Lab 11: Forecasting - Numerical Weather Prediction

You will be using the following website http://mag.ncep.noaa.gov/ for many questions. Open up a few tabs of this site because you will be doing some side-by-side comparisons of forecasts.

Question 2:

Use www.wunderground.com instead. Write down the forecasted values and their typical error <u>with proper units</u> 5 days from now (i.e., 04/30) (for e.g., high temperature of 70°F with typical error of ± 4°F).

Question 3:

http://mag.ncep.noaa.gov/

Click through "Model Guidance → Model Area (NAMER) → Model Type (GFS) → Cycles (Select 04/25/2019 06UTC, make sure to check that the correct cycle is selected since this may be updated as the lab progresses) → 1000_500_thick → 1 Day

Question 4:

Correction: Select **"3 Day"** instead of "Loop All."

Question 5:

In an extra browser tab, redo the steps for Question 3 in the manual, but <u>select NAM for Model Type</u> instead of GFS this time. Cycle: 04/25/2019 06UTC (make sure to check that the correct cycle is selected since this may be updated as the lab progresses). Perform loop simulations for both GFS and NAM side-by-side; note the differences between the two models <u>for 1 Day and 3 Days loop.</u>

Question 6:

- **How to read a MOS table?**

http://www.nws.noaa.gov/mdl/synop/mavcard.php

Correction: *Do not look up MOS tables. Use the ones I have provided below for Questions 6-8*.

For this question, near-term forecast means the forecast <u>for the next day</u> (i.e., April 26, 2019). Answer for **both** GFS and NAM models. Probabilities in the MOS table are shown as digits but are actually percentages. Also note that times are in UTC (which is 4 hours ahead of Eastern Time). Finally, be sure to differentiate between the *probability* of rain and *expected* amount of rain in your answer.

```
GFS MOS (MAV)
 KBWI    GFS MOS GUIDANCE    4/25/2019   1200 UTC
 DT /APR   25/APR   26                    /APR  27                    /APR  28
 HR   18 21 00 03 06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 06 12
 N/X                  57             72          42          66    44
 TMP  72 73 66 62 60 59 62 66 68 65 60 54 49 45 48 59 63 64 60 48 51
 DPT  48 50 53 55 55 55 57 57 56 51 47 42 38 35 34 30 30 28 30 36 40
 CLD  OV OV OV OV OV OV OV OV OV OV OV OV BK CL FW SC FW CL SC OV OV
 WDR  11 10 09 09 12 11 18 17 19 27 29 29 27 26 27 29 28 28 27 23 11
 WSP  05 06 06 05 04 02 04 11 17 07 07 08 09 08 15 22 21 15 07 02 08
 P06     15    70    46    76    75    15     2     0     0 10 14
 P12              83          84          15           2    23
 Q06      0     2     1     2     3     0     0     0     0  0  0
 Q12               3           4           0           0     0
 T06      6/13 20/ 7  7/ 2 22/ 6 42/23  1/ 0  3/ 0  2/ 9  1/21  3/ 3
 T12           20/18      31/13      42/30      3/12      2/21
 POZ   0  0  0  0  1  0  0  0  0  0  1  0  0  0  0  0  0  0  0  1  1
 POS   0  0  0  0  0  0  0  0  0  0  0  0  0 13 13 13  0  6  0  0  0
 TYP   R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R
 SNW               0                       0                    0
 CIG   7  7  7  6  6  7  7  5  5  6  7  7  7  8  8  8  8  8  8  7  7
 VIS   7  7  7  7  7  7  7  7  6  7  7  7  7  7  7  7  7  7  7  7  7
 OBV   N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N  N


NAM MOS (MET)
 KBWI    NAM MOS GUIDANCE    4/25/2019   1200 UTC
 DT /APR   25/APR   26                    /APR  27                    /APR  28
 HR   18 21 00 03 06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 06 12
 N/X                  56             69          44          66    47
 TMP  73 72 66 60 59 58 59 65 66 64 60 53 49 46 48 58 63 65 60 51 53
 DPT  46 47 50 53 54 55 56 57 58 55 51 42 39 36 35 27 28 28 31 40 45
 CLD  OV OV OV OV OV OV OV OV OV OV OV SC SC CL CL CL CL CL FW OV OV
 WDR  10 10 09 09 09 08 11 14 14 27 30 29 28 27 27 29 29 28 28 24 12
 WSP  07 07 07 07 06 05 06 07 11 07 16 13 09 09 15 22 17 15 05 01 05
 P06      9    65    42    39    75     9     4     0     0  5 24
 P12              65          82          12           0    24
 Q06      0     2     1     1     4     0     0     0     0  0  0
 Q12               1           4           0           0     0
 T06      1/14 19/ 9  7/ 8  8/11 27/29  1/ 4  0/ 6  0/13  0/17  2/ 7
 T12           23/14      13/11      28/29      2/13      3/17
 POZ   0  0  0  0  0  1  1  0  0  0  1  1  0  0  0  0  2  1  0  0
 POS   0  0  0  0  0  0  0  0  0  0  0  0  0  9 13 16  1  1  0  0  0
 TYP   R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R  R
 SNW               0                       0                    0
 CIG   7  7  7  7  6  5  6  6  5  4  7  7  8  8  8  8  8  8  8  7  6
 VIS   7  7  7  7  7  7  6  7  7  5  7  7  7  7  7  7  7  7  7  7  7
 OBV   N  N  N  N  N  N BR  N  N BR  N  N  N  N  N  N  N  N  N  N  N
```

Question 7:

Use **Chart 1** on the worksheet I have distributed. Look at the forecasts for **April 27th.** High temperature and low temperature must be found by looking at the X/N row for the last day on the MOS map. **For precipitation, wind, and cloud cover, a short description is required,** i.e., not just a single value.

Sample response for precipitation: *High probability of rain (72% probability) between 6 UTC and 12 UTC; it will likely rain between 0.1 to 0.25 inches before noon.*

Question 8:

Use **Chart 2** and answer the question below it. The third-row entry "Forecast" refers to the human-generated forecast for the same day (April 27th), which can be obtained from: https://www.weather.gov. Enter "KBWI" for Location.

Question 9:

In an extra browser tab, follow the steps written in question 3 in the manual, but select "GEFS-SPAG" for Model Type instead of GFS this time. Click on **500_516_558_ht**. Click "Loop All."

Click "stop" and use the arrow to manually progress through the model. Tell me **where** (geographic location) the model STARTS showing uncertainty as well as **when** (in UTC) this happens. Are there also other areas that are still easier to predict?

Question 11:

In an extra browser tab, follow the steps written in question 3 in the manual, but select "GEFS-SPAG" for Model Type instead of GFS this time. Click on the "mslp 1008 1048 iso" map. Click "Loop All."

Click "stop" and use the arrow to manually progress through the model. Answer the questions in the manual.

Additionally, give me 2 timestamps (in UTC): (i) When does the model first START showing uncertainty, (ii) When does the model output become totally meaningless?

Question 12:

Go to https://weather.gc.ca/ensemble/naefs/cartes_e.html instead of the website the manual tells you to go to.

Forecast Day should be 5 days from now (i.e., the 120-hour forecast) or 2019-04-30.

When looking at these maps, the "means" are the contour lines and the "spreads" are the filled-in colors.

Fill in your answers in the box on the next page **for College Park, MD.** WRITE PROPER UNITS.

Correction for the Table: The left column of the box should be as follows

Rain (Chart type: Precipitation)
Surface Temperature (Chart type: Surface Temperature)
Wind at 200 hPa (Chart type: Wind at 200 hPa)
Surface Wind Speed (Chart type: Surface Wind Speed)