

Birzeit University
Computer Science Department
Encryption Theory (Comp 438)
Assignment One

The Assignment is due by 31/10/2024

Each group must show the work of each group members.

This assignment will be discussed with the instructor.

Each group of students (Two student in each group) required to do the following:

- Select the cover image (PNG or GPEG), this image must be large enough to hide the secretmessage.
- Develop a steganography program that uses the Least Significant Bit (LSB) algorithm to hide a secret message inside the pixels of an image (cover message).
- Apply a distribution technique to scatter the secret message across different pixels in the image.
- Implement the solution in either Java or Python.
- The report is required to discuss the method used for message distribution.
- Each group must define the technique which used though the process of distributing the secrete message in over message, such as using the following:
 - Random Distribution: Use a pseudo-random generator (e.g., seed-based randomness) to select random pixels in the image where the secret message will be hidden. The seed used for randomization should be saved for later extraction.
 - Zig-Zag Distribution: Hide the message in a zig-zag pattern by moving across rows and columns in a specific pattern, rather than sequentially.
 - Block Distribution: Divide the image into blocks of pixels and distribute the secret message across these blocks.
 - Search for recent techniques that are used for the purpose of distribution.

- Each group of students must define the reference of using distribution technique such as research paper or article.
- The program should include options to both hide and retrieve the secret message.
- The program should allow for user input (secret message) and an option to view the modified image.
- Each group requires my approval to the technique that will be used through the process of distribution for secret message.
- The submitted report must contain the following
 - An explanation of the LSB technique.
 - The chosen distribution technique (e.g., sequential, random, etc.).
 - How the distribution impacts the detectability of the hidden message.
 - An evaluation of the robustness of their implementation (i.e., how easy it would be to extract the message without knowing the distribution technique or the seed used for randomization).
 - Show the comparison results
- Each group is required to compare his technique with sequential technique for embedding secret messages.
- The comparison should evaluate aspects such as:
 - Message security (how detectable the hidden message is).
 - The impact of the distribution on the image quality.
 - The robustness of each approach (difficulty of extraction without prior knowledge).