

## SETUP

Generate shapes structure with 3 sub-structures with the following attributes:

- 1) Circle
  - i. Radius
  - ii. Center Area
- 2) Right Triangle
  - i. SideLengths
  - ii. Center
  - iii. Area
- 3) Square
  - i. SideLength
  - ii. Center
  - iii. Area

## Inputs

Ask user if they want to create a circle, a right triangle, and a square

## Solve

- Randomly populate attributes for each shape created by user
- Calculate areas of each shape
  - $A_{circle} = \pi \times r^2$
  - $A_{Right\ Triangle} = 0.5 \times SideLength1 \times SideLength2$
  - $A_{square} = SideLength^2$

## DISPLAY

Shapes and attributes to user in command window

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## Inputs

Ask user to choose 2 shapes upon which to make a calculation of:

- the distance ( $d$ ) between their centers
- calculate the ratio of their areas

## Solve

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$Ratio = A_1 / A_2$$

## DISPLAY

- Distance to command window using 3 digits of precision
- Ratio to command window using 3 digits of precision

## MATLAB SYNTAX/ FUNCTIONS

- To use dynamic variables and keep track of shapes created:
  1. Use indexes
  2. Use cells
  3. Use *for* loops

MATLAB

## MATLAB SYNTAX/ FUNCTIONS

- Introduce dynamic variables
- Use *if else* statements to determine if user created <2 shapes, exit program
- Use *while* loop and dummy variables to ensure user inputs a valid shape name

## MATLAB SYNTAX/ FUNCTIONS

- *sqrt()* to calc distance
- Dynamic variables to calc only shapes the user input in prompt

## MATLAB SYNTAX/ FUNCTIONS

- *fprintf* to display
- *formatSpec* is *%3f* for digits of precision