**Your Name:** Cole Bardin Section: 62

*First Last*

As a convenience, this **answer template** is provided if you wish to easily submit your work. Be sure to save it as a PDF before submitting online!

**Question 1.** **Translation in homogeneous coordinates.**

**Question 1:** Paste your code for translate(dx,dy) here, then include the output for the line included near the bottom.

function [ T ] = translate( dx, dy )

% Returns a matrix T to translate a 2d vector, represented in homogeneous

% coordinates by dx and dy.

% Define T here. Be sure to terminate with a semicolon.

T = [1,0,dx;0,1,dy;0,0,1];

end

Show the result for the following command.

>> translate(5,-5) \* [15; 25; 1]

[20;20;1]

**Questions 2-4: Paste your completed rectangular tessellation (in the answer template). (3 points)**

**Make sure the tiles alternate with at least two colors and some are filled using bilinear interpolation**

Graphical user interface, PowerPoint

Description automatically generated

**Questions 5-7: Paste in your completed honeycomb for three points! The sample includes additional tricks using 'facealpha' so the cells fade near the edges, which yours should not. Your image must not be circular. That's just for the sample.**

**Bubble chart

Description automatically generated**

**Question 8:** Paste your code for rotate(angle\_in\_deg) here, then include the output for the line included near the bottom.

%% Rotate Function

function [ T ] = rotate(angle\_in\_deg)

T = [dcos(angle\_in\_deg), -dsin(angle\_in\_deg), 0; dsin(angle\_in\_deg), dcos(angle\_in\_deg), 0; 0,0,1];

End

Give the value of n after the following commands.

Z = rotate(30) \* [20; 21; 1]; z = Z(1:2) % grab just the first two components

n = norm(z)

**z = [6.8205;28.1865]**

**n = 29**

**Question 9: Paste in your completed wind turbine including all three blades, the pole and the hub.**

**Chart

Description automatically generated**

**Question 10: Paste in your completed for loop for the animated wind turbine.**

for k = 1 : 72\*N

% delete the previous position of each blade and the old hub

delete(hub)

% delete h1, h2 and h3 here

delete(h1)

delete(h2)

delete(h3)

% rotate each blade by delta

% redefine blade1, blade2 and blade3 here – rotate each by delta

blade1 = rotate(delta)\*blade1;

blade2 = rotate(delta)\*blade2;

blade3 = rotate(delta)\*blade3;

% draw all three blades using fill. Use the handles h1, h2 and h3 as before

x = blade1(1, :); y = blade1(2, :);

h1 = fill(x, y, "blue");

x = blade2(1, :); y = blade2(2, :);

h2 = fill(x, y, "blue");

x = blade3(1, :); y = blade3(2, :);

C = rand(size(x)); % For fun, color third blade bilinear interpolation

h3 = fill(x, y, C);

% draw the hub again

hub = circle(0, 0, 2);

pause(0.025)

end

**Ready to Submit?**

Be sure all ten questions are answered. When your lab is complete, be sure to submit three files:

1. Your **completed Answer Template** as a PDF file
2. A copy of your **MATLAB Live Script**
3. A **PDF** copy of your **MATLAB Live Script** (Save-Export to PDF…)

The due date is the day after your lab section by **11:59pm** to receive full credit. You have one more day, to submit the lab (but with a small penalty), and then the window closes for good and your grade will be zero.