

CS110 - Introduction to Computers and Applications
Spring 2016 - Scratch Project #4

Due Date:	Friday, April 1st, 2016 at 11:00 P.M.
Accept Until Date	Friday, April 8th, 2016 at 11:00 P.M.
Evaluation:	15 points
Submit to Sakai:	Scratch program (.sb file)
Related Materials:	Resources posted in Sakai → Lecture Topics → Scratch Scratch Website: http://scratch.mit.edu/ Many .exe files available to download (examples) in Sakai → under this assignment as file attachments. Hints_on_drawing_Geometric_Shapes.pdf
	TA Lab Support Schedule (in Sakai Resources Folder)
Questions?	Meet with your TA during office hours; Visit a campus computing center during CS110 Lab Support Hours












Background

In this assignment you will build another Scratch program. In this program you will be working more with variables, loops, broadcasts, defining blocks, and the Scratch pen to create art using geometric shapes.

Goal

This assignment will require you to create a Scratch program that used the pen, variables, broadcasts, and a basic knowledge of simple geometry!

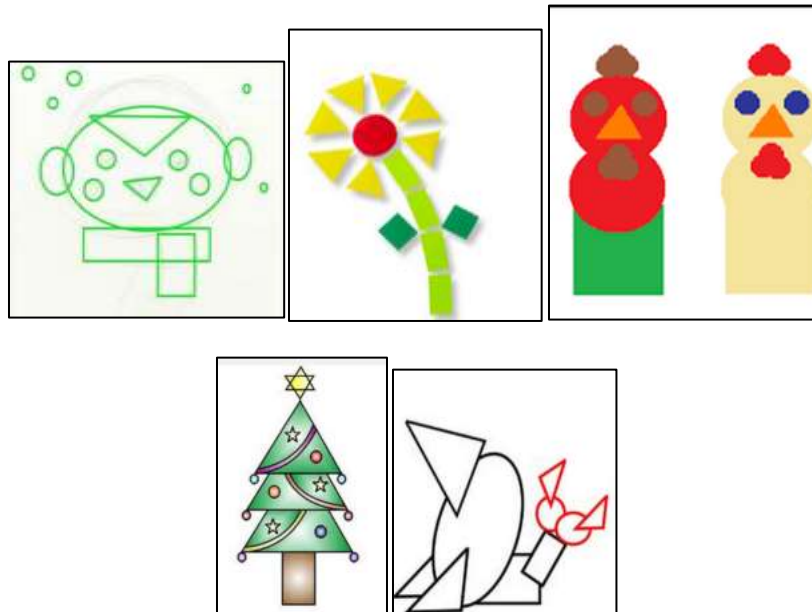
The PEN instructions

-  Clears all pen marks and stamps from the Stage.
-  Puts down sprite's pen, so it will draw as it moves.
-  Pulls up sprite's pen, so it won't draw as it moves.
-  Sets pen's color, based on choice from color picker.
-  Changes pen's color by specified amount.
-  Sets pen's color to specified value. (pen-color=0 at red end of rainbow, pen-color=100 at blue end of rainbow)
-  Changes pen's shade by specified amount.
-  Sets pen's shade to specified amount. (pen-shade=0 is very dark, pen-shade=100 is very light)
-  Changes pen's thickness.
-  Sets pen's thickness.
-  Stamps sprite's image onto the Stage.

Your task: Create a **recognizable** picture by drawing geometric shapes with the pen tool in Scratch.

You can run a video of an example program that draws a decorated Christmas Tree using geometric shapes [here](#). This is an **EXAMPLE** of the project described. You should choose a picture of something that interests you.

GOOGLE: [Pictures using geometric shapes](#) for ideas. Some appear below. There are many others that you can find!

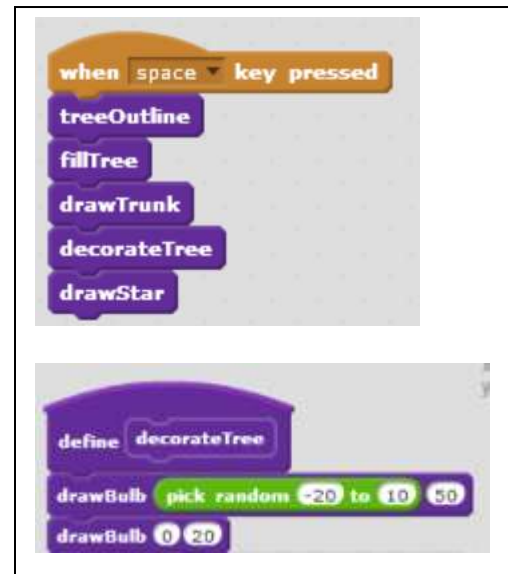
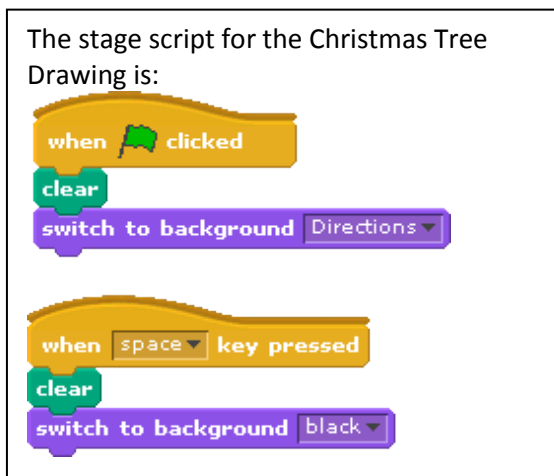


Project Helpful Hints:

- Decide on a picture. You should choose a picture that can be drawn using geometric shapes. There are **Hints to drawing Geometric Shapes** available as a supporting document for this assignment.
- Draw the picture on paper using geometric shapes to be sure it will be recognizable.
- When you begin to write the program, you will find it helpful to use the Grid background for the stage. This will help you in placing different parts of your drawing in correct locations on the stage. Switch to an appropriate (not-grid) background when your drawing is complete.
- The colors in Scratch range from 0 – 200 in numerical values. Shades range from 0 to 100 with default being 50. The higher the number for the shade, the more white is added (lighter colors); the lower the number for the shade, the more black is added (darker colors).
- You can change the size of the pen to help with certain effects (See how the Christmas tree is "filled" in the given example).
- You can choose colors randomly (See the bulbs on the Christmas tree).

Project requirements:

- Your Scratch project will begin (**When Green flag is clicked**) with a stage background that identifies your drawing. The example provided is a Christmas tree. You should identify the geometric shapes used to make your finished product. This does not have to be detailed but it should give us an idea of how your drawing will be created.
- **Your picture must be recognizable:** For example, a boy, a face, a bird, a house, a truck, a flower, etc. "Abstract art" does not satisfy this requirement!
- Your picture must include at least 3 different geometric shapes (triangle, circle, square, rectangle, octagon, pentagon, etc.). In the Christmas tree, there are triangles, a rectangle, and circles.
- Only ONE sprite should be drawing your picture. The SPRITE draws the picture using the PEN. You must have CODE that draws the geometric shapes. The shapes should not be edited into the background.
- The script should be readable and divided into different blocks. This can be accomplished by defining your own blocks.
- **Define Your Own Blocks:** Define a separate block for each part of the drawing. Notice in the Method 1 figure below, several blocks are defined and called. Watch the [video](#) and you will see the separate parts being executed.



Defining your own blocks allows you to pass **parameters** to the blocks as you can see in the calls to **drawBulb**. I can pass a different location for each of the bulbs to be placed on the tree.

- Use variables and loops where appropriate. You should not have code that is repeated over and over again. Think about how variables and/or loops might help make your code more organized and easier to read and follow.
- Use **pen up** and **pen down** appropriately. After drawing one part of your picture, you will probably want to pick the pen up before going to another location on the stage.
- Although you are not required to hide the sprite, doing so may make it easier to see your drawing being created.

- View the following videos for help with Defining your own blocks for geometric shapes.
 - <https://drive.google.com/a/ftrees.com/file/d/0B2EP97CDPI--b3A5QjNEdHI2bGM/view>
 - <https://drive.google.com/a/ftrees.com/file/d/0B2EP97CDPI--LXk3T2FsYjNWV28/view>

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Scratch #4 Assignment (Drawing) Self-Check: 15 points

Directions: Use the checklist below to review your work before submitting it to Sakai for evaluation by your TA:

Read the problem description above to be sure you understand the program specifications. Check the list below to make sure you satisfied the program requirements.

- When the program is run, the resulting picture is recognizable.
- When the green flag is clicked, the stage background identifies the drawing and briefly describes its components.
- The stage background is blank when the drawing begins.
- Your picture includes at least 3 different geometric shapes (triangle, circle, square, rectangle, octagon, pentagon, etc.) that are drawn by the sprite.
- Only ONE sprite should be drawing your picture. The SPRITE draws the picture using the PEN. You must have CODE that draws the geometric shapes.
- Wait** is used to make it obvious that a geometric shape is being drawn by the sprite.
- Define your own blocks** are used to divide code into readable parts.
- The drawing is divided into different parts of the picture. Each block completes one task (drawEar, drawBulb, drawWheel, etc.) Your entire picture should NOT be defined in one block. You should refer to the figure above for an example of a readable program.
- Loops and variables are used to create code that is easy to follow.
- Pen up** and **pen down** are used appropriately.
- The code is organized and easy to read.
- The drawing is creative but recognizable.