Sara Mills **Homework 5** **Due 10-03-2014**

1. Break the message:

   `BNRS BONH FPFH ONTL FCRN ST`

   knowing it was encoded with an affine cipher and contains the word(s) "kayak".

2. Encipher "$Jaguars''$ using hill the key: a=20, b=13, c=3, d=11. Do the calculation (mod 26).

3. (Wait for Wednesday) Decipher "$PURVKA''$ using hill with matrix: $\begin{pmatrix} 9 & 4 \\ 15 & 0 \end{pmatrix}$. This calculation is done (mod 29). Note that the mod is different than the previous problem.

4. (Wait for Wednesday) Find all primes p for which $\begin{pmatrix} 3 & 5 \\ 7 & 3 \end{pmatrix} \pmod{p}$ is *not* invertible.

5. (Wait for Wednesday) Find all values of the b with $0 \leq b < 25$ such that $\begin{pmatrix} 1 & 1 \\ b & 1 \end{pmatrix}$ is invertible (mod 26).

6. Find the One Stop Student Center and take a picture of yourself there and email it to me at cparker@sandiego.edu.

7. Look on the website for sporting events at USD. Choose an event in the future that you would be most likely to attend and write that down. I won't make you actually go to the event but consider doing it, it builds school spirit.