CE640 / OC512 Matlab
Homework 9 – Mapping Stuff

Ok, for this final assignment, I would like you to do some analysis using mapping tools.

1. For your first task, I would like you to (probably need to use a loop) compute the area of each state, following the notes from class as an example to get you started. Please give the area in terms of square kilometers. It would be adequate to output to the screen, in table format, a two-column output including the state names and the areas. If you prefer to instead write your output to a file, you could try writing out a csv file, or an .xls file (with adequate headers). It is up to you. NOTE: a few states will give you unusual results (multiple values) since those states have islands. If you examine, for example, the lon / lat fields for Alaska, you will see that the vectors are broken up by NaN values…those values are used to separate the individual boundaries from each other.

2. For your second task, I would like you to find the annual precipitation for each state. To do this, look at the additional folder contained with this homework. It contains annual precipitation data on a 4 km grid, from the PRISM project. I suggest you bring these data into Matlab using readgeoraster (view the help entry for that) on the .asc file…that is an ESRI ASCII grid file, and we have seen that file format previously this term. Then, to help you out a bit, the code below will create LON / LAT matrices for the grid points (assuming you have named your raster reference object R):

```
[LON,LAT]=meshgrid([0:1:R.RasterSize(2)-
1]*R.CellExtentInLongitude+R.LongitudeLimits(1), ...
[R.RasterSize(1)-1:-1:0]*R.CellExtentInLatitude+R.LatitudeLimits(1));
```

If you don't believe it, create these meshes and then simply try using pcolor with LON, LAT, and Z (assuming you have named data array Z) to see if the data plot up the way you expect. Now what? Well, you can loop over the states and use the 'inpolygon' function to find all the grid cells that lie within a certain state. Take the mean value of those and, there you go, you will have found the mean annual precipitation for that state.

Present your output, similar to #1 above, as a table, or as an easy to read output file.

Good luck…