

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 “pens” 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)  $P(X \geq 5)$
  - (c)  $P(X \geq Z)$
  - (d)  $P(X = 2|Z = 0)$
  - (e)  $P(X = 12|W = 1)$
  - (f)  $E(Z)$
  - (g)  $E(Z + W)$
  - (h) Are  $Z$  and  $W$  independent? Prove or disprove.
3. Find the schedule of classes for the spring semester on your [my.sandiego.edu](http://my.sandiego.edu) site. Find three classes that you are thinking about and write down the classes and the times.