Program must be written In PYTHON

Note: from graphics import \*

**Background**:

The background should be a gradient between two colors the user specifies. To create a gradient between any two colors that continues across the panel, compute the amount you would need to add to the red each time to reach the stop color. For example, if the start was 35 and stop was 220 you could compute the amount by finding the difference, 220 – 35 = 185 and then dividing this number by the width of the panel to create a left to right gradient. If you are creating a top to bottom gradient divide by the height instead of the width. Repeat the process for the green and blue values. Then, to draw the gradient, draw lines from one side of the drawing panel to the other, each one pixel more to the right (if a left to right gradient) or the bottom (if a top to bottom gradient), each time increasing the red, green and blue by the numbers computed above. For example, given the input displayed below, your calculations would look like the following:

Preferred width? **500**

Preferred height? **300**

Start red? **35**

Start green? **50**

Start blue? **255**

Stop red? **220**

green? **24**

Stop blue? **50**

Gradient direction (left/right or up/down):

How many steps have you walked? **8767**

Red: (220 – 35) / 500 = 185 / 500 = 0.37

Green: (24 – 50) / 500 = -26 / 500 = -0.052

Blue: (50 – 255) / 500 = -205 / 500 = -0.42

Now, repeat drawing vertical lines that stretch from top to bottom. The first should be at an x of 0, the second an x of 1, the third an x of 2, etc. Each time you draw a line, add the values calculated above to its red, and blue. Here are the values for red, green and blue that would be used for the first 5 lines in the proceeding example:

red: 35.0 green: 50.0 blue: 255.0

red: 35.37 green: 49.948 blue: 254.59

red: 35.74 green: 49.896 blue: 254.18

red: 36.11 green: 49.844 blue: 253.77

red: 36.48 green: 49.792 blue: 253.36

Create a color from red, green and blue values by writing: Color(red\_value, green\_value, blue\_value)

Required **Behavior**:

When your program starts it should output the introductory message, prompt the user for the window size, prompt the user for red, green and blue start and stop values, prompt the user for the gradient direction and prompt the user for the number of steps they have walked. An example of this interaction is shown above. You can assume that the user will input an integer value greater than 0. Once the user has typed in their data, your program should open a drawing\_panel with your gradient background displayed on it. This background should match the values the user input. It should then animate drawing flowers on the drawing\_panel based on the number of steps the user input. Your program should draw one flower with 10 leaves for every 5000 steps a user has walked. If a user has walked a number of steps that has a remainder when divided by 5000 then the program should draw one more flower. This flower should have two leaves for every 1000 additional steps the user has walked. Therefore, if the user walked 7809 steps, the program should draw one flower with 10 leaves and one flower with 4 leaves. Flowers should all start at the bottom of the screen. They should be placed at random x locations. Flowers should never appear partially off the screen; make sure you choose random locations where the whole flower can fit on the screen. The stalk should grow 20 pixel taller every time two more leaves are added. Both the stalk and leaves are lines that have a stroke weight of 5 pixels. The leaves are positioned at intervals of 10 on the stem. Their x starts at the stem and ends 10 pixels away from it. Their y also ends 10 pixels from where it started. The flower petals are a single 50 x 50 oval centered above the stem. The eye of the flower is a 10 x 10 circle centered inside this one. You may choose any colors you like for the flowers.

Function to draw a gradient:

This function should draw the gradient background. It should not ask for any user input. Instead, it should take all data it needs for parameters. It should be able to draw a gradient between any two colors and, depending on the user input, either left to right or top to bottom.

Function to compute the change in color:

This function should take necessary information about one component of a color (reds, greens or blues) for two colors and compute the amount to add to the start color each time to reach the stop color smoothly. This computation is described in detail in the Background section of this document. Page 3

Function to draw a flower:

Your function should draw a single flower. Notice that we specify each flower in terms of its location and how many leaves it has. Different flowers have different positions, and numbers of leaves. Therefore, your function should accept several parameters so that it is possible to call it many times to draw the many different flowers potentially on the screen. You should also create other functions to capture structure and redundancy. It is up to you to figure out which other functions are necessary.

Use panel.sleep(100) to animate your leaf drawing.