## **Cryptography Worksheet**

This document presents the same example cryptography challenges that are presented in the virtual robot environment. The



- \* = Easy
- \*\* = Medium
- \*\*\* = Difficult

*Encode* the following messages:

\*1. Caesar cipher with a shift key of 4

Plaintext: I LOVE MESA

\*2. Caesar cipher with a shift key of 21

Plaintext: PROGRAMMING

\*\*3. Vigenere cipher with a keyword of MESA

Plaintext: RAVENS

\*\*4. Simple Transposition Cipher with keyword: cat

Plaintext: OCEAN CITY

\*5. Caesar cipher with a shift key of 7

Plaintext: MARYLAND BLUE CRABS

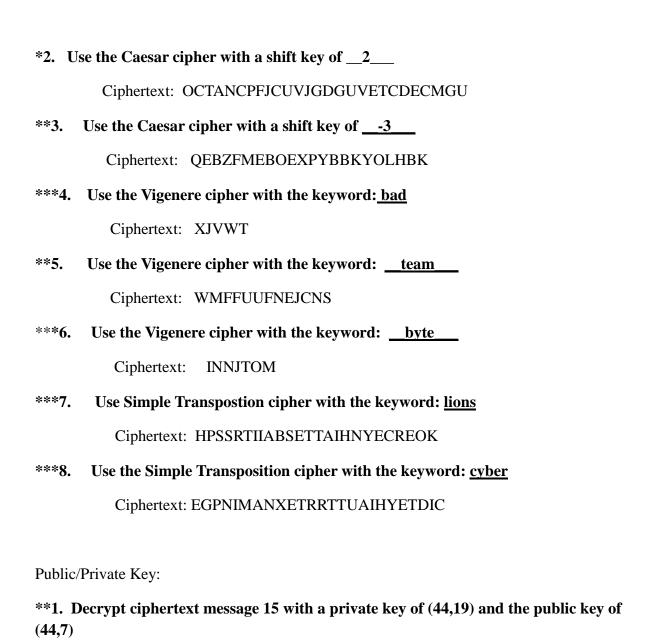
\* 6. Caesar cipher with a shift key of 2

Plaintext: INNER HARBOR IN BALTIMORE CITY

*Decode* the following messages:

\*\*1. Use the Caesar cipher with a shift key of \_\_2\_\_

Ciphertext: EQORWVGTUEKGPEG



\*\*\*2. Encrypt plaintext 89 which represents the word HI using the following integer

 $a_1 = 1$ ,  $b_1 = 2$ ,  $a_2 = 3$ , and  $b_2 = 5$ 

values:

## **Cryptography Worksheet Solutions**

|                                | oryprography (vorigineer solution           |
|--------------------------------|---|
| Encode the following messages: |   |
| 1.                             | Caesar cipher with a shift key of 4         |
|                                | Ciphertext: MPSZIQIWE                       |
| 2.                             | Caesar cipher with a shift key of 21        |
|                                | Ciphertext: KMJBMVHHDIB                     |
| 3.                             | Vigenere cipher with a key word of MESA     |
|                                | Ciphertext: EFOFAX                          |
| 4.                             | Simple Transposition with the keyword: cat  |
|                                | Ciphertext: CNTOAIECY                       |
| 5.                             | Caesar cipher with a shift key of 7         |
|                                | Ciphertext: THYFSHUKISBLJYHIZ               |
| 6.                             | Caesar cipher with a shift key of 2         |
|                                | Ciphertext: KPPGTJCTDQTKPDCNVKOTGEKVA       |
| Decode the following messages: |   |
|                                | Caesar cipher with a shift key of2_         |
|                                | Plaintext : COMPUTER SCIENCE                |
| 2.                             | Caesar cipher with a shift key of2_         |
|                                | Plaintext :MARYLAND HAS THE BEST CRAB CAKES |
| 3.                             | Vigenere cipher with key word of team       |
|                                | Plaintext : CHEASAPEAKE BAY                 |
| 4.                             | Vigenere cipher with key word of byte       |
|                                | Plaintext : GO TERPS                        |
|                                |   |

5. Simple Transposition cipher with the keyword:  $\underline{lions}$ 

Plaintext: THIS CIPHER ISNT EASY TO BREAK

6. Simple Transposition cipher with the keyword: <u>cyber</u>

Plaintext: MEET U AT GRAND PRIX IN THE CITY

Public/Private Key:

1. Decrypt ciphertext message 15 with a private key of (44,19) and the public key of (44,7)

Plaintext: 21

2. Encrypt plaintext 89 which represents the word HI using the following integer values:

$$a_1 = 1$$
,  $b_1 = 2$ ,  $a_2=3$ , and  $b_2 = 5$ 

Ciphertext: 5