**Peter Breslin** **Homework 7** **Due 10-21-2013**

1. For this problem you will be using the Vernam crypto system.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | - | 00000 | H | - | 00111 | O | - | 01110 | V | - | 10101 |
| B | - | 00001 | I | - | 01000 | P | - | 01111 | W | - | 10110 |
| C | - | 00010 | J | - | 01001 | Q | - | 10000 | X | - | 10111 |
| D | - | 00011 | K | - | 01010 | R | - | 10001 | Y | - | 11000 |
| E | - | 00100 | L | - | 01011 | S | - | 10010 | Z | - | 11001 |
| F | - | 00101 | M | - | 01100 | T | - | 10011 | | | |
| G | - | 00110 | N | - | 01101 | U | - | 10100 | | | |

   Using the above code turn the message "tube" into a binary message. Next make a Vernam key by flipping a coin (enough times to make a big enough key). Then encipher the message using the key.

2. Suppose two dice are rolled successively. Let $X$ be the sum of the two dice, $Y$ be the difference (first roll minus the second), $Z$ the number of odd rolls and $W$ the number of prime rolls. Find:
   (a) the ranges of four random variables
   (b) $\mathrm{P}(X \geq 5)$
   (c) $P(X \geq Z)$
   (d) $\mathrm{P}(X = 2|Z = 0)$
   (e) $\mathrm{P}(X = 12|W = 1)$
   (f) $\mathrm{E}(Z)$
   (g) $\mathrm{E}(Z + W)$
   (h) Are $Z$ and $W$ independent? Prove or disprove.

3. Find the schedule of classes for the spring semster on your my.sandiega.edu site. Find three classes that your are thinking about and write down the classes and the times.