ENG EK 125 - Worksheet 6A

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1) The geographic coordinate system is used to represent any location on Earth as a combination of latitude and longitude values. These values are angles that can be written in the decimal degrees (DD) form or the degrees, minutes, seconds (DMS) form just like time. For example, 24.5° is equivalent to 24°30'0". Write a script that will prompt the user for an angle in DD form and will print in sentence format the same angle in DMS form. The script should error-check for invalid user input. The angle conversion is to be done by calling a function in the script. The function receives an angle in DD format as input and returns D, M, and S.

```
1    function angleconv(DD)
2 -      D = floor(DD);
3 -      M = floor((DD - D) * 60);
4 -      S = (((DD - D) * 60) - M) * 60;
5 -      fprintf('%.2f degrees is equivalent to %d degrees %d minutes %.2f seconds\n ', ...
6          DD, D, M, S);
7 -  end
```

```
1 -      DD = input('Enter an angle in decimal degrees form: ');
2 -      angleconv(DD);
```

```
>> WS6A_1
Enter an angle in decimal degrees form: 24.5
24.50 degrees is equivalent to 24 degrees 30 minutes 0.00 seconds
 >> |
```

2) Write a function that prints the area and circumference of a circle for a given radius. Only the radius is passed to the function. The function does not return any values. The area is given by πr^2 and the circumference is $2\pi r$.

```
1    function circlespecs(r)
2 -      fprintf('The area of a circle with radius %.2f is %.2f.\n', r, pi * r^2);
3 -      fprintf('The circumference of a circle with radius %.2f is %.2f.\n', r, 2 * pi * r);
4 -  end
```

```
>> circlespecs(2);
The area of a circle with radius 2.00 is 12.57.
The circumference of a circle with radius 2.00 is 12.57.
>>
```

3) Write a script that will:
- Call a function to prompt the user for an angle in degrees
- Call a function to calculate and return the angle in radians. (Note: π radians = 180°)
- Call a function to print the result

Write all of the functions, also. Note that the solution to this problem involves four code files: one which acts as a main program (the script), and three for the functions.

```
1   function [ang1, ang2] = getangles()
2       ang1 = input('Enter an angle in degrees: ');
3       ang2 = input('Enter another angle in degrees: ');
4   end
```

```
1   function [rad1, rad2] = degtorad(ang1, ang2)
2       rad1 = ang1 * pi / 180;
3       rad2 = ang2 * pi / 180;
4   end
```

```
1   function printresults(rad1, rad2)
2       fprintf('The first angle is %.2f radians.\n', rad1);
3       fprintf('The second angle is %.2f radians.\n', rad2);
4   end
```

```
1   [ang1, ang2] = getangles();
2   [rad1, rad2] = degtorad(ang1, ang2);
3   printresults(rad1, rad2);
```

```
Enter an angle in degrees: 180
Enter another angle in degrees: 90
The first angle is 3.14 radians.
The second angle is 1.57 radians.
>>
```