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BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – M.Sc.(ANCS)-2022/M.Sc.(ANCS)-2023

Course Name – Steganography

Course Code - MNCS304A

(Semester III)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

(i) Choose a common characteristic of Adaptive Steganography.

- | | |
|---|--|
| a) It uses fixed patterns for hiding data | b) It can change hiding techniques based on cover medium |
| c) It relies solely on cryptographic encryption | d) It is more resistant to detection but less efficient |

(ii) Outline a common use case for steganography.

- | | |
|-------------------------------|-------------------------------|
| a) Secure email communication | b) Hiding data in image files |
| c) Data compression | d) User authentication |

(iii) Illustrate a benefit of using digital images for steganography.

- | | |
|-----------------------------------|---------------------------|
| a) High redundancy and large size | b) Low resolution |
| c) Fixed color profiles | d) Simplified compression |

(iv) Which technique involves hiding messages using spaces and tabs?

- | | |
|-----------------------------|-----------------|
| a) Character Encoding | b) LSB Method |
| c) Whitespace Steganography | d) Phase Coding |

(v) Build a primary challenge in maintaining imperceptibility in steganography.

- | | |
|---|---|
| a) Balancing data capacity with the quality of the carrier medium | b) Ensuring the security of hidden messages |
| c) Developing complex encoding schemes | d) Detecting hidden messages |

(vi) Identify null cipher.

- | | |
|--|---|
| a) A method of encrypting messages | b) A technique where hidden messages are formed by certain letters or words in plain text |
| c) A way to encode messages in audio files | d) A technique using invisible ink |

(vii) Which tool combines PGP encryption with steganography?

- | | |
|---------------|-------------|
| a) EzStego | b) FFEncode |
| c) Hide 4 PGP | d) S-Tools |

(viii) Determine the main focus of statistical steganography.

- a) Maintaining statistical properties
- b) Embedding data in DCT coefficients
- c) Spreading data across frequency bands
- d) Embedding data in pixel values

(ix) Estimate steganography technique uses histogram shifting.

- a) LSB Substitution
- b) Model-Based Techniques
- c) Histogram Shifting
- d) Frequency Hopping

(x) Explain LSB substitution.

- a) High resistance to detection
- b) Simple and efficient
- c) Difficult to detect statistically
- d) High embedding capacity

(xi) Focus on Generation, which involves in steganography.

- a) Generating synthetic carriers
- b) Selecting existing carriers
- c) Altering pixel values
- d) Encrypting data

(xii) What does adaptive watermarking involve?

- a) Adjusting watermark based on the carrier media
- b) Using static watermark techniques
- c) Embedding watermarks in audio only
- d) Applying watermarks in frequency domains

(xiii) Choose the technique which embeds watermarks directly in pixel values.

- a) Frequency-Domain
- b) Vector Quantization
- c) Spatial-Domain
- d) Adaptive

(xiv) Express the primary purpose of a semi-fragile watermark.

- a) To detect all types of tampering
- b) To tolerate some changes while detecting tampering
- c) To enhance visual quality
- d) To be highly visible

(xv) Which process is essential in reversible watermarking?

- a) Perfect restoration of the original media
- b) Embedding in high-frequency components
- c) Increasing the watermark size
- d) Using randomization techniques

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Describe the Discrete Cosine Transform (DCT) technique in the context of steganography. (3)
3. Explain Direct Sequence Spread Spectrum (DSSS). (3)
4. Evaluate the impact of malicious attackers on the efficacy of both active and passive steganalysis techniques. (3)
5. What are the advantages and disadvantages of using character encoding for hiding text? (3)
6. Illustrate the public key with an example. (3)

OR

Explain steganalysis?

(3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. How does FFEcode facilitate audio steganography? (5)
8. Choose Frequency-Domain Watermarking and its advantages over spatial-domain techniques. (5)
9. How is watermark security ensured against unauthorized detection or removal? (5)
10. Evaluate the effectiveness of LSB steganalysis using chi-square analysis in detecting complex adaptive steganography. How could it be improved? (5)
11. Examine the strengths and weaknesses of LSB embedding in audio files. How does this differ from image steganography? (5)
12. Focus on Filtering Attacks and their impact on watermarking. (5)

OR

Summarize the Linear Compression Attacks and how they impact the watermark.

(5)

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