

# CT255 Assignment 3

## Steganography

### Overview

The objectives of this assignment are as follow:

1. Reinforce your understanding of steganographic techniques.
2. Implement a simple steganographic algorithm.
3. Improve your implemented algorithm.

The Java class *Stegano1* contains the skeleton code for a steganography class, including the command line interface we've used in previous assignments. The latter accepts command line arguments as shown in the following examples:

1. Adding a bitvector to a file: `Stegano1 A inp.txt out.txt 0010101`
2. Retrieving a bitvector from a file: `Stegano1 E inp.txt`

Fully implemented (by yourself), the code will Add a secret bitvector / message (e.g. “**0010101**”) to an existing text document (“**inp.txt**” above), and saves the resulting text under a different file name (“**out.txt**” above).

Similarly, a hidden bitvector can be Extracted from a file and printed on screen using the 2<sup>nd</sup> example.

### Problem 1: [5 marks]

Complete the code by implementing the following “hiding” algorithm:

- Store one bit of the input vector per line of text you are processing; as you can see from the Java code provided, the *hide()* method reads one line of text at a time:
  - o For hiding a “0”, a single space (“ ”) will be appended to the end of the line.
  - o For hiding a “1”, two spaces (“ ”) will be appended to the end of the line.
- Retrieving a secret message works accordingly.

Please note:

- The secret message / bitvector is stored as a string object, i.e. your solution is basically a series of string operations using methods already shown / exercised in previous assignments. All the file I/O operations and the command line interface are already provided by the skeleton code.
- Make sure that you consider boundary cases, i.e.:
  - o The secret bitvector must fit into your file; e.g. if your text is only 3 lines long, you cannot hide more than 3 bits in it.
  - o Message retrieval of a normal text file (i.e. a text without added spaces) will return nothing (as you would expect).

- Use the attached text file (“The Stolen Child” by W.B. Yeats) to test your solution.

**Problem 2: [5 marks]**

Enhance your code in problem 1 to store two bits per line of text. Fully explain your solution in the source code.

Please note (on top of my previous comments in problem 1):

- Append a padding bit (“0”) to the end of your input bitvector if it has an odd length.
- Think of a good way to hide the additional bit, e.g. adding spaces at the beginning of a text line is too obvious and defeats the purpose of steganography!

## **Assignment Submission**

Please submit a zipped folder to Blackboard containing:

- Your (well-commented!) source code for problems 1 and 2 in PDF format.
- Screenshots showing your programs being compiled and producing results.