

### Solution to Challenge 1

This looks like the alphabet used in a pigpen cipher. While there are a couple of standard “keys” to a pigpen cipher, a standard one is:



The first letter in each group is enciphered by the symbol which represents the outline of the box it is in and the second letter is represented by the same symbol with a “dot”. For example, using this key an “a” would be enciphered as  $\sqcup$ , while a “j” would be enciphered as  $\sqcup\cdot$ . If we assume this is the correct key, a decipherment does not appear to yield reasonable English plaintext.

However, if we assume that a slightly different key might have been used, then essentially we have a simple monoalphabetic substitution cipher: one plaintext letter for each ciphertext symbol. Thus, any standard frequency analysis approach may be employed. A frequency analysis shows that the most common symbols are:  $\sqcup$ ,  $\sqsubset$ ,  $\sqcap$ ,  $\sqsupset$ . At this point there are many methods that will yield the plaintext. One approach might be:

Step 1: replace ( $\sqcup$ ) by “E”.

Step 2: notice the triple  $\sqsupset \sqsupset \sqsupset$  which brings to mind a URL with “WWW”. Replace  $\sqsupset$  by “W”.

Step 3: Continuing with the URL idea, replace the two later occurrences of  $\sqcup \sqsubset \sqsupset$  by “DOT” and after the last “DOT” one might expect to see “COM”. So, replace  $\sqcup \sqsubset \sqsupset$  with “COM”. At this stage we have:

C O > □ □	□ T ^ F □	T □ O > □
L O ^ E □	V E □ O F	V E D T E
E □ □ □ □	T C E □ F	F E > □ E
□ O □ C E	□ F F E >	□ E T E □
E E L O ^	C O ^ F D	□ □ C □ ^
□ □ > E <	T □ □ E □	> T □ L V
□ □ □ T □	> □ W W W	D O T M O
> □ T E □	W O □ □ □	D O T C O
M □ F □ □	E □ □ L □	T O □ □ >
D ^ □ □ >	□ T E E ^	□ E □ > □
M E □ M □	□ T E □ □	F F F O W
E □ C □ □	E	

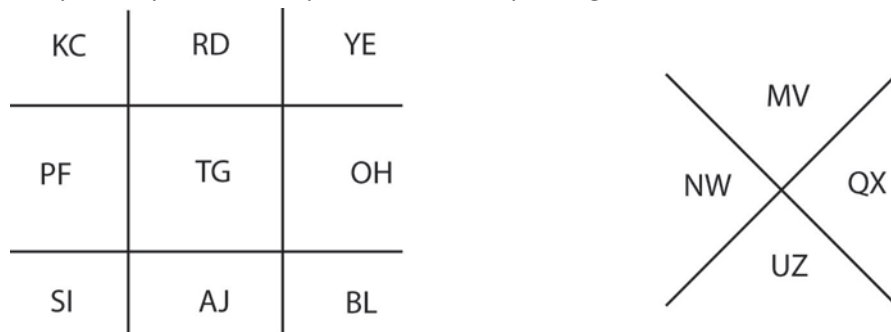
Step 3: "T E E" may be "THE", so replace E by "h".

Step 4: "TH L EE" looks like "THREE", replace L by "r".

Step 5: One then has the sequence "CH P F F E > E", which looks like "CHALLENGE". After making the appropriate replacements the rest pretty much drops out yielding (putting in the punctuation):

"Congratulations. You have solved the first challenge. For challenge three you could pick up an extra hint by visiting [www dot monsterworks dot com slash kryptos](http://www.monsterworks.com/kryptos) and using the username kmaster all lower case."

Note: The pigpen cipher key that would produce this enciphering would be:



Note that this key was constructed by first placing the keyword "kryptos" as the first letters in the first seven pairings. The remaining letters in the alphabet were used to complete the first letters of each pair in the left-hand grid and then used to as the second letters. Continuing in alphabetical order the first letters in each pair of the right-hand grid were filled in followed by the second letters (ignoring, of course, the letters that were used in "kryptos").

Understanding how this key was constructed will help one solve the third challenge.