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Problem 6.15

% Nick McCullough, AerE 161, HW4, Problem 6.15

clear,clc

% Write function to prompt a user for an angle in degrees

% call another function to calculate that angle in radians (pi/180)

% call another function to print the result

% include the main script, one script file and three function files

- - - -(insert your solution here)

function initial = degrees % set a degree function

initial = input('Hello Human, please enter angle in degrees: '); % user input with variable "initial"

end % end function

function radians = degrees2radians(degreesinput) % function to convert degrees to radians

radians = degreesinput * pi/180 % the conversion equation for radians from degrees

end % end function

function printangle(degrees) % function to convert degrees to radians

fprintf('Conversion from degrees to radians is: %.3f\n',degrees)

% fprintf statement showing "degrees" conversion to radians rounded to three decimal places

end % end function

clear,clc

% this is the script to use three previous functions

degreesinput = degrees; % variable for user prompt for degrees function

radians = degrees2radians(degreesinput); % this is the conversion

printangle(radians) % this is the fprintf function to display radians

Output 1:
------(insert output (your results) here)

Hello Human, please enter angle in degrees: 5

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radians =

  0.0873

Conversion from degrees to radians is: 0.087

\>\>

Problem 6.21

```
% Nick McCullough, AerE 161, HW4, Problem 6.21
clear,clc
% write a script prompting user for three points on a graph that make a
% triangle. this script will calculate and print the area of triangle

% the script will call one function to calculate the area of triangle
% this function will call another function that calculates the length
% of one side formed by any two points, aka the distance.
- - - -(insert your solution here)




function distance = triangledistance(x1,y1,x3,y3)
% we create a function triangledistance to calculate the length of the side
% of the triangle from point 1 to point 3
```

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distance = sqrt(((x3-x1)*(x3-x1)) + ((y3-y1)*(y3-y1)));

% equation for the square root of (x3-x1) squared plus (y3-y1) squared,

% providing the distance from point 1 to point 3.

----

function area = trianglearea(x1,y1,x2,y2,x3,y3)

% let's start by creating the sides of the triangle:

a = triangledistance(x1,y1,x2,y2); % using triangledistance in previous function

b = triangledistance(x2,y2,x3,y3); % using triangledistance in previous function

c = triangledistance(x3,y3,x1,y1); % using triangledistance in previous function

s = (a+b+c)/2;

% we will create this variable s to define half of the sum of the lengths.

% we will need this to use in the equation below for area of a triangle.

area = sqrt((s*(s-a)*(s-b)*(s-c)));

% the area of a triangle equation, using s and a,b,c sides we defined.

% now we write the script holding all the values.. then write two

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```matlab
% functions for area and distance.
disp('Hello Human, please gather the X and Y coordinates for the three points of your triangle,
and enter them below. Thank you!')
% instructing the user


% since there are three points we will identify each value as
% x1, x2, x3 and y1, y2, y3 ... as seen below
x1 = input('Enter first point X coordinate: '); % user input for x1
y1 = input('Enter first point Y coordinate: '); % user input for y1


x2 = input('Enter second point X coordinate: '); % user input for x2
y2 = input('Enter second point Y coordinate: '); % user input for y2


x3 = input('Enter third point X coordinate: '); % user input for x3
y3 = input('Enter third point Y coordinate: '); % user input for y3


% since we want to display the area of the triangle after these user inputs,
% we will need to create a variable that will transfer between this script
% and the function we will make.


X = trianglearea(x1,y1,x2,y2,x3,y3); % this creates a variable that we will
% use between this script and the function for area. this pulls from the
% function for area we coded before, using all 6 values for the 3 points


fprintf('The area of the triangle is %f\n',X) % fprintf to display area, X
```

Output 1:
------(insert output (your results) here)

>> triangle

Hello Human, please gather the X and Y coordinates for the three points of your

triangle, and enter them below. Thank you!

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Enter first point X coordinate: 3

Enter first point Y coordinate: 3

Enter second point X coordinate: 6

Enter second point Y coordinate: 3

Enter third point X coordinate: 6

Enter third point Y coordinate: 9

The area of the triangle is 9.000000

Problem 8.12

```matlab
% Nick McCullough, AerE 161, HW4, Problem 8.12
clear,clc
% create a cell array variable to store a student's name, uni id, GPA.
% print this info.


- - - -(insert your solution here)

% let's start by storing the information in variables within the cell % array.

studentinfoCell = {'Stanley Yelnats', 150337333, 3.43};
% Student name, ID, GPA
% this creates a 1x3 cell array. Use squiggly brackets for cell arrays.


% now we can write a fprintf script to define the three values in the
% cell it will have the student name as %s for script, %d for decimal
% for ID, and %.2f for real number to two decimal places, we then
% finish the fprintf statement with the three variables within the 1x3 % cell array.

fprintf("\n The Student Information you requested: \n Student Name: %s \t University ID:  %d \t
GPA: %.2f \n", studentinfoCell{1,1},studentinfoCell{1,2},studentinfoCell{1,3});
```

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Output 1:
------(insert output (your results) here)
>> prob8point12

The Student Information you requested:

Student Name: Stanley Yelnats   University ID: 150337333   GPA: 3.43

Problem 8.13

% Nick McCullough, AerE 161, HW4, Problem 8.13

% create a cell structure variable to store a student's name, uni id, GPA. print this info. very similar to problem 8.12.

% let's start by storing the information in variables within the cell structure.

- - - -(insert your solution here)

clear,clc

studentinfoStruct = struct('StudentName','Stanley Yelnats','UniversityID','150337333','GPA','3.43');

% create structure variable and include name, id, GPA followed by values, use quotations for each

% could not get fprintf to work for struct, used disp.

disp('The student information you requested: ') % title

disp(studentinfoStruct)

% display to print out the structure components

Output 1:
------(insert output (your results) here)
>>

>> prob8point13

The student information you requested:

    StudentName: 'Stanley Yelnats'

   UniversityID: '150337333'

       GPA: '3.43'

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Problem 8.18

% Nick McCullough, Aere161, HW4, Problem 8.18

clear,clc

% create data structure to store info about the elements. choose your

% own element and store the name, atomic number, chemical symbol,

% class, atomic weight, and a seven-element vector for the number of

% electrons in each shell. create structure variable to store the info.

% this is similar to the structure we created in the prior two problems

% let's use Carbon.

% start by creating a variable for the structure.

- - - -*(insert your solution here)*

Carbon =

struct('Name','Carbon','Atomic_Number',6,'Symbol','C','Class','nonmetals','Atomic_Weight',12.011
1,'Electrons_per_shell','[2 4 0 0 0 0 0]')

% structure listing what we are looking for, each time followed by the

% information for the element Carbon. numbers or integers need no

% quotations.

Output 1:
------*(insert output (your results) here)*

Carbon =

  struct with fields:

            Name: 'Carbon'
      Atomic_Number: 6

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```
        Symbol: 'C'
         Class: 'nonmetals'
 Atomic_Weight: 12.0111
 Electrons_per_shell: '[2 4 0 0 0 0 0]'


>>
```