Name _____ Period _____

Black and White Images

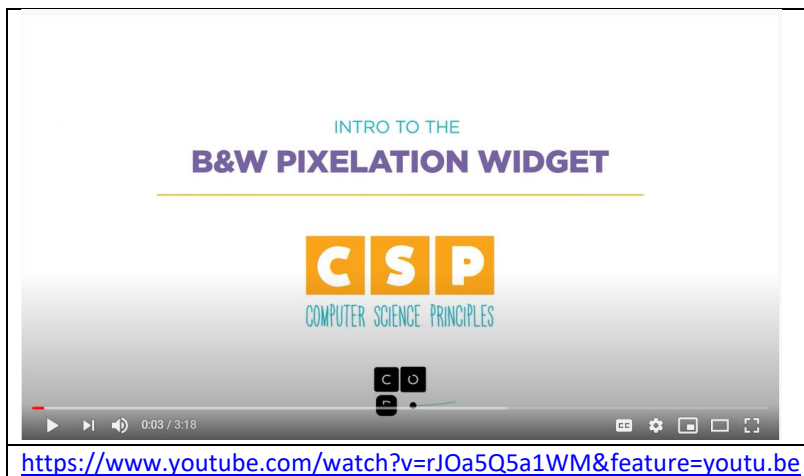| Your Tasks |
|---|
| ☐ Complete the warmup
☐ Get Acquainted with the pixelation widget
☐ Sample an analog image
☐ Create a logo using the pixelation widget
☐ Complete the reflection
☐ Receive credit for this lab guide |

☐ Complete the warmup

Imagine you recently did some online shopping and are expecting a package to arrive in about a month. The delivery service has a tracking system which reads the location of the package. How often would you want the location read? Every week? Every day? Every hour? Every minute? What if instead you won the lottery and were expecting a 2-million-dollar check in the mail, would this situation change how often you would want to read the location of the package? Discuss this with your partner and respond below,
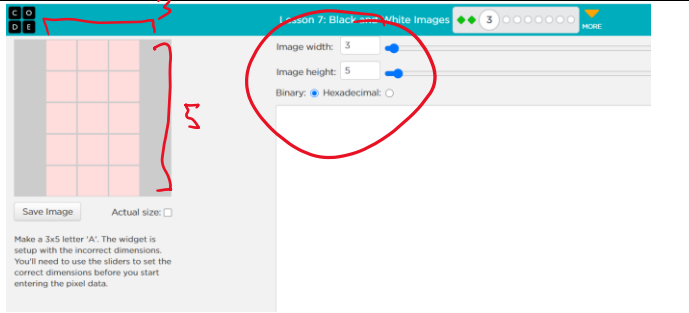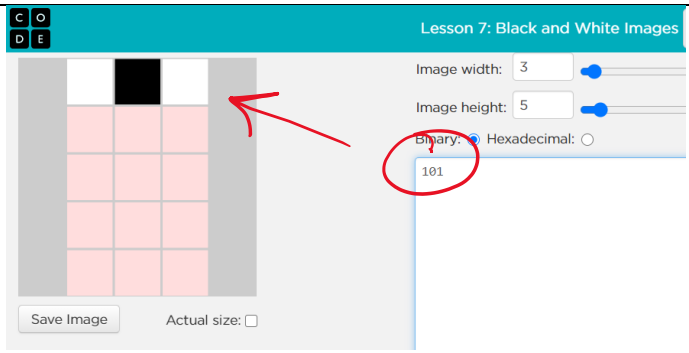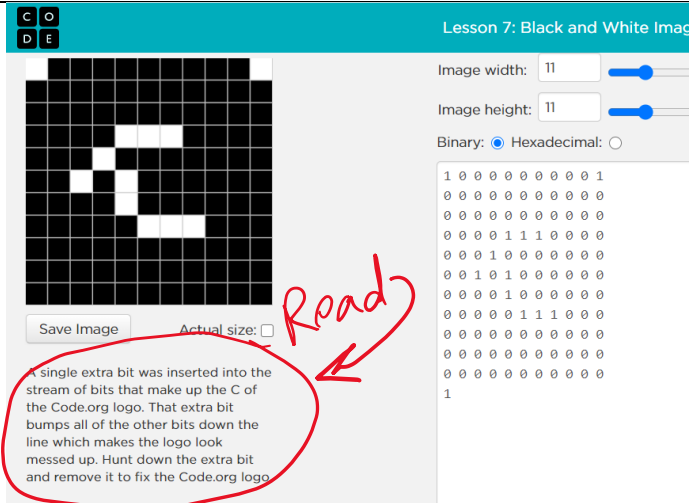

☐ Get acquainted with the pixelation widget

In the lab we will be using the pixelation widget. If you haven't already done so,

- If you haven't already done so, navigate to http://studio.code.org to create an account
- Navigate to https://studio.code.org/join and type in their section code: **SKGWSN**
- Once you have done the above, navigate to the following link, https://studio.code.org/s/csp1-2021/lessons/7/levels/2

To learn more about the pixelation widget watch the video below,

https://www.youtube.com/watch?v=rJOa5Q5a1WM&feature=youtu.be

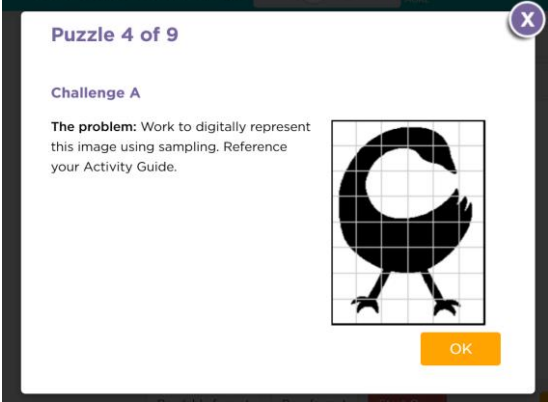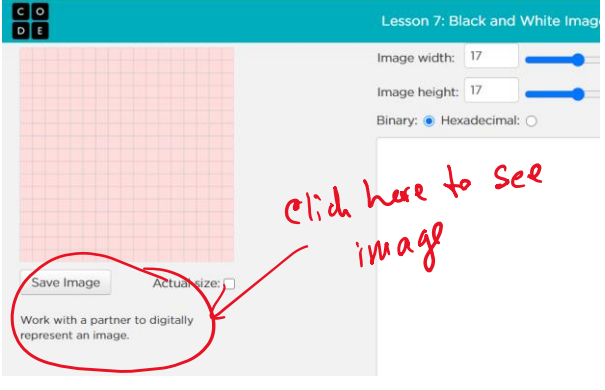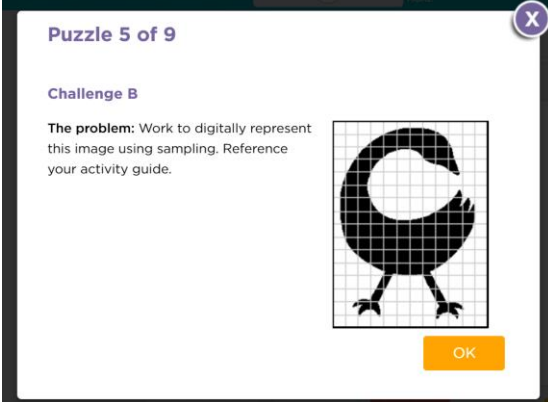|	
Use the sliders to adjust the pixels to 3 x 5	
Try to create the letter A using the black and white pixelation widget. Do this by typing the appropriate bit for each portion of the image ("0" for black, "1" for white).	
Navigate to the next stage (stage 3). Find and delete the extra bit that is causing the image to be distorted.	

☐ Sample an analog image

Now that you've had a chance to see how to set each pixel black or white, we are going to use the widget to represent an analog image using a process called sampling.

What is an analog? It's a term used to mean something with continuous representation - such as a picture you draw on a piece of paper. Each pencil line smoothly connects to the next, no matter how much you zoomed in on the picture with a magnifying glass.

When we represent an analog image digitally, we will have to make some choices on how to sample the image to get the smoothest representation possible while keeping in mind the number of bits it takes to build that image.

What does it mean to sample? We are choosing how small of sections to chop up the picture. The smaller the sample, the more pixels required to represent that image. Larger samples require less pixels, but the image can become blurry.
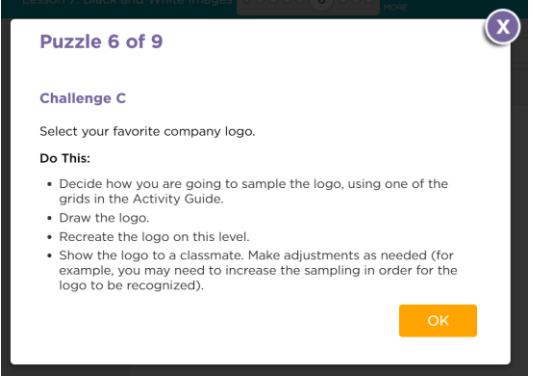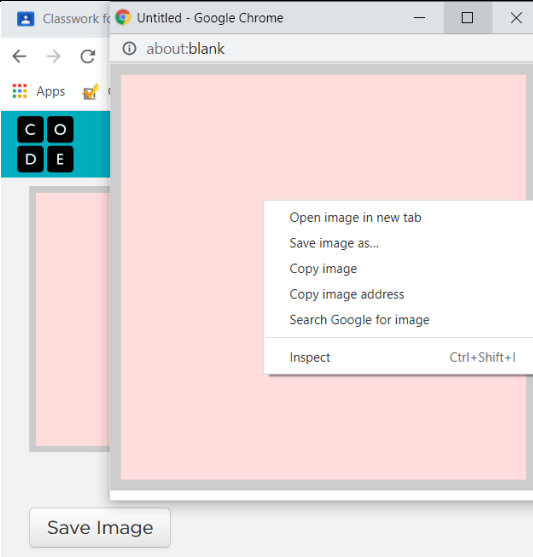
Try it out yourself!

Navigate to the next stage (stage 4).	**Puzzle 4 of 9** **Challenge A** **The problem:** Work to digitally represent this image using sampling. Reference your Activity Guide. OK
Adjust the sliders to a 6 x 8 grid. Work to digitally represent the image using sampling. To see the image you are trying to create, click the text below the "Save Image" button.	Lesson 7: Black and White Image Image width: 17 Image height: 17 Binary: ● Hexadecimal: ○ *Click here to see image* Save Image Actual size: ☐ Work with a partner to digitally represent an image.
When you are done, navigate to the next stage (stage 5). Adjust the sliders to whatever sized grid you want. Work to digitally represent the image as you did before.	**Puzzle 5 of 9** **Challenge B** **The problem:** Work to digitally represent this image using sampling. Reference your activity guide. OK

How many total bits were needed to create the image in Challenge B?

How long did it take to build?

How does the new digital image compare to the one from Challenge A. What effect did taking a larger number of samples have on the image?

☐ Create a logo using the pixelation widget

Navigate to the next stage (stage 6). Select your favorite company logo and recreate it using the pixilation widget.	**Puzzle 6 of 9** **Challenge C** Select your favorite company logo. **Do This:** • Decide how you are going to sample the logo, using one of the grids in the Activity Guide. • Draw the logo. • Recreate the logo on this level. • Show the logo to a classmate. Make adjustments as needed (for example, you may need to increase the sampling in order for the logo to be recognized). OK
When you are done, click the Save Image button. Then right click and select Copy image. If you cannot right click, go to following link to see how you can take a screen shot, https://www.google.com/intl/en_us/chromebook/howto/take-full-screenshots/	Open image in new tab Save image as... Copy image Copy image address Search Google for image Inspect Ctrl+Shift+I Save Image

Paste a picture of your logo below	Copy (Crtl-c) and paste (Ctrl-v) your binary code below

☐ Complete the reflection

1. Assume your friend just sent you 32 bits of pixel data (just the 0s and 1s for black and white pixels) that were encoded after sampling an image. Choose the two statements that are true.

   ☐ The 32 bits of pixel data is enough to produce the image using the widget. Nothing else is needed.
   ☐ The digital image would be an exact copy of the analog image.
   ☐ The correct width and height must be input into the pixelation widget to produce the image.
   ☐ The fact that only 32 bits were used to represent the image indicates relatively large sample squares were used. The digital image may vary from the analog image significantly.

2. Which of the following would result in a better digital approximation of an analog black and white image?

   ☐ Increasing the size of each sample square, thus decreasing the number of samples taken.
   ☐ Decreasing the size of each sample square, thus increasing the number of samples taken.
   ☐ Using fewer bits to represent the image.
   ☐ Using decimal numbers to represent each pixel.

3. Your computer science teacher asks you to sample a black and white image that is 4" x 6". How would you sample the image to provide a good digital approximation using the pixelation widget? What sample size would you use, that is, how many bits? How would your decision affect the digital representation?

☐ Receive credit for this lab guide

Submit this portion of the lab to Pluska to receive credit for the lab guide.