

<b>Name:</b>	<b>Date:</b>	<b>Period:</b>
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## Lab07: Circle $\pi$

- Use PIL to create a  $600 \times 600$  image in PNG format.
- Loop over all the pixels  $(xp, yp)$  and calculate  $(x, y)$  coordinates:
  - Where  $0 \leq xp < 600$  we have  $0 \leq x < 1$  instead, and likewise for  $y$ .
  - While  $xp$  is always an integer value  $x$  is a floating-point number.
  - Be careful! Use code `x=(xp+0.5)/600` to center the coordinates.
- Color each pixel  $(xp, yp)$  differently depending on whether the corresponding coordinates  $(x, y)$  fall inside or outside the unit circle:  $x^2 + y^2 = 1$
- Using printer friendly color choices, attach a print-out of this image.
- Then, count up the number of pixels that fall inside the unit circle.
- The area of a unit square is  $A = 1$ , and of the unit circle  $A = \pi$ , thus a quarter circle has area  $\pi/4$ . Our unit square contains 360,000 pixels. How many fall inside the circle?
- Since we know the ratio should be  $\pi : 4$  we can approximate  $\pi$  as `count/90000`.
- Fill in the following table for larger and larger sizes:

Size	Approximation
600	
1000	
2000	
4000	
8000	
10000	

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### Official Use Only

Header:	Name	Correct Date	Program Description
Style:	Comments	Variable Names	Modular
Data Structures:	Obvious	General	Lean
Algorithm:	Clear	Correct	Efficient
Scoring:	Raw _____	Late _____	Total _____