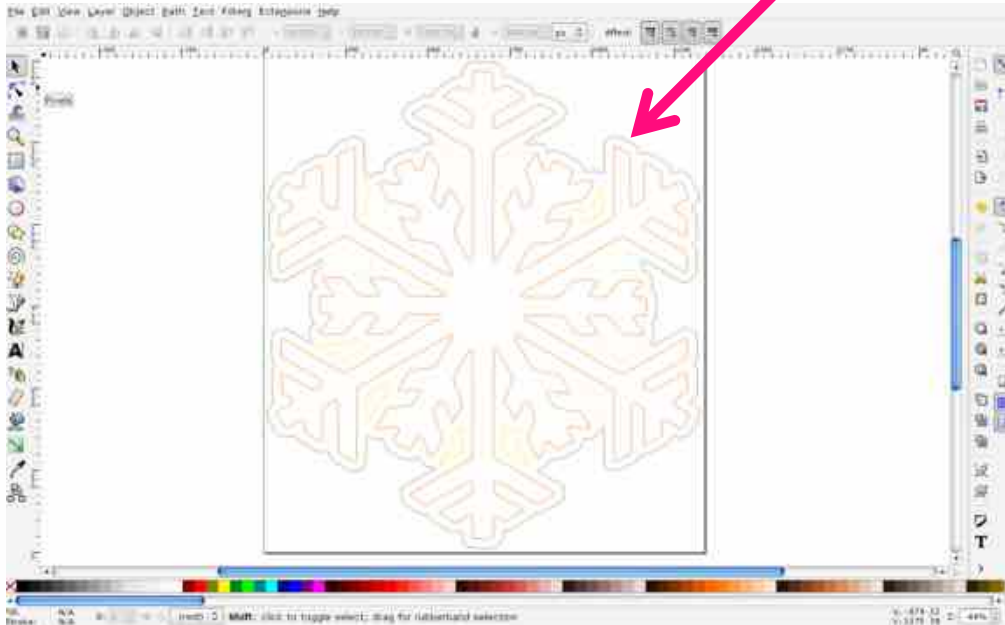


Note: Each node (square dot) has two additional points (circle dots) that determine the angle of the line on either side

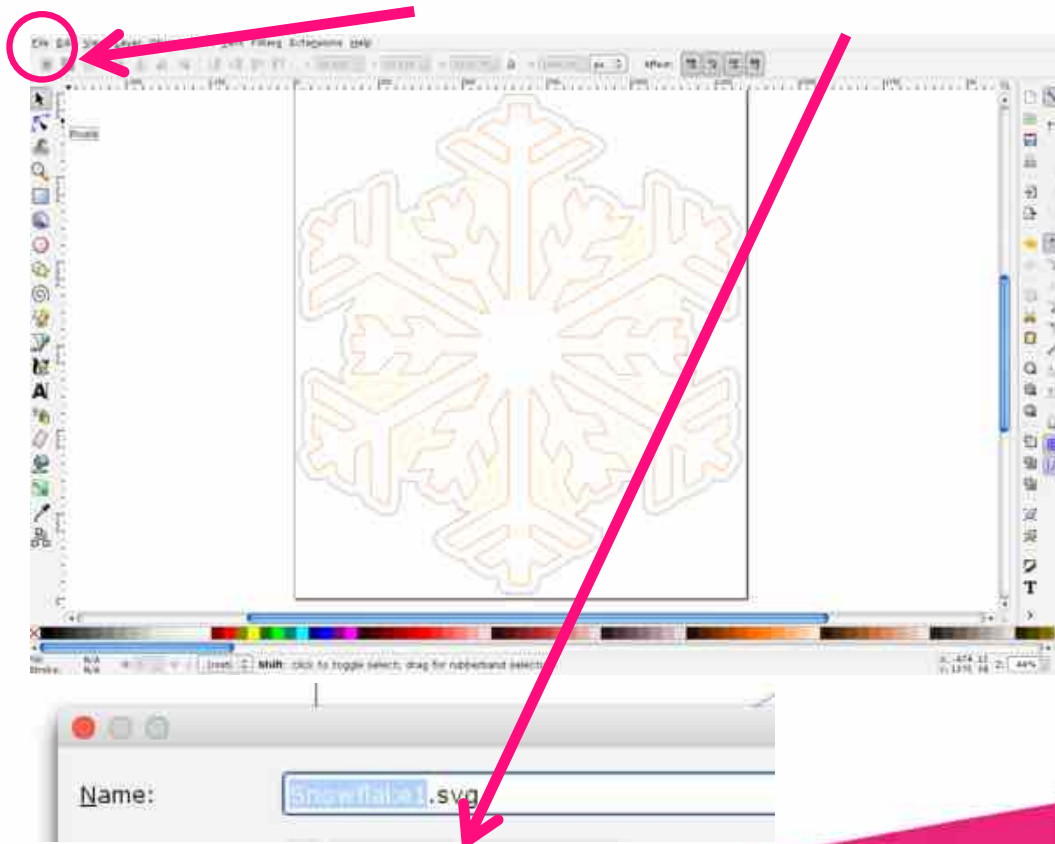
- v. Drag the circles so that they are right next to their corresponding square node points

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vi. Continue to delete extra points on your line, until you are happy with how both lines look



f. Navigate to File -> Save as, and save your file as .svg



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Part 3: Laser Cut Your Snowflake

IMPORTANT: The laser cutter is only operated by trained library staff, so please plan to laser cut your project during our full service makerspace hours, or make an appointment with staff to use the equipment.

Suggested material: felt, cardboard, plywood, cardstock, or colored acrylic plastic

1. Have a library staff member activate and prep the laser cutter.
2. On the laser cutter computer, open your .svg file in Inkscape.
3. Navigate to File -> Print, and print it to the Full Spectrum Engineering Driver
4. In Retina Engrave, input the recommended settings for your material
Note: this project is all vector cutting, no raster engraving
5. Cut 3 pieces – 2 red cuts, 1 blue cut
6. Glue the 2 red cuts to either side of the blue cut
7. Cut, drill, or laser a small hole in your finished ornament for the hook to attach

