

Lesson 2.2: Polygons - Triangles and Keystroke Events

Objectives

In this lesson, students will:

- ❖ Learn to draw polygons based on a keystroke event
- ❖ Be able to explain the difference between a square and a triangle when giving computational instructions.
- ❖ Find the external angle between 2 sides of a triangle.
- ❖ Gain familiarity with user input

Agenda

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|-------------------------------------|---------|
| 1. Review and Introduction | 10 mins |
| 2. Draw a Triangle | 15 mins |
| 3. Get Creative with Color and Size | 15 mins |
| 4. Wrap Up and Reflections | 10 mins |

Resources & Links

- None

Preparation

- Create a project with the solution code for demonstration

1. Review and Introduction



Review the previous concepts learned: polygon, sequence, loop.

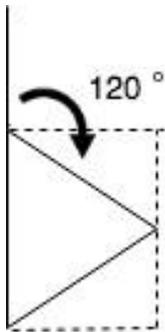
In the previous lesson, students created a program to draw a square. Today, the program will be enhanced to either draw a square or a triangle, depending on a user's keystroke.

Open the *Polygons* project from the previous lesson and ask students to do the same.

2. Draw a Triangle



Ask students: What needs to change between the instructions to draw a square and a triangle? Are the angles the same? Is the number of sides the same?



Prompt students to discover with you through trial and error the angle for a triangle in your project. Work together on the formula for the angles based on the number of sides.

The drawing to the left could be helpful to explain the outer angle of a triangle as compared to a square.



Instruct students to duplicate (right click the top block, click duplicate) the code for drawing a square and modify it to draw a triangle.

Direct students to the "Erase all" block in the Pen section. This block can be used to erase our drawing area so that the polygons do not overlap.

Modify the code to initialize the starting direction to draw our polygon (start drawing pointing to the right) and change the repeat block to draw a triangle as shown here:



3. Keystroke Events



It could be helpful to **review** events briefly before beginning the next topic. An event is an action that causes something to happen. In programming, the computer is continuously keeping track of the action happening, for example, did the user click a key? did the user click a key? When the user does click the key, the program then takes the action for that event.

Explain that we want our program to draw a square or a triangle based on a user clicking a key on the keyboard. Much like we would when using an APP or playing a game, we press a button or click a key on the keyboard to make something happen or make the program run.

For our triangle/square program, we will use the “s” key to draw a square and the “t” key to draw a triangle.

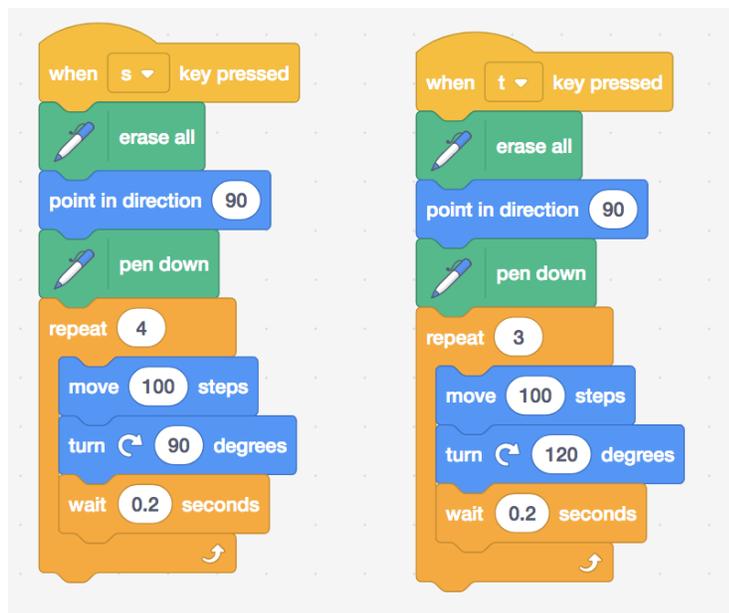
The block to take action when a key is pressed is in the events category.

Student Activity:



Prompt students to add the event code to their script so that when the ‘s’ key is pressed, the code draws a square and when the ‘t’ key is pressed the code to draw the triangle runs.

Solution:



Explain to students that when a program does different things based on input received from an input device such as a keystroke from a keyboard for example, we have created a program that responds to “user input”. Most programs respond to some kind of user input.

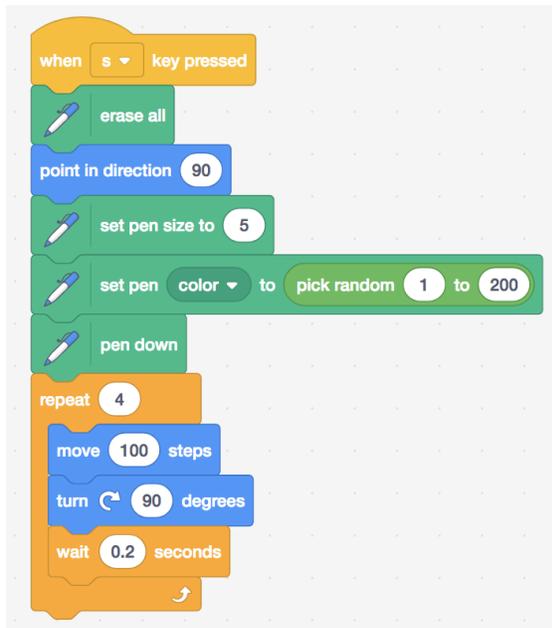
4. Get Creative with Color and Size

Student Activity:



Instruct students to explore adding color and different line sizes to the square and triangle. Prompt them to experiment using the “set pen color to” with random numbers.

This is one example of what the code could look like:



5. Wrap Up and Reflections



Engage students in a brief instruction: Notice that for a square we have four turns of 90 degrees totaling 360. For a triangle, we have three turns of 120 degrees totaling 360. In general, we have N turns totaling 360. To calculate the degrees for each turn we divide 360 by N. So, for a pentagon, we have $360 / 5 = 72$ degrees. For a hexagon, we have $360 / 6 = 60$ degrees.



Reflection Points:

- What did you learn today?
- What is an example of **user input**?
- What is a keystroke event?