

Sequence Diagram 1 (Complex – Hide Message Flow)

Scenario: GUI user hides a message

User → GUIHandler: click "Hide"

GUIHandler → FileDialog: select image

GUIHandler → TextField: get message

GUIHandler → PasswordField: get password + confirm

GUIHandler → ImageValidator: check_capacity(image, message)

ImageValidator → GUIHandler: OK

GUIHandler → AESCipher: encrypt(message, password)

AESCipher → ConfigManager: get encryption config

AESCipher → GUIHandler: ciphertext

GUIHandler → Embedder: embed(ciphertext, image)

Embedder → ImageValidator: double check capacity

Embedder → GUIHandler: returns stego image

GUIHandler → FileSaver: save to user location

GUIHandler → MessageLogger: record_action("hide", timestamp, file)

GUIHandler → User: show success popup

Sequence Diagram 2: Extracting a Hidden Message (GUI Flow)

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User → GUIHandler: click "Extract"  
GUIHandler → FileDialog: select stego image  
GUIHandler → PasswordField: input password  
  
GUIHandler → Extractor: extract_message(stego_image)  
Extractor → GUIHandler: returns ciphertext  
  
GUIHandler → AESCipher: decrypt(ciphertext, password)  
AESCipher → ConfigManager: get decryption config  
AESCipher → GUIHandler: returns plaintext  
  
GUIHandler → MessageLogger: record_action("extract", timestamp, file)  
  
GUIHandler → TextArea: display decrypted message  
GUIHandler → User: show success popup
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Sequence Diagram 3: Invalid Password during Extraction

User → GUIHandler: click "Extract"

GUIHandler → FileDialog: select stego image

GUIHandler → PasswordField: input wrong password

GUIHandler → Extractor: extract_message()

Extractor → GUIHandler: returns ciphertext

GUIHandler → AESCipher: decrypt(ciphertext, wrong_password)

AESCipher → GUIHandler: raises decryption error

GUIHandler → MessageLogger: record_action("failed_decrypt", timestamp, reason)

GUIHandler → ErrorPopup: show "Invalid password or corrupted message"

Sequence Diagram 4: Admin Viewing Logs and Exporting to Report

Admin → AdminDashboard: click "View Logs"
AdminDashboard → MessageLogger: fetch_log_entries()
MessageLogger → AdminDashboard: returns log list

Admin → AdminDashboard: click "Export to PDF"
AdminDashboard → ReportGenerator: generate(log_entries)
ReportGenerator → FileSaver: save_as("message_log.pdf")

AdminDashboard → Admin: show "Export Successful"

4. Activity Diagram (Complex – Full App Lifecycle)

