**Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Group Project#04**

**Computer Applications in Meteorology Due: Fri. Feb. 14, 2020**

**Fortran and scripting in Linux**

1. Driver Initials:\_\_\_\_\_\_\_\_ Passenger Initials:\_\_\_\_\_\_\_\_

* launch Xming
* launch PuTTY Secure Shell
  + logon to “blizzard.atms.unca.edu”
    - login:
    - password:
* create a “project04” subdirectory underneath your “GroupNN” directory
* copy “advection.f90” from the directory “/home/atms261/programs” into your “project04” subdirectory
* edit the program “advection.f90” using the emacs editor, which is initiated by typing
  + emacs advection.f90 &
* you must substitute the “??????” found in the FORTRAN program “advection.f90” with appropriate code to estimate the advection equation using **centered differencing** for the “u/x” term, using a horizontal spacing between grid points of **24** kilometers:



* compile the program “advection.f90” using the following command
  + gfortran advection.f90 –o advect
* note below the directory contents of “project04” after successfully compiling the program

1. Driver Initials:\_\_\_\_\_\_\_\_ Passenger Initials:\_\_\_\_\_\_\_\_

* copy the “runprog04.sh” script shell from the directory “/home/atms261/programs” into your “project04” subdirectory
* modify the script shell to force ‘blizzard’ to run the executable “./advect” four times in your “project04” subdirectory, each time choosing a different option (1, 2, 3, and 4)
* note below the new filenames in “project04” after running the script with four different options
* take a look at one of the output files (using “emacs” or “more outputNNNNNN.txt”) and determine the meaning of the numbers (what are they???) in
  + column#1:
  + column#2:
  + column#3:
  + column#4:
  + column#5:

[you might need to look again at “advection.f90” to figure out how the data files were written]

**Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Group Project#04**

**Computer Applications in Meteorology Due: Fri. Feb. 14, 2020**

**Fortran and scripting in Linux (continued)**

* open the “advection.f90” program in an edit window to find answers to the following…
  + What will cause the program to stop prematurely with a “80907” stop condition?
  + What is the “acos()” function? What does it do?
  + What are the highest wind speeds [m/s] possible for the zonal wind component as defined in the program?
  + What does the “n” variable represent as found in the “do loops” embedded in the code?
  + What is variable “dx” and what must be its MKS units for the advection equation to be properly defined in the program?

1. Driver Initials:\_\_\_\_\_\_\_\_ Passenger Initials:\_\_\_\_\_\_\_\_

* copy the “z500\_gem\_script” GEMPAK script from the directory “/home/atms261/programs” into your “project04” subdirectory
* modify the GEMPAK script to create four 500 hPa level maps using the GFS model 12-, 24-, 36-, and 48-h forecasts, based on the GFS thin model forecast initialized at 1200 UTC 14 May 2014, saving the output Postscript format files (\*.ps) in the “project04” subdirectory
* use “gimp” to convert the four figures from Postscript to JPEG format images, saving the new JPEG images in the “project04” subdirectory {example…[prompt@blizzard] # gimp outfile.ps }
* within the “z500\_gem\_script” GEMPAK script, experiment separately with parameters “SCALE”, “CINT”, “GAREA”, and “FINT” using the GFS 12-h 500 hPa level forecast and briefly summarize below their mapping function

SCALE:

CINT:

GAREA:

FINT:

# Deliverables for Group Project#04 are:

1. A functioning FORTRAN program and responses on this answer sheet
2. Four “output…txt” advection output files and responses on this answer sheet
3. Four 500 hPa level JPEG images kept in your “project04” subdirectory on “blizzard” and responses on this answer sheet

Next meeting: **Python**