

# Problem Solving Session

- The remainder of today's class will comprise the **problem solving session (PSS)**.
- Your instructor will divide you into **teams of 3 or 4 students**.
- Each team will **work together** to solve the following problems over the course of **20-30 minutes**.
  - You may work on paper, a white board, or digitally as determined by your instructor.
  - You will submit your solution by pushing it to GitHub before the end of class.
- Your instructor will go over the solution before the end of class.
- If there is any time remaining, you will begin work on your homework assignment.



Class participation is a significant part of your grade (20%). This includes in class activities and the problem solving session.

Your graders will grade your participation by verifying that you pushed your solutions before the end of the class period each day.

# Problem Solving 1

Remember, `turtle.circle(r)` draws a circle of radius `r` to the ***turtle's left***.

Working together with your problem solving team, write a function that uses the turtle to draw a filled in circle anywhere in the turtle window. Your function ***must*** use parameters to determine:

- The x,y coordinate of the starting point.
- The radius of the circle.
- The pen color.
- The fill color.

What is the state of the turtle when your function is finished drawing the circle?

```
def draw_circle(x_cor, y_cor, radius, pen_color):  
    turtle.color(pen_color)  
    turtle.penup()  
    turtle.goto(x_cor,y_cor)  
    turtle.begin_fill()  
    turtle.circle(radius)  
    turtle.end_fill()
```

```
def equil_triangle(x_cor, y_cor, size, pen_color):  
    turtle.penup()  
    turtle.goto(x_cor, y_cor)  
    turtle.begin_fill()  
    turtle.pendown()  
    turtle.color(pen_color)  
    turtle.forward(size)  
    turtle.left(120)  
    turtle.forward(size)  
    turtle.left(120)  
    turtle.forward(size)  
    turtle.left(120)  
    turtle.end_fill()
```

## Problem Solving 2

Write a function that uses the turtle to draw a filled in *equilateral triangle* anywhere in the turtle window. Your function **must** use parameters to determine:

- The x,y coordinate of the bottom left corner.
- The size of the base of the triangle.
- The pen color.
- The fill color.

The turtle must end in the bottom left corner of the triangle with its original heading.

**Hint:** it may be a good idea to draw a picture of an equilateral triangle *first*; label the (x,y) coordinate of the bottom left, interior and exterior angles, etc.

# Problem Solving 3

Write a function that uses the turtle to draw a filled in *rectangle* anywhere in the turtle window. Your function **must** use parameters to determine:

- The x,y coordinate of the bottom left corner.
- The width and height of the rectangle.
- The pen color.
- The fill color.

The turtle must end in the bottom left corner of the rectangle with its original heading.

```
def rectangle(x_cor, y_cor, width, height, pen_color):  
    turtle.penup()  
    turtle.goto(x_cor, y_cor)  
    turtle.color(pen_color)  
    turtle.begin_fill()  
    turtle.pendown()  
    turtle.forward(width)  
    turtle.left(90)  
    turtle.forward(height)  
    turtle.left(90)  
    turtle.forward(width)  
    turtle.left(90)  
    turtle.forward(height)  
    turtle.left(90)  
    turtle.end_fill()
```

```
def composite_shape(x_cor, y_cor, size, width,
                    height, pen_color):
    turtle.penup()
    turtle.goto(x_cor, y_cor)
    turtle.color(pen_color)
    turtle.begin_fill()
    turtle.pendown()
    turtle.forward(width)
    turtle.left(90)
    turtle.forward(height)
    turtle.left(90)
    turtle.forward(width)
    turtle.left(90)
    turtle.forward(height)
    turtle.left(90)
    turtle.goto(x_cor, y_cor + height)
    turtle.forward(size)
    turtle.left(120)
    turtle.forward(size)
    turtle.left(120)
    turtle.forward(size)
    turtle.left(120)
    turtle.end_fill()
```

## Problem Solving 4

Write a function that creates a composite shape by using the functions that you previously wrote to combine two or more shapes together.

It does not matter what shape you choose to draw, but it should comprise at least two shapes that touch or overlap.

Draw your picture.