## Assignment 2

## Submission

You must submit one ZIP file on Autolab. This ZIP file must be named *userid*-hw2.zip and must include all of the Python files that you have written for this assignment. Please write your name and userid as a comment at the beginning of each Python file.

## Recommendations

- **Make sure to test your program**.

- Make sure that your program is executable. If you are unable to complete portions of the assignment, comment out the part of the code that does not work properly, and explain what you did, what worked, and what did not. It is your responsibility to explain as carefully as you can why you think you were unable to get the code working, what you think is wrong, and how you might go about fixing it. The quality of such an explanation will be important to us in deciding whether to give you partial credit.

# 1 Drawing a petal [10 points]



<div align="center">
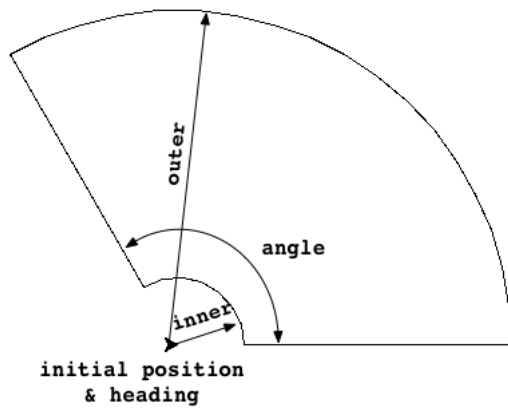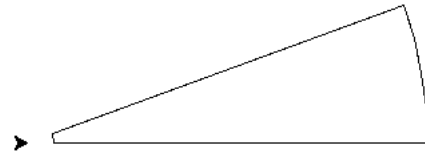
(a) `petal(50,200,120)`      (b) `petal(20,300,20)`

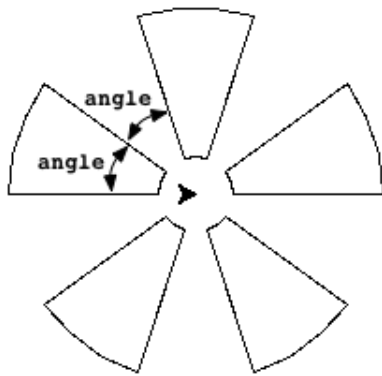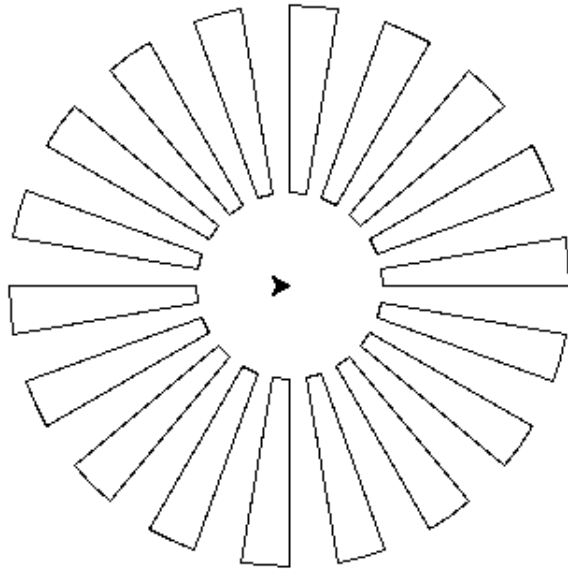Figure 1: `petal(inner, outer, angle)`

</div>

Write a function `petal(inner, outer, angle)` that draws one petal as shown:

- `inner` is the radius of the inner circle of the petal.

- `outer` is the radius of the outer circle of the petal.

- `angle` is the angle size of the petal.

**Instructions**:

- The turtle should go back to its original position and original heading. Note that you should **not** use the method `home` for that.

# 2   Drawing a flower [10 points]



(a) `flower(20,100,5)`                    (b) `flower(50,150,18)`

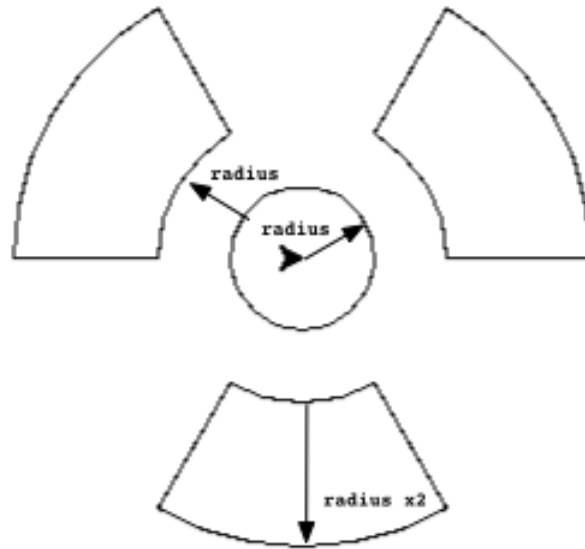Figure 2: `flower(inner, outer, nbpetals)`

Write a function `flower(inner, outer, nbpetals)` that draws one petal.

- `inner` is the radius of the inner circle of the petals.

- `outer` is the radius of the outer circle of the petals.

- `nbpetals` is the number of petals.

**Instructions**:

- Each petals should be separated by a space <u>equal to</u> a petal.

- Your code should <u>use the function</u> `petal` defined in exercise 1.

# 3 Drawing a nuclear flower [10 points]



Figure 3: `nuclear(30)`

Write a function `nuclear(radius)` that draws a flower shaped as the nuclear symbol.

- `radius` is the radius of the middle circle.

**Instructions**:

- The distance between the middle circle and the petals should be <u>equal to</u> the radius of the middle circle.

- The size of the petal should be <u>two times bigger</u> than the radius of the middle circle.

- The petals should be <u>perfectly aligned</u> as shown in figure 3.

- Your code should <u>use the function</u> `flower` defined in exercise 2.

# 4 Drawing a growing flower [20 points]
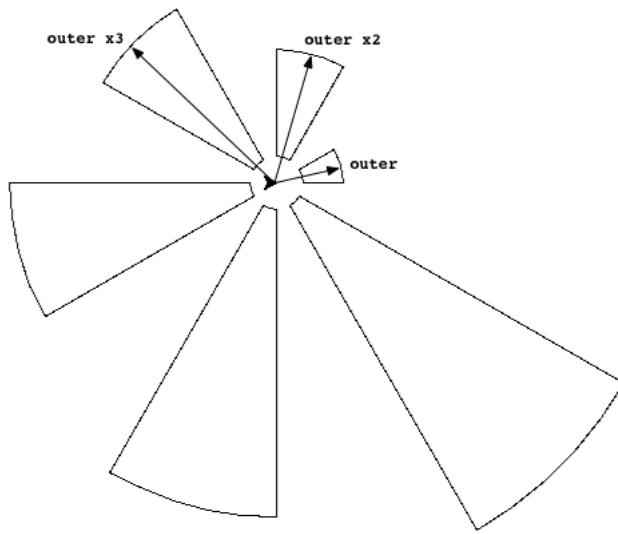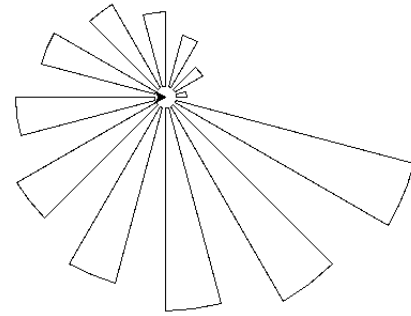


(a) `growing(20,50,6)`
(b) `growing(10,20,12)`
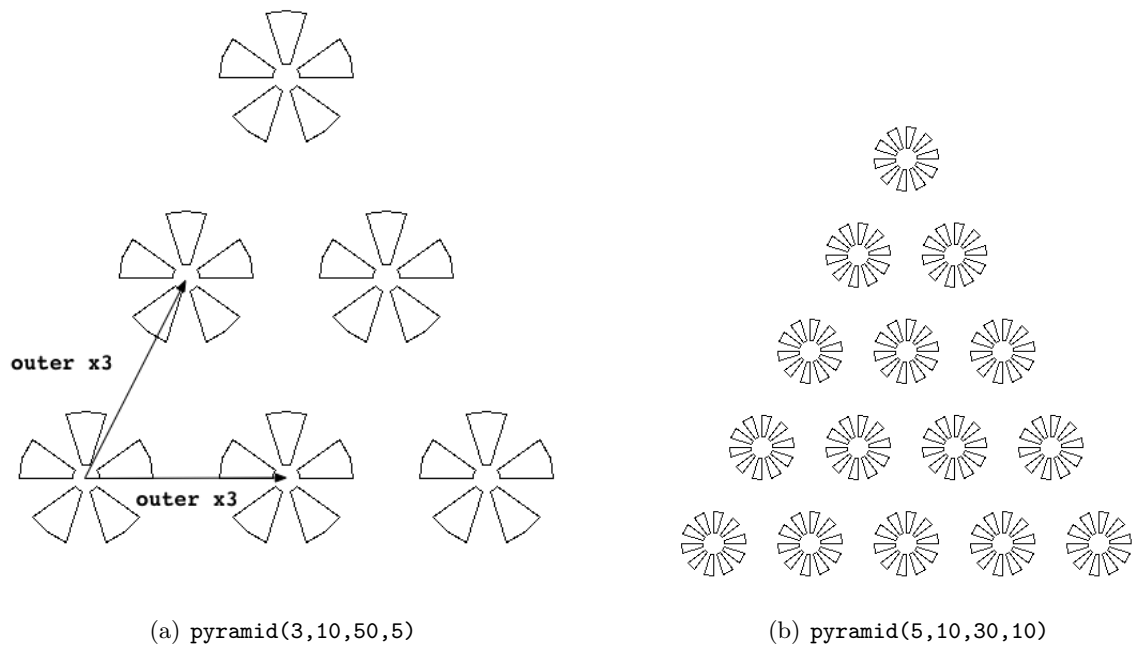
Figure 4: `growing(inner, outer, nbpetals)`

Write a function `growing(inner, outer, nbpetals)` that draws a special flower for which each petal is twice bigger than the previous one.

- `inner` is the radius of the inner circle of the <u>smaller petal</u>.

- `outer` is the radius of the outer circle of the <u>smaller petal</u>.

- `nbpetals` is the number of petals.

**Instructions**:

- Each petal should be <u>one radius bigger</u> than the previous petal.

- Your code should <u>use the function</u> `petal` defined in exercise 1.

# 5 Drawing a flower pyramid [20 points]

(a) `pyramid(3,10,50,5)`                    (b) `pyramid(5,10,30,10)`

Figure 5: `pyramid(nbflower, inner, outer, nbpetals)`

Write a function `pyramid(nbflower, inner, outer, nbpetals)` that draws a pyramid of flowers.

- `nbflower` the number of flowers <u>at the base</u> of the pyramid.

- `inner` is the radius of the inner circle of the petals.

- `outer` is the radius of the outer circle of the petals.

- `nbpetals` is the number of petals per flower.

**Instructions**:

- The distance between the center of two flowers should be <u>three times the size of the of the outer radius</u> of the flowers.

- The flowers should be <u>perfectly aligned</u> as shown in figure 5(a).

- Your code should use the function flower defined in exercise 2.

# 6   Drawing your own flower [10 points]

Write a function `myflower(inner, outer, nbpetals, ...)`   that draws a special flower from your imagination.

- `inner` is the radius of the inner circle of the petals.

- `outer` is the radius of the outer circle of the petals.

- `nbpetals` is the number of petals.

- `...` is the argument(s) of your choice. You should add and use <u>at least</u> one argument or more.

**Instructions**:

- Be <u>crazy</u> and <u>elegant</u>!

- Your function should <u>use</u> all arguments including the one(s) you have added.

# 7   Drawing a rose [20 points]
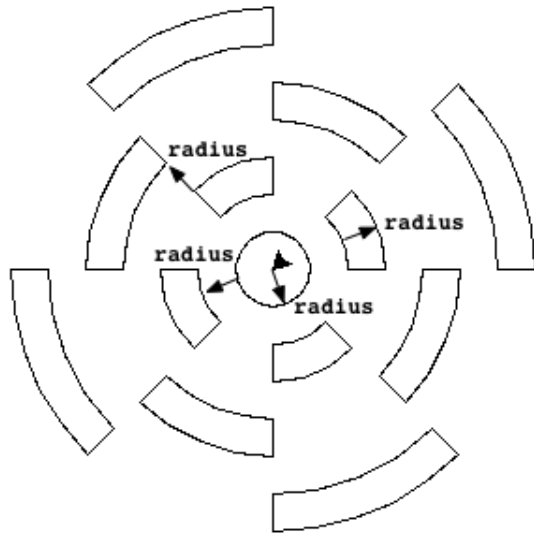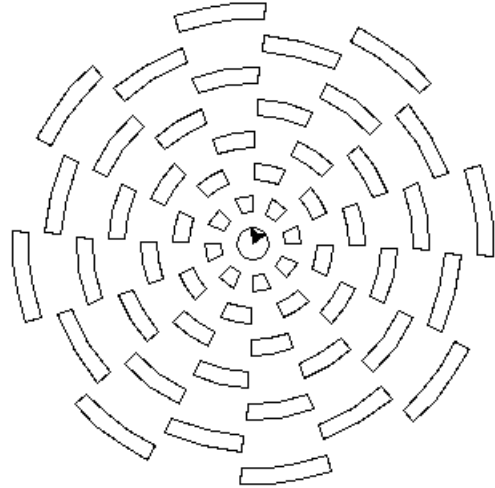


(a) `rose(20, 4, 3)`                    (b) `rose(10,8,7)`

Figure 6: `rose(radius, nbpetals, nblayers)`

Write a function `rose(radius, nbpetals, nblayers)` that rose flower which has many layers as shown in figure 6(a).

- `radius` is the radius of middle circle.

- `nbpetals` is the number of petals per layer.

- `nblayers` is the number of layers.

**Instructions**:

- The distance between the middle circle and the petals on the first layer should be <u>equal to</u> the radius of the middle circle.

- The distance between two petals from two adjacent layers should be <u>equal to</u> the radius of the middle circle.

- The size of the petals should be <u>equal to</u> the radius of the middle circle.

- The petals and the layers should be <u>perfectly aligned</u> as shown in figure 6(a).

- Your code should <u>use the function</u> `flower` defined in exercise 2.