ESCI7205 hw5a

**Due Tu., Oct. 4, 2011.**

1) read the three AWK articles linked on the web page under the title “texts”.

2) Re-read Ch 10. Read Ch 12 and the sections on tar, compress, uncompress, gzip, gunzip, zip and unzip in Ch 13.

3) Now we are going to make a map of this data. As mentioned earlier, the way to learn programming is to take somebody else’s program and modify it to do what you need.

We are going to make a “world” map in a Mercator projection between ±60° (you can’t go to ±90 as those latitudes are at ± ∞ in a Mercator projection.) and 0 to 360. A template for this file is below. You will have to put this into and editor and fill in the blanks.

The key to getting this homework done is to “vote early and often”. If you don’t understand some detail of what you are trying to do, or it is not coming out correctly, ask for help (from me, or if I’m not available try finding a more computer savvy senior grad student) as soon as possible.

We are going to give our output file the same name as the input file with “.ps” appended (to identify it as a postscript file produced my the shell script making up the first part of the name).

Notice that I have made a bunch of useful shell variables for colors, the control of the postscript file header, continuation, and footer, and the output file name. You will have to replace the ***bold italic parts of the shell script with the appropriate shell variables, commands, etc***.

Don’t worry that we have not done any GMT yet. You don’t need to know anything about GMT to do this exercise. You may have to look at one or two GMT program man pages to answer some of the questions. You can find information on GMT programs several ways. Man pages (man NameOfGMTProgram, eg man psxy), typing the gmt program name without any arguments will produce a the part of the man page that shows how to call it, or you can look for man pages and other info for the GMT program on the web (try google on “psxy gmt” for example). The GMT calls are blue below (you will not have the colors in your UNIX shell script)

a) The first thing you have to do is replace the **W, X, Y** and **Z** with the appropriate latitude and longitude values.

b) Next get the latest earthquake data using the shell script you wrote for the last homework (reuse things!). This should be one line.

c) Plot the basemap. You will need to set up the output file name where it says ***output***. What is the output file name that will be used (how is it constructed)?

d) We will then plot the earthquakes in magenta (you have to put the proper thing in where it says ***color***). This will require some processing of the input data file using awk.

Read the description of the ascii file (not the more easily readable file) that you downloaded on the USGS web page, or just look at the file to see what is in it, and use that information to write a single line awk program to produce an output that can be piped into psxy (psxy wants lines with just a longitude and latitude separated by a space or comma). You will need to write a one line awk command for this.

e) Plot the plate boundaries in red for ridges, green for transform, and blue for trenches, using files from the directory pb2002.

You can find the Plate Boundary files in /gaia/home/rsmalley/ESCI7205/pb2002 on the SUN and in /gaia/home/rsmalley/ESCI7205/pb2002 on the Mac. You will need to set the variable ROOT appropriately.

Please let me know if there are any problems with the files.

f) Why did we plot the plate boundaries last?

g) Explain what the sections of code marked by the #f-i and #f-ii do. What files do they process? How are the files selected?

h) What does the -M$ mean in the psxy calls to plot the plate boundaries? You (might) need to read the man page for psxy and look in the data files to answer this.

i) What do the > and >> do?

j) What does the last line “echo showpage >> ***output***“ do?

The file produced by GMT is in the postscript language and is a text file so you can look in it if you want or need to (hint for j).

This script worked before I butchered it to make the template, so if you replace the stuff in ***bold italic*** correctly it should work.

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Shell script template – put this in your favorite editor and have at it:

#!/bin/bash

#Set stuff up

ROOT=***SUN or Mac location***

PB=$ROOT/pb2002

LONMIN=***W***

LONMAX=***X***

LATMIN=***Y***

LATMAX=***Z***

REGION=$LONMIN/$LONMAX/$LATMIN/$LATMAX

PROJ=-Jm0.06

RED=255/0/0

BLUE=0/0/255

GREEN=0/255/0

MAGENTA=255/0/255

CYAN=0/255/255

MOREPS=-K

CONTINUEPS="-K -O"

ENDPS=-O

OUTFILE=$0.ps

#Done with setup, now process and plot

***Now get the data. Put your ftp shell script in here to get the latest PDE data from the NEIC. Put it in a file or shell variable.***

#Start the map. Draw the basemap

pscoast -R$REGION $PROJ -G200 -B30g15 -W1 $MOREPS -X4.8 -Y3.6 -Dh -U > ***output***

#Now add the earthquakes

***use awk to process the file you obtained above and pipe it into gmt*** | psxy -R$REGION $PROJ -Sc0.1 -G***color*** -L -W.1/0 -: $CONTINUEPS >> ***output***

psxy -R$REGION $PROJ -M$ -W3/***color*** $CONTINUEPS -V $PB/OceanicSpreadingRift.gmt >> ***output***

#f-i

transforms=`ls $PB/\*Transform\*gmt`

for transform in $transforms

do

psxy -R$REGION $PROJ -M$ -W3/***color*** $CONTINUEPS -V $transform >> ***output***

done

#f-ii

convergents=`ls $PB/\*Convergent\*gmt $PB/\*Subd\*.gmt`

for converge in $convergents

do

psxy -R$REGION $PROJ -M$ -W3/***color*** $CONTINUEPS -V $converge >> ***output***

done

echo showpage >> ***output***