**CT Unit 2: Decoding Project Group: 6 Name: Ryan Zhang, Odysseus Pyrovolakis**

# Introduction

The purpose of the decoding project is for students to become familiar with the binary number system, its arithmetic operations, and its relationships with other number systems. In addition, students will be able to see how easy binary numbers can be manipulated, compressed, or encrypted.

# Tasks

In the past five years, *Laboratoire de recherche CT* detected some repeating structured signals from a remote planet *Fomalhaut b* that is 25 light years from *Earth* and is about three times the mass of *Jupiter*. These signals have been translated into a series of hexadecimal codes. After computer scientists, engineers, physicists, and mathematicians working around the clock for a few months, they are pleased to proclaim to the world that the procedure of creating (***encoding***) these codes has been identified!

Each group will be assigned a series of codes, and based on the identified encoding procedure each group will have to find (***decode***) the hidden message embedded in these codes. The codes and the encoding procedure are listed below.

1. ***Procedure***:
   1. These detected messages were written in English that maybe related to some written words created by human on Earth.
   2. Each character (including space) has been coded into binary numbers using ASCII code.
   3. The ASCII-coded binary numbers have been arranged in raster scan order (Figure 1) to form an 8 x 16 binary matrix (Figure 2).
   4. Each ASCII-coded binary number in odd rows (1st, 3rd, 5th and 7th) has been added a number equivalent to its row number.
   5. Each ASCII-coded binary number in even rows (0th, 2nd, 4th and 6th) has been subtracted a number equivalent to its row number.
   6. The 8th column of the 8 x 16 matrix has been cut and inserted into the left side of the 0th column.
   7. The newly formed binary number (cascading two numbers into one) in each row has been converted to a hexadecimal number.
2. ***Codes***:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **GP** | **1**  Decoded:  A lighted torch and led the way.  From:  The Decameron –  Giovanni Boccaccio | | **2**  Decoded:  I do not call this counsel good.  From:  The Hobbit – J R. R. Tolkien | | **3**  Decoded:  But the light seemed too strong.  From:  1984 – George Orwell | | **4**  Decoded:  O, what may man within him hide,  From:  Measure For Measure – William Shakespeare | | **5**  Decoded:  They will probably hit me again.  From:  The Old Man and the Sea – Ernest Hemingway | | **6**  Decoded:  It is a doubling of the chances.  From:  Herman Melville – Moby Dick | |
| Code | 20A0  36EA  32E6  3BE8  301C  3CF4  365D  37A7 | 30EE  32A1  3563 33A3  3864  3525  38DB  4035 | 24A0  32F0  0F6C  3977 0E5F 3371  331A  3DEF | 34F3  10E4  36F3  38F6  30E8  12EC  34E9  35B5 | 2175  3AA1  3966  3423  3465  366D  371A  3D6C | 32ED  3365  0F72  3972  0E6F  3CF7 34E8  3735 | 27AC  10F8  335F  3BA3  34DD  3F25  33DB  3AA7 | 3BE9  3AE9  33EC  11EB  32E9  12ED  31DE  3633 | 2A68  337A  0F75  366F  341C  3AF7  34DC  3469 | 3679  10E9  33F2  11F0  309C  336C  2DE3  3AB5 | 24F4  10EA  389E  3223  306B  3D67  3363  3AEE | 106F  33A1  3966  3423 2FE4 3373  2EDF  3D35 |
| **GP** | **7**  Decoded:  Craft against vice I must apply.  From:  Measure for Measure – William Shakespeare | | **8**  Decoded:  This was said loudly in a pause.  From:  To the Lighthouse – Virginia Woolf | | **9**  Decoded:  I saw one a-struggling just now.  From:  The Hobbit –  J R. R. Tolkien | | **10**  Decoded:  Another two seconds would do it.  From:  1984 – George Orwell | | **11**  Decoded:  Many for many virtues excellent,  From:  Tragedy of Romeo and Juliet – William Shakespeare | | **12**  Decoded:  This was said loudly in a pause.  From:  To the Lighthouse – Virginia Woolf | |
| Code | 21F2  3167  391E  326A 2EE5  39F8  371A  3EF0 | 31E5  10CA  0F6B  3C76  381C  3375  3566  4035 | 2A68  3574  0F75  3276  0E6F  336E  2F1A  39F6 | 3AE4 36FA 0F67  38A3  2E9C 3AE6  37ED  3635 | 24A0  3A62 3A9E  3971  309C  3332  36EE  3CFC | 33E7  36EA  3665  11ED  38EF  3CA5  3469  3F35 | 20EE  3875  3363  3AA3  3873 3A25  36DF  3576 | 3764 3A21  3AED  3C6F  301C  34F4  0D63  3DB5 | 26E1  37FA  0F64  3975  0E69  3373  399A  3EF0 | 3974  3B66 389E  347B 2FE1 38F1 2FE8  3DB3 | 2A68  3574  0F75  3276  0E6F  336E  2F1A  39F6 | 3AE4 36FA 0F67  38A3  2E9C 3AE6  37ED  3635 |