

Rainbow Skies

This project shows how you can create a rainbow in Minecraft using code and the mathematical equation for a circle.

Here's how this project will work:

- The "create rainbow" function uses the circle equation.
- The bot places the colored blocks that make the rainbow.
- You can modify the "rainbow colors" function to change the colors of the rainbow.

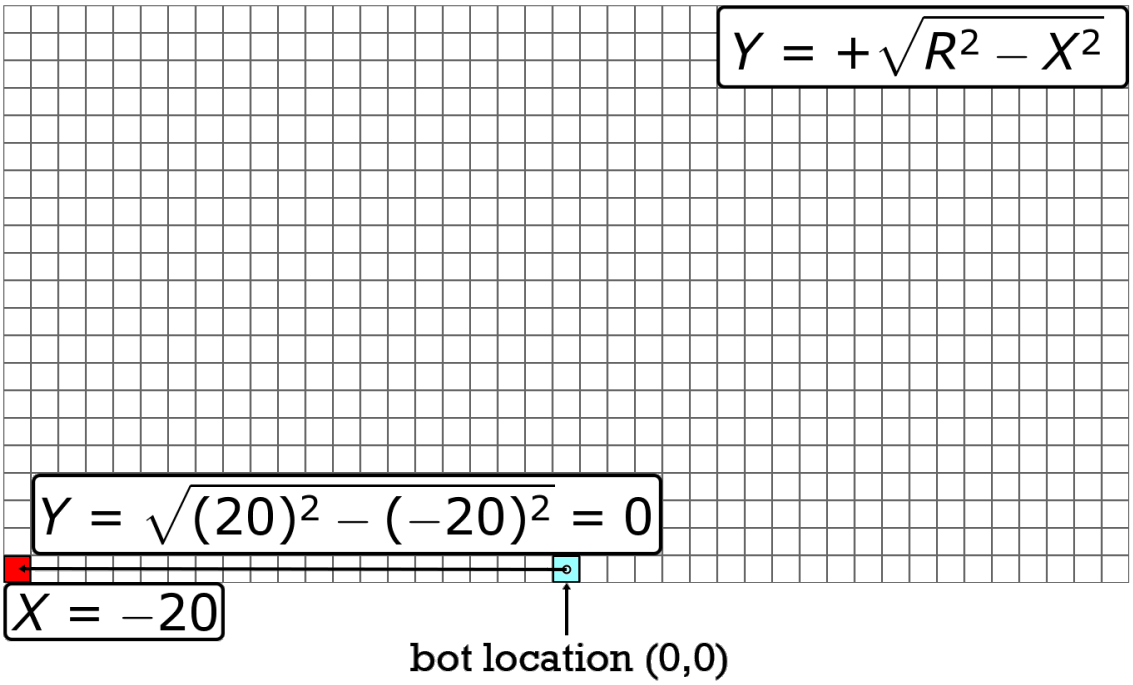
When this project is run (by pressing the "**play**" button) it creates a rainbow.

Circle Equation

You can think of the rainbow as being one half of a circle.

$$Y = +\sqrt{R^2 - X^2}$$

This project uses the equation of a circle to create a rainbow.



This animation demonstrates how to calculate the coordinates for a circle with a radius of 20.

The x-values start at -20 and count up by 1.

When the x-values reach 20, the rainbow will be finished.

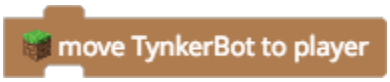
The "create rainbow" function calculates these values for you.



What is the Bot?

This project also uses a special tool used for building in Minecraft called the **bot**.

These are the code blocks used in this project that affect the **bot**:



This block moves the **bot** to the player's position.



This block saves the **bot's** current location with the provided name.



This block will return the **bot** to the named checkpoint.



This block will move the drone in the provided direction, the distance provided.

How the Bot is Working

Here's how the project plots the **x**-and **y-values** for the rainbow:



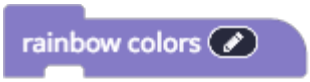
For every x-value:

- Return the drone to the center of the circle.
- Move the drone to the right "x-value" steps.
- Move the drone up "y-value" steps.

Once the drone is in position, it places the colored Minecraft blocks by calling the "**rainbow colors**" function.

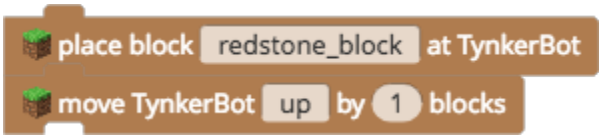


Rainbow Colors

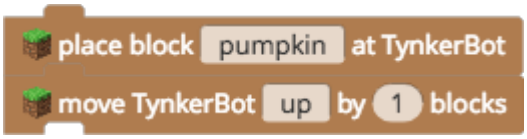


The "**rainbow colors**" function does the work of placing the colored blocks for the rainbow once the drone is in the correct position.

This function places colors for the rainbow by:



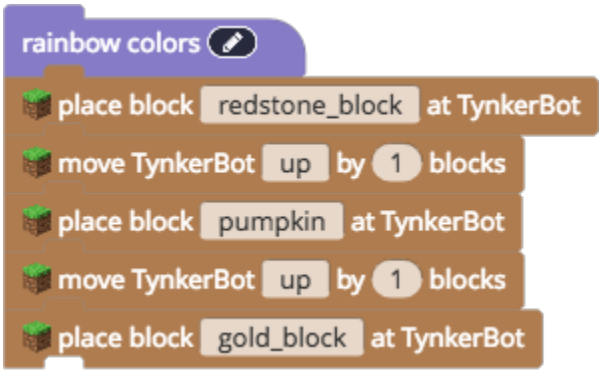
- Placing 1 colored block at the bot's current location, then moving the bot up.



- Placing the next colored block at the bot's current location, and then moving the bot up.

This process repeats for all the colors in your rainbow.

This project has already added red, orange, and yellow for your rainbow with this code:



Add More Colors

Can you modify the "rainbow colors" function to draw all the colors of the rainbow?

These blocks will help you get started:



Change the Rainbow Size

It's actually pretty simple to change the size of the rainbow. All you have to do is change the number in the "create rainbow" block.



The function parameter (currently 20) represents the radius for the rainbow that will be drawn.

Change the number to draw a bigger or smaller rainbow.

Render With a Buffer

If you're an advanced coder you get access to cool power ups; like making code faster!

By default the bot tool places blocks one-at-a-time.

By using something called a **buffer** you can tell the bot to place all the blocks at once.

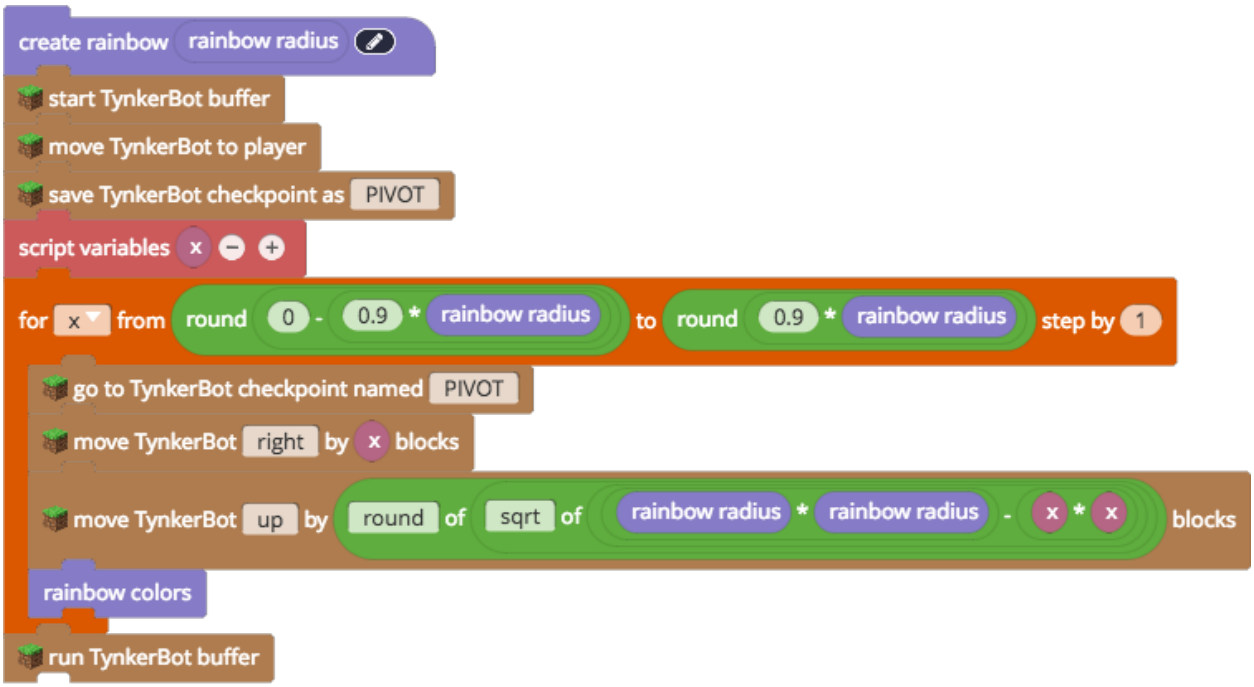
To use the bot buffer:



- Use the "start bot buffer" block before all of the bot commands.
- Use the "run bot buffer" when you want to see the result of the bot commands.

Modify the "create rainbow" function to make use of the **bot buffer**.

Your code might look like this:


create rainbow rainbow radius
start TynkerBot buffer
move TynkerBot to player
save TynkerBot checkpoint as PIVOT
script variables x
for x from round 0 - 0.9 * rainbow radius to round 0.9 * rainbow radius step by 1
go to TynkerBot checkpoint named PIVOT
move TynkerBot right by x blocks
move TynkerBot up by round of sqrt of rainbow radius * rainbow radius - x * x blocks
rainbow colors
run TynkerBot buffer