

# book\_to\_slide\_BY\_sections\_V6\_Image\_data

July 5, 2025

## 1 Set up Paths

```
[2]: # Cell 1: Setup and Configuration
import os
import re
import logging
import warnings
from PIL import Image
import io
from docx import Document
import pdfplumber
import ollama
from tenacity import retry, stop_after_attempt, wait_exponential, RetryError
import json

# Setup Logger for this cell
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s - %(message)s')
logger = logging.getLogger(__name__)

# --- 1. CORE SETTINGS ---
# Set this to True for EPUB, False for PDF. This controls the entire notebook's flow.
PROCESS_EPUB = True # for EPUB
# PROCESS_EPUB = False # for PDF

# --- 2. INPUT FILE NAMES ---
# The name of the Unit Outline file (e.g., DOCX, PDF)
UNIT_OUTLINE_FILENAME = "ICT312 Digital Forensic_Final.docx" # epub
# UNIT_OUTLINE_FILENAME = "ICT311 Applied Cryptography.docx" # pdf

EXTRACT_UO = False

# The names of the book files
EPUB_BOOK_FILENAME = "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to Computer Forensics and Investigations_ Processing Digital Evidence-Cengage Learning (2018).epub"
```

```

PDF_BOOK_FILENAME = "(Chapman & Hall_CRC Cryptography and Network Security_
↳Series) Jonathan Katz, Yehuda Lindell - Introduction to Modern_
↳Cryptography-CRC Press (2020).pdf"

# --- 3. DIRECTORY STRUCTURE ---
# Define the base path to your project to avoid hardcoding long paths everywhere
PROJECT_BASE_DIR = "/home/sebas_dev_linux/projects/course_generator"

# Define subdirectories relative to the base path
DATA_DIR = os.path.join(PROJECT_BASE_DIR, "data")
PARSE_DATA_DIR = os.path.join(PROJECT_BASE_DIR, "Parse_data")

# Construct full paths for clarity
INPUT_UO_DIR = os.path.join(DATA_DIR, "UO")
INPUT_BOOKS_DIR = os.path.join(DATA_DIR, "books")
OUTPUT_PARSED_UO_DIR = os.path.join(PARSE_DATA_DIR, "Parse_UO")
OUTPUT_PARSED_TOC_DIR = os.path.join(PARSE_DATA_DIR, "Parse_TOC_books")
OUTPUT_DB_DIR = os.path.join(DATA_DIR, "DataBase_Chroma")
OUTPUT_IMAGES_DIR = os.path.join(PROJECT_BASE_DIR, "extracted_images")
os.makedirs(OUTPUT_IMAGES_DIR, exist_ok=True)

# --- 4. LLM & EMBEDDING CONFIGURATION ---
LLM_PROVIDER = "ollama" # Can be "ollama", "openai", "gemini"
OLLAMA_HOST = "http://localhost:11434"
OLLAMA_MODEL = "qwen3:8b" # "qwen3:8b", #"mistral:latest"
EMBEDDING_MODEL_OLLAMA = "nomic-embed-text"
CHUNK_SIZE = 800
CHUNK_OVERLAP = 100

# --- 5. DYNAMICALLY GENERATED PATHS & IDs (DO NOT EDIT THIS SECTION) ---
# This section uses the settings above to create all the necessary variables_
↳for later cells.

# Extract Unit ID from the filename
def print_header(text: str, char: str = "="):
    """Prints a centered header to the console."""
    print("\n" + char * 80)
    print(text.center(80))
    print(char * 80)

def extract_uo_id_from_filename(filename: str) -> str:
    match = re.match(r'^[A-Z]+\d+', os.path.basename(filename))
    if match:
        return match.group(0)
    raise ValueError(f"Could not extract a valid Unit ID from filename:_
↳'{filename}'")

```

```

try:
    UNIT_ID = extract_uo_id_from_filename(UNIT_OUTLINE_FILENAME)
except ValueError as e:
    print(f"Error: {e}")
    UNIT_ID = "UNKNOWN_ID"

# Full path to the unit outline file
FULL_PATH_UNIT_OUTLINE = os.path.join(INPUT_UO_DIR, UNIT_OUTLINE_FILENAME)

# Determine which book and output paths to use based on the PROCESS_EPUB flag
if PROCESS_EPUB:
    BOOK_PATH = os.path.join(INPUT_BOOKS_DIR, EPUB_BOOK_FILENAME)
    PRE_EXTRACTED_TOC_JSON_PATH = os.path.join(OUTPUT_PARSED_TOC_DIR,
    ↪f"{UNIT_ID}_epub_table_of_contents.json")
else:
    BOOK_PATH = os.path.join(INPUT_BOOKS_DIR, PDF_BOOK_FILENAME)
    PRE_EXTRACTED_TOC_JSON_PATH = os.path.join(OUTPUT_PARSED_TOC_DIR,
    ↪f"{UNIT_ID}_pdf_table_of_contents.json")

# Define paths for the vector database
file_type_suffix = 'epub' if PROCESS_EPUB else 'pdf'
CHROMA_PERSIST_DIR = os.path.join(OUTPUT_DB_DIR,
    ↪f"chroma_db_toc_guided_chunks_{file_type_suffix}")
CHROMA_COLLECTION_NAME = f"book_toc_guided_chunks_{file_type_suffix}_v2"

# Define path for the parsed unit outline
PARSED_UO_JSON_PATH = os.path.join(OUTPUT_PARSED_UO_DIR, f"{os.path.
    ↪splitext(UNIT_OUTLINE_FILENAME)[0]}_parsed.json")

# --- Sanity Check Printout ---
print("--- CONFIGURATION SUMMARY ---")
print(f"Processing Mode: {'EPUB' if PROCESS_EPUB else 'PDF'}")
print(f"Unit ID: {UNIT_ID}")
print(f"Unit Outline Path: {FULL_PATH_UNIT_OUTLINE}")
print(f"Book Path: {BOOK_PATH}")
print(f"Parsed UO Output Path: {PARSED_UO_JSON_PATH}")
print(f"Parsed ToC Output Path: {PRE_EXTRACTED_TOC_JSON_PATH}")
print(f"Vector DB Path: {CHROMA_PERSIST_DIR}")
print(f"Vector DB Collection: {CHROMA_COLLECTION_NAME}")
print("--- SETUP COMPLETE ---")

```

--- CONFIGURATION SUMMARY ---

Processing Mode: EPUB

Unit ID: ICT312

Unit Outline Path:

/home/sebas\_dev\_linux/projects/course\_generator/data/UO/ICT312 Digital  
Forensic\_Final.docx

Book Path: /home/sebas\_dev\_linux/projects/course\_generator/data/books/Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to Computer Forensics and Investigations\_ Processing Digital Evidence-Cengage Learning (2018).epub  
 Parsed UO Output Path:  
 /home/sebas\_dev\_linux/projects/course\_generator/Parse\_data/Parse\_UO/ICT312 Digital Forensic\_Final\_parsed.json  
 Parsed ToC Output Path: /home/sebas\_dev\_linux/projects/course\_generator/Parse\_data/Parse\_TOC\_books/ICT312\_epub\_table\_of\_contents.json  
 Vector DB Path: /home/sebas\_dev\_linux/projects/course\_generator/data/DataBase\_Chroma/chroma\_db\_toc\_guided\_chunks\_epub  
 Vector DB Collection: book\_toc\_guided\_chunks\_epub\_v2  
 --- SETUP COMPLETE ---

## 2 System Prompt

```
[3]: UNIT_OUTLINE_SYSTEM_PROMPT_TEMPLATE = """
You are an expert academic assistant tasked with parsing a university unit
  ↳outline document and extracting key information into a structured JSON
  ↳format.

The input will be the raw text content of a unit outline. Your goal is to
  ↳identify and extract the following details and structure them precisely as
  ↳specified in the JSON schema below. Note: do not change any key name

**JSON Output Schema:**

```json
{{
  "unitInformation": {{
    "unitCode": "string | null",
    "unitName": "string | null",
    "creditPoints": "integer | null",
    "unitRationale": "string | null",
    "prerequisites": "string | null"
  }},
  "learningOutcomes": [
    "string"
  ],
  "assessments": [
    {{
      "taskName": "string",
      "description": "string",
      "dueWeek": "string | null",
      "weightingPercent": "integer | null",
      "learningOutcomesAssessed": "string | null"
    }}
  ]
}}
```

```

],
"weeklySchedule": [
  {{
    "week": "string",
    "contentTopic": "string",
    "requiredReading": "string | null"
  }}
],
"requiredReadings": [
  "string"
],
"recommendedReadings": [
  "string"
]
}}

```

Instructions for Extraction:

Unit Information: Locate Unit Code, Unit Name, Credit Points. Capture 'Unit\_Overview / Rationale' as unitRationale. Identify prerequisites.

Learning Outcomes: Extract each learning outcome statement.

Assessments: Each task as an object. Capture full task name, description, Due\_Week, Weighting % (number), and Learning Outcomes Assessed.

weeklySchedule: Each week as an object. Capture Week, contentTopic, and\_requiredReading.

Required and Recommended Readings: List full text for each.

**\*\*Important Considerations for the LLM\*\*:**

Pay close attention to headings and table structures.

If information is missing, use null for string/integer fields, or an empty list\_[] for array fields.

Do no change keys in the template given

Ensure the output is ONLY the JSON object, starting with {{{{ and ending with\_}}}}. No explanations or conversational text before or after the JSON.

Now, parse the following unit outline text:

```

--- UNIT_OUTLINE_TEXT_START ---
{outline_text}
--- UNIT_OUTLINE_TEXT_END ---
"""

```

[4]: *# Place this in a new cell after your imports, or within Cell 3 before the\_*  
*functions.*

*# This code is based on the schema from your screenshot on page 4.*

```

from pydantic import BaseModel, Field, ValidationError
from typing import List, Optional
import time

```

*# Define Pydantic models that match your JSON schema*

```

class UnitInformation(BaseModel):
    unitCode: Optional[str] = None
    unitName: Optional[str] = None
    creditPoints: Optional[int] = None
    unitRationale: Optional[str] = None
    prerequisites: Optional[str] = None

class Assessment(BaseModel):
    taskName: str
    description: str
    dueWeek: Optional[str] = None
    weightingPercent: Optional[int] = None
    learningOutcomesAssessed: Optional[str] = None

class WeeklyScheduleItem(BaseModel):
    week: str
    contentTopic: str
    requiredReading: Optional[str] = None

class ParsedUnitOutline(BaseModel):
    unitInformation: UnitInformation
    learningOutcomes: List[str]
    assessments: List[Assessment]
    weeklySchedule: List[WeeklyScheduleItem]
    requiredReadings: List[str]
    recommendedReadings: List[str]

```

### 3 Extrac Unit outline details to process following steps - output raw json with UO details

```

[4]: # Cell 3: Parse Unit Outline

# --- Helper Functions for Parsing ---
def extract_text_from_file(filepath: str) -> str:
    _, ext = os.path.splitext(filepath.lower())
    if ext == '.docx':
        doc = Document(filepath)
        full_text = [p.text for p in doc.paragraphs]
        for table in doc.tables:
            for row in table.rows:
                full_text.append(" | ".join(cell.text for cell in row.cells))
        return '\n'.join(full_text)
    elif ext == '.pdf':
        with pdfplumber.open(filepath) as pdf:

```

```

        return "\n".join(page.extract_text() for page in pdf.pages if page.
↪extract_text())
    else:
        raise TypeError(f"Unsupported file type: {ext}")

def parse_llm_json_output(content: str) -> dict:
    try:
        match = re.search(r'\{.*\}', content, re.DOTALL)
        if not match: return None
        return json.loads(match.group(0))
    except (json.JSONDecodeError, TypeError):
        return None

@retry(stop=stop_after_attempt(3), wait=wait_exponential(min=2, max=10))
def call_ollama_with_retry(client, prompt):
    logger.info(f"Calling Ollama model '{OLLAMA_MODEL}'...")
    response = client.chat(
        model=OLLAMA_MODEL,
        messages=[{"role": "user", "content": prompt}],
        format="json",
        options={"temperature": 0.0}
    )
    if not response or 'message' not in response or not response['message'].
↪get('content'):
        raise ValueError("Ollama returned an empty or invalid response.")
    return response['message']['content']

# --- Main Orchestration Function for this Cell ---
def parse_and_save_outline_robust(
    input_filepath: str,
    output_filepath: str,
    prompt_template: str,
    max_retries: int = 3
):
    logger.info(f"Starting to robustly process Unit Outline: {input_filepath}")

    if not os.path.exists(input_filepath):
        logger.error(f"Input file not found: {input_filepath}")
        return

    try:
        outline_text = extract_text_from_file(input_filepath)
        if not outline_text.strip():
            logger.error("Extracted text is empty. Aborting.")
            return
    except Exception as e:
        logger.error(f"Failed to extract text from file: {e}", exc_info=True)

```

```

    return

    client = ollama.Client(host=OLLAMA_HOST)
    current_prompt = prompt_template.format(outline_text=outline_text)

    for attempt in range(max_retries):
        logger.info(f"Attempt {attempt + 1}/{max_retries} to parse outline.")

        try:
            # Call the LLM
            llm_output_str = call_ollama_with_retry(client, current_prompt)

            # Find the JSON blob in the response
            json_blob = parse_llm_json_output(llm_output_str) # Your existing
↪helper

            if not json_blob:
                raise ValueError("LLM did not return a parsable JSON object.")

            # *** THE KEY VALIDATION STEP ***
            # Try to parse the dictionary into your Pydantic model.
            # This will raise a `ValidationError` if keys are wrong, types are
↪wrong, or fields are missing.
            parsed_data = ParsedUnitOutline.model_validate(json_blob)

            # If successful, save the validated data and exit the loop
            logger.info("Successfully validated JSON structure against Pydantic
↪model.")

            os.makedirs(os.path.dirname(output_filepath), exist_ok=True)
            with open(output_filepath, 'w', encoding='utf-8') as f:
                # Use .model_dump_json() for clean, validated output
                f.write(parsed_data.model_dump_json(indent=2))

            logger.info(f"Successfully parsed and saved Unit Outline to:
↪{output_filepath}")
            return # Exit function on success

        except ValidationError as e:
            logger.warning(f"Validation failed on attempt {attempt + 1}. Error:
↪{e}")

            # Formulate a new prompt with the error message for self-correction
            error_feedback = (
                f"\n\nYour previous attempt failed. You MUST correct the
↪following errors:\n"
                f"{e}\n\n"
                f"Please regenerate the entire JSON object, ensuring it
↪strictly adheres to the schema "

```



```

        f"and corrects these specific errors. Do not change any key_
↳names."
    )
    current_prompt = current_prompt + error_feedback # Append the error_
↳to the prompt

    except Exception as e:
        # Catch other errors like network issues from call_ollama_with_retry
        logger.error(f"An unexpected error occurred on attempt {attempt +_
↳1}: {e}", exc_info=True)
        # You might want to wait before retrying for non-validation errors
        time.sleep(5)

    logger.error(f"Failed to get valid structured data from the LLM after_
↳{max_retries} attempts.")

# --- In your execution block, call the new function ---
# parse_and_save_outline(...) becomes:

if EXTRACT_UO:
    parse_and_save_outline_robust(
        input_filepath=FULL_PATH_UNIT_OUTLINE,
        output_filepath=PARSED_UO_JSON_PATH,
        prompt_template=UNIT_OUTLINE_SYSTEM_PROMPT_TEMPLATE
    )

```

## 4 Extract TOC from epub or epub

```

[14]: # Cell 4: Extract Book Table of Contents (ToC) with Pre-assigned IDs in Order

from ebooklib import epub, ITEM_NAVIGATION
from bs4 import BeautifulSoup
import fitz # PyMuPDF
import json
import os
from typing import List, Dict

# =====
# 1. HELPER FUNCTIONS (MODIFIED TO INCLUDE ID ASSIGNMENT)
# =====

# --- EPUB Extraction Logic ---
def parse_navpoint(navpoint: BeautifulSoup, counter: List[int], level: int = 0)_
↳-> Dict:
    """Recursively parses EPUB 2 navPoints and assigns a toc_id."""

```

```

title = navpoint.navLabel.text.strip()
if not title: return None

# Assign ID immediately upon creation
node = {
    "level": level,
    "toc_id": counter[0],
    "title": title,
    "children": []
}
counter[0] += 1 # Increment counter for the next node

for child_navpoint in navpoint.find_all('navPoint', recursive=False):
    child_node = parse_navpoint(child_navpoint, counter, level + 1)
    if child_node: node["children"].append(child_node)

return node

def parse_li(li_element: BeautifulSoup, counter: List[int], level: int = 0) -> Dict:
    """Recursively parses EPUB 3 <li> elements and assigns a toc_id."""
    a_tag = li_element.find('a', recursive=False)
    if a_tag:
        title = a_tag.get_text(strip=True)
        if not title: return None

        # Assign ID immediately upon creation
        node = {
            "level": level,
            "toc_id": counter[0],
            "title": title,
            "children": []
        }
        counter[0] += 1 # Increment counter for the next node

        nested_ol = li_element.find('ol', recursive=False)
        if nested_ol:
            for sub_li in nested_ol.find_all('li', recursive=False):
                child_node = parse_li(sub_li, counter, level + 1)
                if child_node: node["children"].append(child_node)
            return node
        return None

def extract_epub_toc(epub_path, output_json_path):
    print(f"Processing EPUB ToC for: {epub_path}")
    toc_data = []
    book = epub.read_epub(epub_path)

```

```

    # The counter is a list so it can be passed by reference and modified by
    ↪ the helpers
    id_counter = [1]

    for nav_item in book.get_items_of_type(ITEM_NAVIGATION):
        soup = BeautifulSoup(nav_item.get_content(), 'xml')
        if nav_item.get_name().endswith('.ncx'):
            print("INFO: Found EPUB 2 (NCX) Table of Contents. Parsing...")
            navmap = soup.find('navMap')
            if navmap:
                for navpoint in navmap.find_all('navPoint', recursive=False):
                    node = parse_navpoint(navpoint, id_counter, level=0)
                    if node: toc_data.append(node)
            else:
                print("INFO: Found EPUB 3 (XHTML) Table of Contents. Parsing...")
                toc_nav = soup.select_one('nav[epub:type="toc"]')
                if toc_nav:
                    top_ol = toc_nav.find('ol', recursive=False)
                    if top_ol:
                        for li in top_ol.find_all('li', recursive=False):
                            node = parse_li(li, id_counter, level=0)
                            if node: toc_data.append(node)
                if toc_data: break

        if toc_data:
            os.makedirs(os.path.dirname(output_json_path), exist_ok=True)
            with open(output_json_path, 'w', encoding='utf-8') as f:
                json.dump(toc_data, f, indent=2, ensure_ascii=False)
            print(f" Successfully wrote EPUB ToC with assigned IDs to:
            ↪ {output_json_path}")
        else:
            print(" WARNING: No ToC data extracted from EPUB.")

# --- PDF Extraction Logic ---
def build_pdf_hierarchy_with_ids(toc_list: List) -> List[Dict]:
    """Builds a hierarchical structure from a flat PyMuPDF ToC list and assigns
    ↪ IDs."""
    root = []
    parent_stack = {-1: {"children": root}}
    id_counter = [1]

    for level, title, page in toc_list:
        normalized_level = level - 1
        node = {
            "level": normalized_level,
            "toc_id": id_counter[0],
            "title": title.strip(),

```

```

        "page": page,
        "children": []
    }
    id_counter[0] += 1

    parent_node = parent_stack.get(normalized_level - 1)
    if parent_node:
        parent_node["children"].append(node)

    parent_stack[normalized_level] = node
    return root

def extract_pdf_toc(pdf_path, output_json_path):
    print(f"Processing PDF ToC for: {pdf_path}")
    try:
        doc = fitz.open(pdf_path)
        toc = doc.get_toc()
        hierarchical_toc = []
        if not toc:
            print(" WARNING: This PDF has no embedded bookmarks (ToC).")
        else:
            print(f"INFO: Found {len(toc)} bookmark entries. Building hierarchy_
↳and assigning IDs...")
            hierarchical_toc = build_pdf_hierarchy_with_ids(toc)

            os.makedirs(os.path.dirname(output_json_path), exist_ok=True)
            with open(output_json_path, 'w', encoding='utf-8') as f:
                json.dump(hierarchical_toc, f, indent=2, ensure_ascii=False)
            print(f" Successfully wrote PDF ToC with assigned IDs to:
↳{output_json_path}")

        except Exception as e:
            print(f"An error occurred during PDF ToC extraction: {e}")

# =====
# 2. EXECUTION BLOCK
# =====

# Assumes global variables from Cell 1 are available
if PROCESS_EPUB:
    extract_epub_toc(BOOK_PATH, PRE_EXTRACTED_TOC_JSON_PATH)
else:
    extract_pdf_toc(BOOK_PATH, PRE_EXTRACTED_TOC_JSON_PATH)

```

Processing EPUB ToC for:  
/home/sebas\_dev\_linux/projects/course\_generator/data/books/Bill Nelson, Amelia  
Phillips, Christopher Steuart - Guide to Computer Forensics and Investigations\_

Processing Digital Evidence-Cengage Learning (2018).epub

INFO: Found EPUB 2 (NCX) Table of Contents. Parsing...

Successfully wrote EPUB ToC with assigned IDs to: /home/sebas\_dev\_linux/projects/course\_generator/Parse\_data/Parse\_TOC\_books/ICT312\_epub\_table\_of\_contents.json

## 5 Hirachical DB base on TOC

### 5.1 Process Book

```
[ ]: # Cell 5: Create Hierarchical Vector Database (V11 - Semantic Chunking)
# This cell groups content by section BEFORE chunking to ensure metadata
# integrity.

# --- Core Imports ---
import os
import json
import shutil
import logging
from typing import List, Dict, Any, Tuple

# --- LangChain and Data Loading Imports ---
from langchain_core.documents import Document
from langchain_community.document_loaders import PyPDFLoader
from langchain_ollama.embeddings import OllamaEmbeddings
from langchain_chroma import Chroma
from langchain.text_splitter import RecursiveCharacterTextSplitter

# --- Imports for EPUB and PDF Processing ---
from ebooklib import epub, ITEM_DOCUMENT
from bs4 import BeautifulSoup
import fitz # PyMuPDF

# --- Logger Setup ---
logger = logging.getLogger(__name__)
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s - 
    %(message)s')

# =====
# 1. HELPER FUNCTIONS (No changes needed from previous version)
# =====
def clean_metadata_for_chroma(value: Any) -> Any:
    if isinstance(value, (list, dict, set)):
        if isinstance(value, set): value = sorted(list(value))
        return json.dumps(value)
    if isinstance(value, (str, int, float, bool)) or value is None: return value
```

```

    return str(value)

def extract_images_from_epub(epub_path: str, output_dir: str, unit_id: str) -> Dict[str, List[str]]:
    # This function remains correct and can be copied from the previous answer.
    # For brevity, its implementation is condensed here.
    logger.info(f"Extracting images from EPUB: {os.path.basename(epub_path)}")
    image_map: Dict[str, List[str]] = {}
    book_image_dir = os.path.join(output_dir, f"{unit_id}_epub_images")
    os.makedirs(book_image_dir, exist_ok=True)
    book = epub.read_epub(epub_path)
    for item in book.get_items_of_type(ITEM_DOCUMENT):
        source_filename = os.path.basename(item.get_name())
        content = item.get_content().decode('utf-8', 'ignore')
        for image_item in book.get_items_of_type('image'):
            img_internal_path = image_item.get_name()
            if img_internal_path in content:
                if source_filename not in image_map: image_map[source_filename] = []

                img_filename = os.path.basename(img_internal_path)
                image_path = os.path.join(book_image_dir, img_filename)
                if not os.path.exists(image_path):
                    with open(image_path, "wb") as f: f.write(image_item.get_content())

                if image_path not in image_map[source_filename]:
                    image_map[source_filename].append(image_path)

    total_images = sum(len(v) for v in image_map.values())
    logger.info(f"Extracted {total_images} total images to '{book_image_dir}'")
    return image_map

def flatten_toc_with_paths(nodes: List[Dict], current_path: List[str] = []) -> List[Dict]:
    flat_list = []
    for node in nodes:
        new_path = current_path + [node['title']]
        flat_entry = node.copy()
        flat_entry['titles_path'] = new_path
        children = flat_entry.pop('children', [])
        flat_list.append(flat_entry)
        if children:
            flat_list.extend(flatten_toc_with_paths(children, new_path))
    return flat_list

# =====
# 2. CORE ORCHESTRATION FUNCTION (WITH SEMANTIC CHUNKING)
# =====

```

```

def process_book_with_extracted_toc(
    book_path: str,
    extracted_toc_json_path: str,
    chunk_size: int,
    chunk_overlap: int
) -> Tuple[List[Document], List[Dict[str, Any]]]:

    logger.info(f"Processing book '{os.path.basename(book_path)}' using ToC
↳from '{os.path.basename(extracted_toc_json_path)}'.")

    # --- Step 1: Load ToC with Pre-assigned IDs ---
    try:
        with open(extracted_toc_json_path, 'r', encoding='utf-8') as f:
            hierarchical_toc = json.load(f)
        logger.info("Successfully loaded pre-extracted ToC with assigned IDs.")
    except Exception as e:
        logger.error(f"FATAL: Error loading ToC JSON: {e}", exc_info=True)
        return [], []

    # --- Step 2: Create Flattened ToC and Lookup Table ---
    flat_toc = flatten_toc_with_paths(hierarchical_toc)
    toc_lookup = {entry['title'].strip().lower(): entry for entry in flat_toc}
    logger.info(f"Created a flattened ToC with {len(flat_toc)} entries for
↳matching.")

    # --- Step 3: Extract Images ---
    file_extension = os.path.splitext(book_path.lower())[1]
    image_map = {}
    if file_extension == ".epub":
        unit_id = extract_uo_id_from_filename(UNIT_OUTLINE_FILENAME)
        image_map = extract_images_from_epub(book_path, OUTPUT_IMAGES_DIR,
↳unit_id)

    # --- Step 4: Group Content into Section-Level Documents ---
    section_documents: List[Document] = []
    if file_extension == ".epub":
        book = epub.read_epub(book_path)

        current_metadata = {"source": os.path.basename(book_path), "toc_id":
↳-1, "level_1_title": "Preamble"}
        current_content_parts = []

        for item in book.get_items_of_type(ITEM_DOCUMENT):
            source_filename = os.path.basename(item.get_name())
            soup = BeautifulSoup(item.get_content(), 'html.parser')

```

```

        for element in soup.find_all(['h1', 'h2', 'h3', 'h4', 'h5', 'h6', 'p', 'div', 'li']):
            text = element.get_text().strip()
            if not text:
                continue

            normalized_text = text.lower()
            if normalized_text in toc_lookup:
                # Found a new heading. Save the previous section's content.
                if current_content_parts:
                    section_content = "\n\n".join(current_content_parts)
                    if source_filename in image_map:
                        current_metadata.setdefault('image_paths', []).
                extend(p for p in image_map[source_filename] if p not in current_metadata.
                get('image_paths', []))
                    section_documents.
                append(Document(page_content=section_content, metadata=current_metadata))

                # Now, reset for the new section.
                current_content_parts = []
                toc_entry = toc_lookup[normalized_text]
                current_metadata = {"source": os.path.basename(book_path)}
                for i, title in enumerate(toc_entry['titles_path']):
                    current_metadata[f"level_{i+1}_title"] = title
                    current_metadata['toc_id'] = toc_entry['toc_id']
                    logger.info(f"Started new section: '{' -> '.
                join(toc_entry['titles_path'])}' [ID: {toc_entry['toc_id']}]")
                else:
                    # Not a heading, just regular content. Append it.
                    current_content_parts.append(text)

            # Don't forget to save the very last section after the loop finishes
            if current_content_parts:
                section_content = "\n\n".join(current_content_parts)
                section_documents.append(Document(page_content=section_content,
                metadata=current_metadata))

            logger.info(f"Grouped content into {len(section_documents)} section-level
            documents.")

            # --- Step 5: Sanitize Metadata and Chunk the Section Documents ---
            logger.info("Sanitizing metadata and chunking documents...")
            text_splitter = RecursiveCharacterTextSplitter(chunk_size=chunk_size,
            chunk_overlap=chunk_overlap, length_function=len)

            for doc in section_documents:

```



```

        doc.metadata = {k: clean_metadata_for_chroma(v) for k, v in doc.
↪metadata.items()}

    final_chunks = text_splitter.split_documents(section_documents)

    logger.info(f"Split into {len(final_chunks)} final chunks and assigning_
↪chunk_id...")
    for i, chunk in enumerate(final_chunks):
        chunk.metadata['chunk_id'] = i

    return final_chunks, hierarchical_toc

# =====
# 3. MAIN EXECUTION BLOCK (UNCHANGED)
# =====
if not os.path.exists(PRE_EXTRACTED_TOC_JSON_PATH):
    logger.error(f"CRITICAL: Pre-extracted ToC file not found at_
↪'{PRE_EXTRACTED_TOC_JSON_PATH}'.")
else:
    final_chunks_for_db, toc_reloaded = process_book_with_extracted_toc(
        book_path=BOOK_PATH,
        extracted_toc_json_path=PRE_EXTRACTED_TOC_JSON_PATH,
        chunk_size=CHUNK_SIZE,
        chunk_overlap=CHUNK_OVERLAP
    )
    if final_chunks_for_db:
        if os.path.exists(CHROMA_PERSIST_DIR):
            logger.warning(f"Deleting existing ChromaDB directory:_
↪'{CHROMA_PERSIST_DIR}'")
            shutil.rmtree(CHROMA_PERSIST_DIR)

        logger.info(f"Initializing embedding model '{EMBEDDING_MODEL_OLLAMA}'...
↪")
        embedding_model = OllamaEmbeddings(model=EMBEDDING_MODEL_OLLAMA)

        logger.info(f"Creating new vector database with_
↪{len(final_chunks_for_db)} chunks...")
        vector_db = Chroma.from_documents(
            documents=final_chunks_for_db,
            embedding=embedding_model,
            persist_directory=CHROMA_PERSIST_DIR,
            collection_name=CHROMA_COLLECTION_NAME
        )
        count = vector_db._collection.count()
        print("-" * 50)
        logger.info(f"Vector DB created successfully at: {CHROMA_PERSIST_DIR}")

```

```
logger.info(f"Collection '{CHROMA_COLLECTION_NAME}' contains {count}␣
↳documents.")
print("-" * 50)
else:
    logger.error("Failed to generate chunks. Vector DB not created.")
```

2025-07-05 13:21:18,733 - INFO - Processing book 'Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to Computer Forensics and Investigations\_ Processing Digital Evidence-Cengage Learning (2018).epub' using ToC from 'ICT312\_epub\_table\_of\_contents.json'.

2025-07-05 13:21:18,918 - INFO - Successfully loaded pre-extracted ToC with assigned IDs.

2025-07-05 13:21:18,919 - INFO - Created a flattened ToC with 877 entries for matching.

2025-07-05 13:21:18,920 - INFO - Extracting images from EPUB: Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to Computer Forensics and Investigations\_ Processing Digital Evidence-Cengage Learning (2018).epub

2025-07-05 13:21:20,172 - INFO - Extracted 0 total images to '/home/sebas\_dev\_linux/projects/course\_generator/extracted\_images/ICT312\_epub\_images'

2025-07-05 13:21:20,439 - INFO - Started new section: 'Cover Page' [ID: 1]

2025-07-05 13:21:20,440 - INFO - Started new section: 'Title Page' [ID: 2]

2025-07-05 13:21:20,440 - INFO - Started new section: 'Copyright Page' [ID: 3]

2025-07-05 13:21:20,441 - INFO - Started new section: 'Preface' [ID: 4]

2025-07-05 13:21:20,441 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Introduction' [ID: 558]

2025-07-05 13:21:20,441 - INFO - Started new section: 'About the Authors' [ID: 6]

2025-07-05 13:21:20,442 - INFO - Started new section: 'Acknowledgments' [ID: 7]

2025-07-05 13:21:20,442 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,443 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> An Overview of Digital Forensics -> Digital Forensics and Other Related Disciplines' [ID: 11]

2025-07-05 13:21:20,443 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> An Overview of Digital Forensics -> A Brief History of Digital Forensics' [ID: 12]

2025-07-05 13:21:20,444 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> An Overview of Digital Forensics -> Understanding Case Law' [ID: 13]

2025-07-05 13:21:20,444 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> An Overview of Digital Forensics -> Developing Digital Forensics Resources' [ID: 14]

2025-07-05 13:21:20,445 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Law Enforcement Agency Investigations' [ID: 16]

2025-07-05 13:21:20,445 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital

Investigations -> Following Legal Processes' [ID: 17]

2025-07-05 13:21:20,445 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations -> Establishing Company Policies' [ID: 19]

2025-07-05 13:21:20,446 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations -> Displaying Warning Banners' [ID: 20]

2025-07-05 13:21:20,446 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations -> Designating an Authorized Requester' [ID: 21]

2025-07-05 13:21:20,446 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations -> Conducting Security Investigations' [ID: 22]

2025-07-05 13:21:20,447 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations -> Distinguishing Personal and Company Property' [ID: 23]

2025-07-05 13:21:20,447 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Maintaining Professional Conduct' [ID: 24]

2025-07-05 13:21:20,447 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> An Overview of a Computer Crime' [ID: 26]

2025-07-05 13:21:20,448 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> An Overview of a Company Policy Violation' [ID: 27]

2025-07-05 13:21:20,449 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> Taking a Systematic Approach -> Assessing the Case' [ID: 29]

2025-07-05 13:21:20,449 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> Taking a Systematic Approach -> Planning Your Investigation' [ID: 30]

2025-07-05 13:21:20,450 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> Taking a Systematic Approach -> Securing Your Evidence' [ID: 31]

2025-07-05 13:21:20,450 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> Employee Termination Cases' [ID: 33]

2025-07-05 13:21:20,450 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> Internet Abuse Investigations' [ID: 34]

2025-07-05 13:21:20,451 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> E-mail Abuse Investigations' [ID: 35]

2025-07-05 13:21:20,451 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> Attorney-Client Privilege Investigations' [ID: 36]

2025-07-05 13:21:20,452 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> Industrial Espionage Investigations -> Interviews and Interrogations in High-Tech Investigations' [ID: 38]

2025-07-05 13:21:20,452 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Understanding Data Recovery Workstations and Software -> Setting Up Your Workstation for Digital Forensics' [ID: 40]

2025-07-05 13:21:20,452 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Gathering the Evidence' [ID: 42]

2025-07-05 13:21:20,453 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Understanding Bit-stream Copies -> Acquiring an Image of Evidence Media' [ID: 44]

2025-07-05 13:21:20,453 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Analyzing Your Digital Evidence -> Some Additional Features of Autopsy' [ID: 46]

2025-07-05 13:21:20,454 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Completing the Case -> Autopsy's Report Generator' [ID: 48]

2025-07-05 13:21:20,454 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Critiquing the Case' [ID: 49]

2025-07-05 13:21:20,455 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:20,455 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,455 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,456 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,456 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,457 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,457 - INFO - Started new section: 'Chapter 2. The

Investigator's Office and Laboratory -> Understanding Forensics Lab  
Accreditation Requirements -> Identifying Duties of the Lab Manager and Staff' [ID: 59]

2025-07-05 13:21:20,458 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Lab Budget Planning' [ID: 60]

2025-07-05 13:21:20,458 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> International Association of Computer Investigative Specialists' [ID: 535]

2025-07-05 13:21:20,459 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training -> ISC2 Certified Cyber Forensics Professional' [ID: 63]

2025-07-05 13:21:20,459 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training -> High Tech Crime Network' [ID: 64]

2025-07-05 13:21:20,459 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training -> EnCase Certified Examiner Certification' [ID: 65]

2025-07-05 13:21:20,460 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training -> AccessData Certified Examiner' [ID: 66]

2025-07-05 13:21:20,460 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training -> Other Training and Certifications' [ID: 67]

2025-07-05 13:21:20,461 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Identifying Lab Security Needs' [ID: 69]

2025-07-05 13:21:20,461 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Conducting High-Risk Investigations' [ID: 70]

2025-07-05 13:21:20,462 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Using Evidence Containers' [ID: 71]

2025-07-05 13:21:20,462 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Overseeing Facility Maintenance' [ID: 72]

2025-07-05 13:21:20,463 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Considering Physical Security Needs' [ID: 73]

2025-07-05 13:21:20,463 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Auditing a Digital Forensics Lab' [ID: 74]

2025-07-05 13:21:20,463 - INFO - Started new section: 'Chapter 2. The

Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Determining Floor Plans for Digital Forensics Labs' [ID: 75]

2025-07-05 13:21:20,464 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Selecting Workstations for a Lab' [ID: 77]

2025-07-05 13:21:20,464 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Selecting Workstations for Private-Sector Labs' [ID: 78]

2025-07-05 13:21:20,465 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Stocking Hardware Peripherals' [ID: 79]

2025-07-05 13:21:20,465 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Maintaining Operating Systems and Software Inventories' [ID: 80]

2025-07-05 13:21:20,465 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Using a Disaster Recovery Plan' [ID: 81]

2025-07-05 13:21:20,466 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Planning for Equipment Upgrades' [ID: 82]

2025-07-05 13:21:20,466 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Justification' [ID: 85]

2025-07-05 13:21:20,466 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Budget Development' [ID: 86]

2025-07-05 13:21:20,467 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Facility Cost' [ID: 87]

2025-07-05 13:21:20,468 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Hardware Requirements' [ID: 88]

2025-07-05 13:21:20,468 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Software Requirements' [ID: 89]

2025-07-05 13:21:20,469 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Miscellaneous Budget Needs' [ID: 90]

2025-07-05 13:21:20,469 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab ->

Approval and Acquisition' [ID: 91]  
 2025-07-05 13:21:20,469 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Implementation' [ID: 92]  
 2025-07-05 13:21:20,470 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Acceptance Testing' [ID: 93]  
 2025-07-05 13:21:20,470 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Correction for Acceptance' [ID: 94]  
 2025-07-05 13:21:20,470 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Production' [ID: 95]  
 2025-07-05 13:21:20,471 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]  
 2025-07-05 13:21:20,472 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]  
 2025-07-05 13:21:20,472 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]  
 2025-07-05 13:21:20,473 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]  
 2025-07-05 13:21:20,473 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]  
 2025-07-05 13:21:20,473 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]  
 2025-07-05 13:21:20,475 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Understanding Storage Formats for Digital Evidence -> Raw Format' [ID: 105]  
 2025-07-05 13:21:20,475 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Understanding Storage Formats for Digital Evidence -> Proprietary Formats' [ID: 106]  
 2025-07-05 13:21:20,475 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Understanding Storage Formats for Digital Evidence -> Advanced Forensic Format' [ID: 107]  
 2025-07-05 13:21:20,476 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Determining the Best Acquisition Method' [ID: 108]  
 2025-07-05 13:21:20,477 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Contingency Planning for Image Acquisitions' [ID: 109]  
 2025-07-05 13:21:20,477 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Mini-WinFE Boot CDs and USB Drives' [ID: 111]

2025-07-05 13:21:20,478 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Acquiring Data with a Linux Boot CD -> Using Linux Live CD Distributions' [ID: 113]

2025-07-05 13:21:20,478 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Acquiring Data with a Linux Boot CD -> Preparing a Target Drive for Acquisition in Linux' [ID: 114]

2025-07-05 13:21:20,479 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Acquiring Data with a Linux Boot CD -> Acquiring Data with dd in Linux' [ID: 115]

2025-07-05 13:21:20,479 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Acquiring Data with a Linux Boot CD -> Acquiring Data with dcfldd in Linux' [ID: 116]

2025-07-05 13:21:20,480 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Capturing an Image with AccessData FTK Imager Lite' [ID: 117]

2025-07-05 13:21:20,480 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Validating Data Acquisitions -> Linux Validation Methods -> Validating dd-Acquired Data' [ID: 120]

2025-07-05 13:21:20,480 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Validating Data Acquisitions -> Linux Validation Methods -> Validating dcfldd-Acquired Data' [ID: 121]

2025-07-05 13:21:20,481 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Validating Data Acquisitions -> Windows Validation Methods' [ID: 122]

2025-07-05 13:21:20,481 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Performing RAID Data Acquisitions -> Understanding RAID' [ID: 124]

2025-07-05 13:21:20,481 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Performing RAID Data Acquisitions -> Acquiring RAID Disks' [ID: 125]

2025-07-05 13:21:20,482 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools -> Remote Acquisition with ProDiscover' [ID: 127]

2025-07-05 13:21:20,483 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools -> Remote Acquisition with EnCase Enterprise' [ID: 128]

2025-07-05 13:21:20,483 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools -> Remote Acquisition with R-Tools R-Studio' [ID: 129]

2025-07-05 13:21:20,484 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools -> Remote Acquisition with WetStone US-LATT PRO' [ID: 130]

2025-07-05 13:21:20,484 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools -> Remote Acquisition with F-Response' [ID: 131]

2025-07-05 13:21:20,484 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> PassMark Software ImageUSB' [ID: 133]



2025-07-05 13:21:20,485 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> ASR Data SMART' [ID: 134]

2025-07-05 13:21:20,485 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> Runtime Software' [ID: 135]

2025-07-05 13:21:20,486 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> ILookIX IXImager' [ID: 136]

2025-07-05 13:21:20,486 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> SourceForge' [ID: 137]

2025-07-05 13:21:20,487 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:20,487 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,488 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,488 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,488 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,489 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,490 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Identifying Digital Evidence -> Understanding Rules of Evidence' [ID: 147]

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2025-07-05 13:21:20,503 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]  
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2025-07-05 13:21:20,516 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Understanding Microsoft Startup Tasks -> Startup in Windows NT and Later -> Windows XP System Files' [ID: 222]

2025-07-05 13:21:20,516 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Understanding Microsoft Startup Tasks -> Startup in Windows NT and Later -> Contamination Concerns with Windows XP' [ID: 223]

2025-07-05 13:21:20,517 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Understanding Virtual Machines -> Creating a Virtual Machine' [ID: 225]

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2025-07-05 13:21:20,517 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,518 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,518 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,519 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,519 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

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2025-07-05 13:21:20,522 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Extraction' [ID: 241]

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2025-07-05 13:21:20,532 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,532 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,532 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,533 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

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2025-07-05 13:21:20,536 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,537 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,537 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,537 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,538 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,538 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Recognizing a Graphics File -> Understanding Bitmap and Raster Images' [ID: 293]

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2025-07-05 13:21:20,548 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,549 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,549 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,550 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,550 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,551 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Determining What Data to Collect and Analyze -> Approaching Digital Forensics Cases -> Refining and Modifying the Investigation Plan' [ID: 326]

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2025-07-05 13:21:20,552 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Determining What Data to Collect and Analyze -> Collecting Hash Values in Autopsy' [ID: 329]

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2025-07-05 13:21:20,554 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Marking Bad Clusters' [ID: 337]

2025-07-05 13:21:20,554 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Bit-Shifting' [ID: 338]

2025-07-05 13:21:20,554 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Understanding Steganalysis Methods' [ID: 339]

2025-07-05 13:21:20,555 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Examining Encrypted Files' [ID: 340]

2025-07-05 13:21:20,555 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Recovering Passwords' [ID: 341]

2025-07-05 13:21:20,557 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:20,557 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,558 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,558 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,558 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,559 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,560 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors -> Parallels Desktop' [ID: 352]

2025-07-05 13:21:20,560 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors -> KVM' [ID: 353]

2025-07-05 13:21:20,561 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors -> Microsoft Hyper-V' [ID: 354]

2025-07-05 13:21:20,561 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors -> VMware Workstation and Workstation Player' [ID: 355]

2025-07-05 13:21:20,562 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors -> VirtualBox' [ID: 356]

2025-07-05 13:21:20,562 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of

Virtual Machine Forensics -> Conducting an Investigation with Type 2 Hypervisors -> Other VM Examination Methods' [ID: 358]

2025-07-05 13:21:20,562 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Conducting an Investigation with Type 2 Hypervisors -> Using VMs as Forensics Tools' [ID: 359]

2025-07-05 13:21:20,563 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Working with Type 1 Hypervisors' [ID: 360]

2025-07-05 13:21:20,564 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Performing Live Acquisitions -> Performing a Live Acquisition in Windows' [ID: 362]

2025-07-05 13:21:20,564 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview -> The Need for Established Procedures' [ID: 364]

2025-07-05 13:21:20,565 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview -> Securing a Network' [ID: 365]

2025-07-05 13:21:20,565 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview -> Developing Procedures for Network Forensics -> Reviewing Network Logs' [ID: 367]

2025-07-05 13:21:20,565 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview -> Developing Procedures for Network Forensics -> Using Network Tools' [ID: 368]

2025-07-05 13:21:20,566 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview -> Developing Procedures for Network Forensics -> Using Packet Analyzers' [ID: 369]

2025-07-05 13:21:20,566 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview -> Investigating Virtual Networks' [ID: 370]

2025-07-05 13:21:20,566 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview -> Examining the Honeynet Project' [ID: 371]

2025-07-05 13:21:20,567 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:20,567 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,567 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,568 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,568 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,569 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,569 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Exploring the Role of E-mail in Investigations' [ID: 380]

2025-07-05 13:21:20,569 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Exploring the Roles of the Client and Server in E-mail' [ID: 381]

2025-07-05 13:21:20,570 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations -> Understanding Forensic Linguistics' [ID: 383]

2025-07-05 13:21:20,570 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations -> Examining E-mail Messages -> Copying an E-mail Message' [ID: 385]

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2025-07-05 13:21:20,571 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations -> Examining E-mail Headers' [ID: 387]

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2025-07-05 13:21:20,575 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Understanding E-mail Servers -> Examining UNIX E-mail Server Logs' [ID: 392]

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2025-07-05 13:21:20,576 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Using Specialized E-mail Forensics Tools -> Using Magnet AXIOM to Recover E-mail' [ID: 395]

2025-07-05 13:21:20,577 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Using Specialized E-mail Forensics Tools -> Using a Hex Editor to Carve E-mail Messages' [ID: 396]

2025-07-05 13:21:20,578 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Using Specialized E-mail Forensics Tools -> Recovering Outlook Files' [ID: 397]

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2025-07-05 13:21:20,579 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:20,579 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,580 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,581 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,581 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,582 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,582 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Mobile Device Forensics -> Mobile Phone Basics' [ID: 410]

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2025-07-05 13:21:20,583 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Acquisition Procedures for Mobile Devices -> Mobile Forensics Equipment -> SIM Card Readers' [ID: 415]

2025-07-05 13:21:20,584 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Acquisition Procedures for Mobile Devices -> Mobile Forensics Equipment -> Mobile Phone Forensics Tools and Methods' [ID: 416]

2025-07-05 13:21:20,584 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Acquisition Procedures for Mobile Devices -> Using Mobile Forensics Tools' [ID: 417]

2025-07-05 13:21:20,585 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Forensics in the Internet of Anything' [ID: 418]

2025-07-05 13:21:20,585 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:20,586 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,586 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,586 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,587 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,587 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,587 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> An Overview of Cloud Computing -> History of the Cloud' [ID: 428]

2025-07-05 13:21:20,588 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> An Overview of Cloud Computing -> Cloud Service Levels and Deployment Methods' [ID: 429]

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Forensics -> Conducting a Cloud Investigation -> Investigating CSPs' [ID: 450]  
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2025-07-05 13:21:20,600 - INFO - Started new section: 'Chapter 13. Cloud  
Forensics -> Conducting a Cloud Investigation -> Examining Stored Cloud Data on  
a PC -> Google Drive' [ID: 455]  
2025-07-05 13:21:20,601 - INFO - Started new section: 'Chapter 13. Cloud  
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Forensics -> Tools for Cloud Forensics -> F-Response for the Cloud' [ID: 460]  
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2025-07-05 13:21:20,604 - INFO - Started new section: 'Chapter 16. Ethics for  
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2025-07-05 13:21:20,605 - INFO - Started new section: 'Chapter 16. Ethics for  
the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]  
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2025-07-05 13:21:20,606 - INFO - Started new section: 'Lab Manual for Guide to  
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2025-07-05 13:21:20,608 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Report Structure' [ID: 475]

2025-07-05 13:21:20,609 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Writing Reports Clearly -> Considering Writing Style' [ID: 477]

2025-07-05 13:21:20,609 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Writing Reports Clearly -> Including Signposts' [ID: 478]

2025-07-05 13:21:20,610 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Providing Supporting Material' [ID: 480]

2025-07-05 13:21:20,610 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Formatting Consistently' [ID: 481]

2025-07-05 13:21:20,610 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Explaining Examination and Data Collection Methods' [ID: 482]

2025-07-05 13:21:20,611 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Including Calculations' [ID: 483]

2025-07-05 13:21:20,611 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Providing for Uncertainty and Error Analysis' [ID: 484]

2025-07-05 13:21:20,612 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Explaining Results and Conclusions' [ID: 485]

2025-07-05 13:21:20,612 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Providing References' [ID: 486]

2025-07-05 13:21:20,613 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Including Appendixes' [ID: 487]

2025-07-05 13:21:20,613 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Generating Report Findings with Forensics Software Tools -> Using Autopsy to Generate Reports' [ID: 489]

2025-07-05 13:21:20,614 - INFO - Started new section: 'Chapter 16. Ethics for



the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]  
2025-07-05 13:21:20,615 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]  
2025-07-05 13:21:20,616 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]  
2025-07-05 13:21:20,616 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]  
2025-07-05 13:21:20,617 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]  
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2025-07-05 13:21:20,617 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for Testimony -> Documenting and Preparing Evidence' [ID: 499]  
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2025-07-05 13:21:20,620 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> Providing Qualifications for Your Testimony' [ID: 506]  
2025-07-05 13:21:20,621 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> General Guidelines on Testifying -> Using Graphics During Testimony' [ID: 508]  
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2025-07-05 13:21:20,622 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> Testifying During Direct Examination' [ID: 511]  
2025-07-05 13:21:20,624 - INFO - Started new section: 'Chapter 15. Expert

Testimony in Digital Investigations -> Testifying in Court -> Testifying During Cross-Examination' [ID: 512]

2025-07-05 13:21:20,624 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for a Deposition or Hearing -> Guidelines for Testifying at Depositions -> Recognizing Deposition Problems' [ID: 515]

2025-07-05 13:21:20,625 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for a Deposition or Hearing -> Guidelines for Testifying at Hearings' [ID: 516]

2025-07-05 13:21:20,625 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing Forensics Evidence for Testimony -> Preparing a Defense of Your Evidence-Collection Methods' [ID: 518]

2025-07-05 13:21:20,626 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:20,626 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,626 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,627 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,628 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,628 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,629 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Applying Ethics and Codes to Expert Witnesses -> Forensics Examiners' Roles in Testifying' [ID: 528]

2025-07-05 13:21:20,629 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Applying Ethics and Codes to Expert Witnesses -> Considerations in Disqualification' [ID: 529]

2025-07-05 13:21:20,629 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Applying Ethics and Codes to Expert Witnesses -> Traps for Unwary Experts' [ID: 530]

2025-07-05 13:21:20,630 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Applying Ethics and Codes to Expert Witnesses -> Determining Admissibility of Evidence' [ID: 531]

2025-07-05 13:21:20,630 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> International Society of Forensic Computer Examiners' [ID: 533]

2025-07-05 13:21:20,630 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> International High Technology Crime Investigation Association' [ID: 534]

2025-07-05 13:21:20,631 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> International Association of Computer Investigative Specialists' [ID: 535]

2025-07-05 13:21:20,631 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> American Bar Association' [ID: 536]

2025-07-05 13:21:20,631 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> American Psychological Association' [ID: 537]

2025-07-05 13:21:20,632 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Ethical Difficulties in Expert Testimony -> Ethical Responsibilities Owed to You' [ID: 539]

2025-07-05 13:21:20,632 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Ethical Difficulties in Expert Testimony -> Standard Forensics Tools and Tools You Create' [ID: 540]

2025-07-05 13:21:20,633 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Performing a cursory Exam of a Forensic Image' [ID: 542]

2025-07-05 13:21:20,633 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Performing a Detailed Exam of a Forensic Image' [ID: 543]

2025-07-05 13:21:20,633 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Performing the Exam -> Preparing for an Examination' [ID: 545]

2025-07-05 13:21:20,634 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Interpreting Attribute 0x80 Data Runs -> Finding Attribute 0x80 an MFT Record' [ID: 547]

2025-07-05 13:21:20,636 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Interpreting Attribute 0x80 Data Runs -> Configuring Data Interpreter Options in WinHex' [ID: 548]

2025-07-05 13:21:20,636 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Interpreting Attribute 0x80 Data Runs -> Calculating Data Runs' [ID: 549]

2025-07-05 13:21:20,637 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Carving Data Run Clusters Manually' [ID: 550]

2025-07-05 13:21:20,637 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:20,638 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,638 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,639 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,639 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,640 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Introduction' [ID: 558]

2025-07-05 13:21:20,640 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,640 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,641 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,642 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,642 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,643 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,644 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,644 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,644 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,645 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,645 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,646 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,646 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert

Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,646 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,647 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,647 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,647 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,647 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,648 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,648 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,649 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,649 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,650 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,650 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,651 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'

[ID: 868]

2025-07-05 13:21:20,653 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,654 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,654 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,655 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,655 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,655 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,656 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 3. Data Acquisition -> Lab 3.1. Creating a DEFT Zero Forensic Boot CD and USB Drive -> Activity -> Creating a DEFT Zero Boot CD' [ID: 614]

2025-07-05 13:21:20,656 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 3. Data Acquisition -> Lab 3.1. Creating a DEFT Zero Forensic Boot CD and USB Drive -> Activity -> Creating a Bootable USB DEFT Zero Drive' [ID: 615]

2025-07-05 13:21:20,657 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 3. Data Acquisition -> Lab 3.1. Creating a DEFT Zero Forensic Boot CD and USB Drive -> Activity -> Learning DEFT Zero Features' [ID: 616]

2025-07-05 13:21:20,658 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,658 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,659 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,659 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,659 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,660 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,660 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,661 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,661 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,661 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,662 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,663 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,664 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 4. Processing Crime and Incident Scenes -> Lab 4.1. Creating a Mini-WinFE Boot CD -> Activity -> Setting Up Mini-WinFE' [ID: 639]

2025-07-05 13:21:20,664 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 4. Processing Crime and Incident Scenes -> Lab 4.1. Creating a Mini-WinFE Boot CD -> Activity -> Creating a Mini-WinFE ISO Image' [ID: 640]

2025-07-05 13:21:20,664 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,665 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,665 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,665 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,666 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,667 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,667 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,668 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,668 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,669 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,669 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,670 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,670 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,671 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert



Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,671 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,672 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,672 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,672 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,673 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,673 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,673 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,675 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,675 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,676 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,678 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,678 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 6. Current Digital Forensics Tools -> Lab 6.1. Using Autopsy 4.7.0 to Search an Image File -> Activity ->

Installing Autopsy 4.7.0' [ID: 685]  
2025-07-05 13:21:20,679 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 6. Current Digital Forensics Tools -> Lab 6.1. Using Autopsy 4.7.0 to Search an Image File -> Activity -> Searching E-mail in Autopsy 4.7.0' [ID: 686]  
2025-07-05 13:21:20,679 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]  
2025-07-05 13:21:20,680 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]  
2025-07-05 13:21:20,681 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]  
2025-07-05 13:21:20,683 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]  
2025-07-05 13:21:20,684 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]  
2025-07-05 13:21:20,684 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 6. Current Digital Forensics Tools -> Lab 6.3. Examining a Corrupt Image File with FTK Imager Lite, Autopsy, and WinHex -> Activity -> Testing an Image File in Autopsy 4.3.0' [ID: 697]  
2025-07-05 13:21:20,685 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 6. Current Digital Forensics Tools -> Lab 6.3. Examining a Corrupt Image File with FTK Imager Lite, Autopsy, and WinHex -> Activity -> Examining Image Files in WinHex' [ID: 698]  
2025-07-05 13:21:20,686 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]  
2025-07-05 13:21:20,687 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]  
2025-07-05 13:21:20,688 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]  
2025-07-05 13:21:20,689 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,689 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,690 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,691 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,691 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,691 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,692 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,692 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,693 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,694 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,694 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,694 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,695 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,696 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,697 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,697 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,698 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,699 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,700 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,701 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,701 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,702 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,703 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,703 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,704 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,704 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 9. Digital Forensics Analysis

and Validation -> Lab 9.3. Validating File Hash Values with WinHex -> Objectives  
-> Materials Required' [ID: 748]

2025-07-05 13:21:20,704 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'  
[ID: 868]

2025-07-05 13:21:20,705 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]

2025-07-05 13:21:20,706 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,706 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives  
-> Materials Required' [ID: 867]

2025-07-05 13:21:20,708 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics,  
Live Acquisitions, and Network Forensics -> Lab 10.1. Analyzing a Forensic Image  
Hosting a Virtual Machine -> Activity -> Installing MD5 Hashes in Autopsy' [ID:  
757]

2025-07-05 13:21:20,708 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics,  
Live Acquisitions, and Network Forensics -> Lab 10.1. Analyzing a Forensic Image  
Hosting a Virtual Machine -> Activity -> Analyzing a Windows Image Containing a  
Virtual Machine' [ID: 758]

2025-07-05 13:21:20,709 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]

2025-07-05 13:21:20,710 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives  
-> Materials Required' [ID: 867]

2025-07-05 13:21:20,710 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics,  
Live Acquisitions, and Network Forensics -> Lab 10.2. Conducting a Live  
Acquisition -> Activity -> Installing Tools for Live Acquisitions' [ID: 764]

2025-07-05 13:21:20,711 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics,  
Live Acquisitions, and Network Forensics -> Lab 10.2. Conducting a Live  
Acquisition -> Activity -> Exploring Tools for Live Acquisitions' [ID: 765]

2025-07-05 13:21:20,712 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics,  
Live Acquisitions, and Network Forensics -> Lab 10.2. Conducting a Live  
Acquisition -> Activity -> Capturing Data in a Live Acquisition' [ID: 766]

2025-07-05 13:21:20,713 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,714 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,714 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.3. Using Kali Linux for Network Forensics -> Activity -> Installing Kali Linux' [ID: 772]

2025-07-05 13:21:20,715 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.3. Using Kali Linux for Network Forensics -> Activity -> Mounting Drives in Kali Linux' [ID: 773]

2025-07-05 13:21:20,715 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.3. Using Kali Linux for Network Forensics -> Activity -> Identifying Open Ports and Making a Screen Capture' [ID: 774]

2025-07-05 13:21:20,716 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,716 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,717 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,718 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,718 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,719 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,720 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,720 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,721 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,722 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,722 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,723 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,724 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,725 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,726 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,727 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,729 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,729 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,730 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,730 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert

Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'  
[ID: 868]

2025-07-05 13:21:20,731 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]

2025-07-05 13:21:20,731 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,731 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives  
-> Materials Required' [ID: 867]

2025-07-05 13:21:20,732 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'  
[ID: 868]

2025-07-05 13:21:20,734 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]

2025-07-05 13:21:20,735 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives  
-> Materials Required' [ID: 867]

2025-07-05 13:21:20,736 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'  
[ID: 868]

2025-07-05 13:21:20,736 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]

2025-07-05 13:21:20,737 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives  
-> Materials Required' [ID: 867]

2025-07-05 13:21:20,738 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'  
[ID: 868]

2025-07-05 13:21:20,739 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]

2025-07-05 13:21:20,739 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Chapter Introduction' [ID: 864]



2025-07-05 13:21:20,740 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,741 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,742 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,743 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,743 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,744 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,744 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,745 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,746 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,746 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,747 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,747 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,749 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,749 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,750 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:20,751 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,752 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,754 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 15. Expert Testimony in Digital Investigations -> Lab 15.3. Recovering a Password from Password-Protected Files -> Activity -> Verifying the Existence of a Warning Banner' [ID: 860]

2025-07-05 13:21:20,755 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 15. Expert Testimony in Digital Investigations -> Lab 15.3. Recovering a Password from Password-Protected Files -> Activity -> Recovering a Password from Password-Protected Files' [ID: 861]

2025-07-05 13:21:20,756 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,756 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Chapter Introduction' [ID: 864]

2025-07-05 13:21:20,757 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:20,758 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity -> Creating a Duplicate Forensic Image' [ID: 869]

2025-07-05 13:21:20,759 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity -> Determining the Offset Byte Address of the Corrupt MFT Record' [ID: 870]

2025-07-05 13:21:20,759 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert

Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity  
-> Copying the Corrected MFT Record' [ID: 871]  
2025-07-05 13:21:20,760 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity  
-> Extracting Additional Evidence' [ID: 872]  
2025-07-05 13:21:20,761 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]  
2025-07-05 13:21:20,761 - INFO - Started new section: 'Appendix A. Certification  
Test References' [ID: 874]  
2025-07-05 13:21:20,762 - INFO - Started new section: 'Appendix B. Digital  
Forensics References' [ID: 875]  
2025-07-05 13:21:20,763 - INFO - Started new section: 'Appendix C. Digital  
Forensics Lab Considerations' [ID: 876]  
2025-07-05 13:21:20,764 - INFO - Started new section: 'Appendix D. Legacy File  
System and Forensics Tools' [ID: 877]  
2025-07-05 13:21:20,764 - INFO - Started new section: 'Title Page' [ID: 2]  
2025-07-05 13:21:20,767 - INFO - Started new section: 'Copyright Page' [ID: 3]  
2025-07-05 13:21:20,768 - INFO - Started new section: 'Preface' [ID: 4]  
2025-07-05 13:21:20,768 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Introduction' [ID: 558]  
2025-07-05 13:21:20,778 - INFO - Started new section: 'Preface' [ID: 4]  
2025-07-05 13:21:20,793 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Introduction' [ID: 558]  
2025-07-05 13:21:20,794 - INFO - Started new section: 'Chapter 16. Ethics for  
the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]  
2025-07-05 13:21:20,795 - INFO - Started new section: 'Chapter 16. Ethics for  
the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]  
2025-07-05 13:21:20,797 - INFO - Started new section: 'About the Authors' [ID:  
6]  
2025-07-05 13:21:20,800 - INFO - Started new section: 'Acknowledgments' [ID: 7]  
2025-07-05 13:21:20,878 - INFO - Started new section: 'Chapter 1. Understanding  
the Digital Forensics Profession and Investigations -> An Overview of Digital  
Forensics' [ID: 10]  
2025-07-05 13:21:20,879 - INFO - Started new section: 'Chapter 1. Understanding  
the Digital Forensics Profession and Investigations -> An Overview of Digital  
Forensics -> Digital Forensics and Other Related Disciplines' [ID: 11]  
2025-07-05 13:21:20,880 - INFO - Started new section: 'Chapter 1. Understanding  
the Digital Forensics Profession and Investigations -> An Overview of Digital  
Forensics -> A Brief History of Digital Forensics' [ID: 12]  
2025-07-05 13:21:20,881 - INFO - Started new section: 'Chapter 1. Understanding  
the Digital Forensics Profession and Investigations -> An Overview of Digital  
Forensics -> Understanding Case Law' [ID: 13]  
2025-07-05 13:21:20,882 - INFO - Started new section: 'Chapter 1. Understanding  
the Digital Forensics Profession and Investigations -> An Overview of Digital  
Forensics -> Developing Digital Forensics Resources' [ID: 14]

2025-07-05 13:21:20,883 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations' [ID: 15]

2025-07-05 13:21:20,883 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Law Enforcement Agency Investigations' [ID: 16]

2025-07-05 13:21:20,883 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Following Legal Processes' [ID: 17]

2025-07-05 13:21:20,884 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations' [ID: 18]

2025-07-05 13:21:20,884 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations -> Establishing Company Policies' [ID: 19]

2025-07-05 13:21:20,885 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations -> Displaying Warning Banners' [ID: 20]

2025-07-05 13:21:20,885 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations -> Designating an Authorized Requester' [ID: 21]

2025-07-05 13:21:20,886 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations -> Conducting Security Investigations' [ID: 22]

2025-07-05 13:21:20,887 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing for Digital Investigations -> Understanding Private-Sector Investigations -> Distinguishing Personal and Company Property' [ID: 23]

2025-07-05 13:21:20,887 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Maintaining Professional Conduct' [ID: 24]

2025-07-05 13:21:20,888 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation' [ID: 25]

2025-07-05 13:21:20,889 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> An Overview of a Computer Crime' [ID: 26]

2025-07-05 13:21:20,889 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> An Overview of a Company Policy Violation' [ID: 27]

2025-07-05 13:21:20,889 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> Taking a Systematic Approach' [ID: 28]

2025-07-05 13:21:20,890 - INFO - Started new section: 'Chapter 1. Understanding

the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> Taking a Systematic Approach -> Assessing the Case' [ID: 29]

2025-07-05 13:21:20,890 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> Taking a Systematic Approach -> Planning Your Investigation' [ID: 30]

2025-07-05 13:21:20,892 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Preparing a Digital Forensics Investigation -> Taking a Systematic Approach -> Securing Your Evidence' [ID: 31]

2025-07-05 13:21:20,893 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations' [ID: 32]

2025-07-05 13:21:20,893 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> Employee Termination Cases' [ID: 33]

2025-07-05 13:21:20,893 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> Internet Abuse Investigations' [ID: 34]

2025-07-05 13:21:20,894 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> E-mail Abuse Investigations' [ID: 35]

2025-07-05 13:21:20,894 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> Attorney-Client Privilege Investigations' [ID: 36]

2025-07-05 13:21:20,895 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> Industrial Espionage Investigations' [ID: 37]

2025-07-05 13:21:20,895 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Procedures for Private-Sector High-Tech Investigations -> Industrial Espionage Investigations -> Interviews and Interrogations in High-Tech Investigations' [ID: 38]

2025-07-05 13:21:20,896 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Understanding Data Recovery Workstations and Software' [ID: 39]

2025-07-05 13:21:20,897 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Understanding Data Recovery Workstations and Software -> Setting Up Your Workstation for Digital Forensics' [ID: 40]

2025-07-05 13:21:20,897 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation' [ID: 41]

2025-07-05 13:21:20,898 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Gathering the Evidence' [ID: 42]

2025-07-05 13:21:20,898 - INFO - Started new section: 'Chapter 1. Understanding

the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Understanding Bit-stream Copies' [ID: 43]

2025-07-05 13:21:20,899 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Understanding Bit-stream Copies -> Acquiring an Image of Evidence Media' [ID: 44]

2025-07-05 13:21:20,899 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Analyzing Your Digital Evidence' [ID: 45]

2025-07-05 13:21:20,901 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Analyzing Your Digital Evidence -> Some Additional Features of Autopsy' [ID: 46]

2025-07-05 13:21:20,901 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Completing the Case' [ID: 47]

2025-07-05 13:21:20,902 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Completing the Case -> Autopsy's Report Generator' [ID: 48]

2025-07-05 13:21:20,902 - INFO - Started new section: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations -> Conducting an Investigation -> Critiquing the Case' [ID: 49]

2025-07-05 13:21:20,903 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:20,904 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,904 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,905 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,907 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:20,937 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements' [ID: 58]

2025-07-05 13:21:20,938 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Identifying Duties of the Lab Manager and Staff' [ID: 59]

2025-07-05 13:21:20,939 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Lab Budget Planning' [ID: 60]

2025-07-05 13:21:20,940 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training' [ID: 61]

2025-07-05 13:21:20,940 - INFO - Started new section: 'Chapter 16. Ethics for

the Expert Witness -> Organizations with Codes of Ethics -> International Association of Computer Investigative Specialists' [ID: 535]

2025-07-05 13:21:20,941 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training -> ISC2 Certified Cyber Forensics Professional' [ID: 63]

2025-07-05 13:21:20,942 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training -> High Tech Crime Network' [ID: 64]

2025-07-05 13:21:20,943 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training -> EnCase Certified Examiner Certification' [ID: 65]

2025-07-05 13:21:20,943 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training -> AccessData Certified Examiner' [ID: 66]

2025-07-05 13:21:20,944 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Understanding Forensics Lab Accreditation Requirements -> Acquiring Certification and Training -> Other Training and Certifications' [ID: 67]

2025-07-05 13:21:20,944 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab' [ID: 68]

2025-07-05 13:21:20,945 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Identifying Lab Security Needs' [ID: 69]

2025-07-05 13:21:20,946 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Conducting High-Risk Investigations' [ID: 70]

2025-07-05 13:21:20,946 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Using Evidence Containers' [ID: 71]

2025-07-05 13:21:20,947 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Overseeing Facility Maintenance' [ID: 72]

2025-07-05 13:21:20,947 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Considering Physical Security Needs' [ID: 73]

2025-07-05 13:21:20,948 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Auditing a Digital Forensics Lab' [ID: 74]

2025-07-05 13:21:20,949 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Determining the Physical Requirements for a Digital Forensics Lab -> Determining Floor Plans for Digital Forensics Labs' [ID: 75]

2025-07-05 13:21:20,950 - INFO - Started new section: 'Chapter 2. The

Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation' [ID: 76]

2025-07-05 13:21:20,950 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Selecting Workstations for a Lab' [ID: 77]

2025-07-05 13:21:20,950 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Selecting Workstations for Private-Sector Labs' [ID: 78]

2025-07-05 13:21:20,951 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Stocking Hardware Peripherals' [ID: 79]

2025-07-05 13:21:20,952 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Maintaining Operating Systems and Software Inventories' [ID: 80]

2025-07-05 13:21:20,952 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Using a Disaster Recovery Plan' [ID: 81]

2025-07-05 13:21:20,953 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Selecting a Basic Forensic Workstation -> Planning for Equipment Upgrades' [ID: 82]

2025-07-05 13:21:20,953 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab' [ID: 83]

2025-07-05 13:21:20,953 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab' [ID: 84]

2025-07-05 13:21:20,954 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Justification' [ID: 85]

2025-07-05 13:21:20,955 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Budget Development' [ID: 86]

2025-07-05 13:21:20,955 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Facility Cost' [ID: 87]

2025-07-05 13:21:20,956 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Hardware Requirements' [ID: 88]

2025-07-05 13:21:20,956 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Software Requirements' [ID: 89]

2025-07-05 13:21:20,957 - INFO - Started new section: 'Chapter 2. The



Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Miscellaneous Budget Needs' [ID: 90]

2025-07-05 13:21:20,957 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Approval and Acquisition' [ID: 91]

2025-07-05 13:21:20,957 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Implementation' [ID: 92]

2025-07-05 13:21:20,958 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Acceptance Testing' [ID: 93]

2025-07-05 13:21:20,958 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Correction for Acceptance' [ID: 94]

2025-07-05 13:21:20,958 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Production' [ID: 95]

2025-07-05 13:21:20,959 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:20,959 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:20,960 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:20,961 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:20,961 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:21,021 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Understanding Storage Formats for Digital Evidence' [ID: 104]

2025-07-05 13:21:21,022 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Understanding Storage Formats for Digital Evidence -> Raw Format' [ID: 105]

2025-07-05 13:21:21,022 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Understanding Storage Formats for Digital Evidence -> Proprietary Formats' [ID: 106]

2025-07-05 13:21:21,023 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Understanding Storage Formats for Digital Evidence -> Advanced Forensic Format' [ID: 107]

2025-07-05 13:21:21,023 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Determining the Best Acquisition Method' [ID: 108]

2025-07-05 13:21:21,023 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Contingency Planning for Image Acquisitions' [ID: 109]

2025-07-05 13:21:21,024 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools' [ID: 110]

2025-07-05 13:21:21,025 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Mini-WinFE Boot CDs and USB Drives' [ID: 111]

2025-07-05 13:21:21,025 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Acquiring Data with a Linux Boot CD' [ID: 112]

2025-07-05 13:21:21,025 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Acquiring Data with a Linux Boot CD -> Using Linux Live CD Distributions' [ID: 113]

2025-07-05 13:21:21,026 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Acquiring Data with a Linux Boot CD -> Preparing a Target Drive for Acquisition in Linux' [ID: 114]

2025-07-05 13:21:21,026 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Acquiring Data with a Linux Boot CD -> Acquiring Data with dd in Linux' [ID: 115]

2025-07-05 13:21:21,027 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Acquiring Data with a Linux Boot CD -> Acquiring Data with dcfldd in Linux' [ID: 116]

2025-07-05 13:21:21,027 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Acquisition Tools -> Capturing an Image with AccessData FTK Imager Lite' [ID: 117]

2025-07-05 13:21:21,028 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Validating Data Acquisitions' [ID: 118]

2025-07-05 13:21:21,029 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Validating Data Acquisitions -> Linux Validation Methods' [ID: 119]

2025-07-05 13:21:21,029 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Validating Data Acquisitions -> Linux Validation Methods -> Validating dd-Acquired Data' [ID: 120]

2025-07-05 13:21:21,030 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Validating Data Acquisitions -> Linux Validation Methods -> Validating dcfldd-Acquired Data' [ID: 121]

2025-07-05 13:21:21,031 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Validating Data Acquisitions -> Windows Validation Methods' [ID: 122]

2025-07-05 13:21:21,031 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Performing RAID Data Acquisitions' [ID: 123]

2025-07-05 13:21:21,031 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Performing RAID Data Acquisitions -> Understanding RAID' [ID: 124]

2025-07-05 13:21:21,032 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Performing RAID Data Acquisitions -> Acquiring RAID Disks' [ID: 125]

2025-07-05 13:21:21,032 - INFO - Started new section: 'Chapter 3. Data

Acquisition -> Using Other Forensics Acquisition Tools -> Runtime Software' [ID: 135]

2025-07-05 13:21:21,033 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> Runtime Software' [ID: 135]

2025-07-05 13:21:21,033 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools' [ID: 126]

2025-07-05 13:21:21,034 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools -> Remote Acquisition with ProDiscover' [ID: 127]

2025-07-05 13:21:21,035 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools -> Remote Acquisition with EnCase Enterprise' [ID: 128]

2025-07-05 13:21:21,035 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools -> Remote Acquisition with R-Tools R-Studio' [ID: 129]

2025-07-05 13:21:21,036 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools -> Remote Acquisition with WetStone US-LATT PRO' [ID: 130]

2025-07-05 13:21:21,036 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Remote Network Acquisition Tools -> Remote Acquisition with F-Response' [ID: 131]

2025-07-05 13:21:21,036 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools' [ID: 132]

2025-07-05 13:21:21,037 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> PassMark Software ImageUSB' [ID: 133]

2025-07-05 13:21:21,037 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> ASR Data SMART' [ID: 134]

2025-07-05 13:21:21,037 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> Runtime Software' [ID: 135]

2025-07-05 13:21:21,038 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> ILookIX IXImager' [ID: 136]

2025-07-05 13:21:21,038 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Using Other Forensics Acquisition Tools -> SourceForge' [ID: 137]

2025-07-05 13:21:21,038 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:21,039 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:21,039 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:21,040 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:21,041 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:21,041 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Understanding Storage Formats for Digital Evidence -> Raw Format' [ID: 105]

2025-07-05 13:21:21,042 - INFO - Started new section: 'Chapter 3. Data Acquisition -> Understanding Storage Formats for Digital Evidence -> Raw Format' [ID: 105]

2025-07-05 13:21:21,171 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Identifying Digital Evidence' [ID: 146]

2025-07-05 13:21:21,171 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Identifying Digital Evidence -> Understanding Rules of Evidence' [ID: 147]

2025-07-05 13:21:21,172 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Collecting Evidence in Private-Sector Incident Scenes' [ID: 148]

2025-07-05 13:21:21,172 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Processing Law Enforcement Crime Scenes' [ID: 149]

2025-07-05 13:21:21,173 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Processing Law Enforcement Crime Scenes -> Understanding Concepts and Terms Used in Warrants' [ID: 150]

2025-07-05 13:21:21,173 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Preparing for a Search' [ID: 151]

2025-07-05 13:21:21,174 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Preparing for a Search -> Identifying the Nature of the Case' [ID: 152]

2025-07-05 13:21:21,175 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Preparing for a Search -> Identifying the Type of OS or Digital Device' [ID: 153]

2025-07-05 13:21:21,175 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Preparing for a Search -> Determining Whether You Can Seize Computers and Digital Devices' [ID: 154]

2025-07-05 13:21:21,175 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Preparing for a Search -> Getting a Detailed Description of the Location' [ID: 155]

2025-07-05 13:21:21,176 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Preparing for a Search -> Determining Who Is in Charge' [ID: 156]

2025-07-05 13:21:21,176 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Preparing for a Search -> Using Additional Technical Expertise' [ID: 157]

2025-07-05 13:21:21,176 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Preparing for a Search -> Determining the Tools You Need' [ID: 158]

2025-07-05 13:21:21,177 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Preparing for a Search -> Preparing the Investigation Team' [ID: 159]

2025-07-05 13:21:21,178 - INFO - Started new section: 'Chapter 4. Processing

Crime and Incident Scenes -> Securing a Digital Incident or Crime Scene' [ID: 160]

2025-07-05 13:21:21,178 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Seizing Digital Evidence at the Scene' [ID: 161]

2025-07-05 13:21:21,179 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Seizing Digital Evidence at the Scene -> Preparing to Acquire Digital Evidence' [ID: 162]

2025-07-05 13:21:21,179 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Seizing Digital Evidence at the Scene -> Processing Incident or Crime Scenes' [ID: 163]

2025-07-05 13:21:21,180 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Seizing Digital Evidence at the Scene -> Processing Data Centers with RAID Systems' [ID: 164]

2025-07-05 13:21:21,180 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Seizing Digital Evidence at the Scene -> Using a Technical Advisor' [ID: 165]

2025-07-05 13:21:21,181 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Seizing Digital Evidence at the Scene -> Documenting Evidence in the Lab' [ID: 166]

2025-07-05 13:21:21,181 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Seizing Digital Evidence at the Scene -> Processing and Handling Digital Evidence' [ID: 167]

2025-07-05 13:21:21,182 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Storing Digital Evidence' [ID: 168]

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2025-07-05 13:21:21,183 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Storing Digital Evidence -> Documenting Evidence' [ID: 170]

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2025-07-05 13:21:21,184 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Reviewing a Case' [ID: 172]

2025-07-05 13:21:21,184 - INFO - Started new section: 'Chapter 4. Processing Crime and Incident Scenes -> Reviewing a Case -> Sample Civil Investigation' [ID: 173]

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2025-07-05 13:21:21,186 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:21,187 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:21,187 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:21,188 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:21,189 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:21,282 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Understanding File Systems' [ID: 186]

2025-07-05 13:21:21,282 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Understanding File Systems -> Understanding the Boot Sequence' [ID: 187]

2025-07-05 13:21:21,283 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Understanding File Systems -> Understanding Disk Drives' [ID: 188]

2025-07-05 13:21:21,284 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Understanding File Systems -> Solid-State Storage Devices' [ID: 189]

2025-07-05 13:21:21,284 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Exploring Microsoft File Structures' [ID: 190]

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2025-07-05 13:21:21,289 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Examining NTFS Disks -> MFT Structures for File Data -> Attribute 0x10: Standard Information' [ID: 199]

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2025-07-05 13:21:21,290 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Examining NTFS Disks -> MFT Structures for File Data -> Attribute 0x40: Object\_ID' [ID: 201]

2025-07-05 13:21:21,290 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Examining NTFS Disks -> MFT Structures for File Data -> Attribute 0x40: Object\_ID' [ID: 201]

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2025-07-05 13:21:21,291 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Examining NTFS Disks -> MFT Structures for File Data -> Attribute 0x80: Data for a Resident File' [ID: 202]

2025-07-05 13:21:21,291 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Examining NTFS Disks -> MFT Structures for File Data -> Attribute 0x80: Data for a Nonresident File' [ID: 203]

2025-07-05 13:21:21,292 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Examining NTFS Disks -> MFT Structures for File Data -> Attribute 0x80: Data for a Nonresident File' [ID: 203]

2025-07-05 13:21:21,292 - INFO - Started new section: 'Chapter 5. Working with Windows and CLI Systems -> Examining NTFS Disks -> MFT Structures for File Data -> Interpreting a Data Run' [ID: 204]

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2025-07-05 13:21:21,306 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:21,308 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:21,362 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs' [ID: 234]

2025-07-05 13:21:21,363 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Types of Digital Forensics Tools' [ID: 235]

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2025-07-05 13:21:21,365 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Acquisition' [ID: 239]

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2025-07-05 13:21:21,367 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Validation and Verification' [ID: 240]

2025-07-05 13:21:21,367 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Extraction' [ID: 241]

2025-07-05 13:21:21,368 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Extraction' [ID: 241]

2025-07-05 13:21:21,368 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Reconstruction' [ID: 242]

2025-07-05 13:21:21,369 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Reconstruction' [ID: 242]

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2025-07-05 13:21:21,370 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks

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2025-07-05 13:21:21,372 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Reconstruction' [ID: 242]  
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2025-07-05 13:21:21,376 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Digital Forensics Software Tools -> Linux Forensics Tools -> Smart' [ID: 249]  
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2025-07-05 13:21:21,383 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:21,384 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:21,384 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:21,385 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Validation and Verification' [ID: 240]

2025-07-05 13:21:21,386 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Validation and Verification' [ID: 240]

2025-07-05 13:21:21,386 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Acquisition' [ID: 239]

2025-07-05 13:21:21,386 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Acquisition' [ID: 239]

2025-07-05 13:21:21,386 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Extraction' [ID: 241]

2025-07-05 13:21:21,387 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Extraction' [ID: 241]

2025-07-05 13:21:21,387 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Reconstruction' [ID: 242]

2025-07-05 13:21:21,388 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Reconstruction' [ID: 242]

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2025-07-05 13:21:21,389 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression -> Reconstructing File Fragments' [ID: 309]

2025-07-05 13:21:21,389 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

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2025-07-05 13:21:21,442 - INFO - Started new section: 'Chapter 7. Linux and Macintosh File Systems -> Examining Linux File Structures' [ID: 273]

2025-07-05 13:21:21,444 - INFO - Started new section: 'Chapter 7. Linux and Macintosh File Systems -> Examining Linux File Structures -> File Structures in Ext4' [ID: 274]

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2025-07-05 13:21:21,500 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Recognizing a Graphics File -> Understanding Graphics File Formats' [ID: 296]  
2025-07-05 13:21:21,501 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Recognizing a Graphics File -> Understanding Digital Photograph File Formats' [ID: 297]  
2025-07-05 13:21:21,501 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Recognizing a Graphics File -> Understanding Digital Photograph File Formats -> Examining the Raw File Format' [ID: 298]  
2025-07-05 13:21:21,501 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Recognizing a Graphics File -> Understanding Digital Photograph File Formats -> Examining the Exchangeable Image File Format' [ID: 299]  
2025-07-05 13:21:21,502 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression' [ID: 300]  
2025-07-05 13:21:21,502 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression -> Lossless and Lossy Compression' [ID: 301]  
2025-07-05 13:21:21,502 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression -> Locating and Recovering Graphics Files' [ID: 302]

2025-07-05 13:21:21,503 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression -> Identifying Graphics File Fragments' [ID: 303]

2025-07-05 13:21:21,503 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression -> Repairing Damaged Headers' [ID: 304]

2025-07-05 13:21:21,505 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression -> Searching for and Carving Data from Unallocated Space' [ID: 305]

2025-07-05 13:21:21,505 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression -> Searching for and Carving Data from Unallocated Space -> Planning Your Examination' [ID: 306]

2025-07-05 13:21:21,505 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression -> Searching for and Carving Data from Unallocated Space -> Searching for and Recovering Digital Photograph Evidence' [ID: 307]

2025-07-05 13:21:21,506 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression -> Rebuilding File Headers' [ID: 308]

2025-07-05 13:21:21,507 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Data Compression -> Reconstructing File Fragments' [ID: 309]

2025-07-05 13:21:21,507 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Identifying Unknown File Formats' [ID: 310]

2025-07-05 13:21:21,508 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Identifying Unknown File Formats -> Analyzing Graphics File Headers' [ID: 311]

2025-07-05 13:21:21,509 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Identifying Unknown File Formats -> Tools for Viewing Images' [ID: 312]

2025-07-05 13:21:21,510 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Identifying Unknown File Formats -> Understanding Steganography in Graphics Files' [ID: 313]

2025-07-05 13:21:21,510 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Identifying Unknown File Formats -> Using Steganalysis Tools' [ID: 314]

2025-07-05 13:21:21,511 - INFO - Started new section: 'Chapter 8. Recovering Graphics Files -> Understanding Copyright Issues with Graphics' [ID: 315]

2025-07-05 13:21:21,511 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:21,512 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:21,512 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:21,513 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:21,515 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:21,640 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Determining What Data to Collect and Analyze' [ID: 324]

2025-07-05 13:21:21,642 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Determining What Data to Collect and Analyze -> Approaching Digital Forensics Cases' [ID: 325]

2025-07-05 13:21:21,642 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Determining What Data to Collect and Analyze -> Approaching Digital Forensics Cases -> Refining and Modifying the Investigation Plan' [ID: 326]

2025-07-05 13:21:21,643 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Determining What Data to Collect and Analyze -> Using Autopsy to Validate Data' [ID: 327]

2025-07-05 13:21:21,643 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Determining What Data to Collect and Analyze -> Using Autopsy to Validate Data -> Installing NSRL Hashes in Autopsy' [ID: 328]

2025-07-05 13:21:21,644 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Determining What Data to Collect and Analyze -> Collecting Hash Values in Autopsy' [ID: 329]

2025-07-05 13:21:21,644 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Validating Forensic Data' [ID: 330]

2025-07-05 13:21:21,645 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Validating Forensic Data -> Validating with Hexadecimal Editors' [ID: 331]

2025-07-05 13:21:21,645 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Validating Forensic Data -> Validating with Hexadecimal Editors -> Using Hash Values to Discriminate Data' [ID: 332]

2025-07-05 13:21:21,646 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Validating Forensic Data -> Validating with Digital Forensics Tools' [ID: 333]

2025-07-05 13:21:21,646 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques' [ID: 334]

2025-07-05 13:21:21,647 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Hiding Files by Using the OS' [ID: 335]

2025-07-05 13:21:21,647 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Hiding Partitions' [ID: 336]

2025-07-05 13:21:21,648 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Marking Bad Clusters' [ID: 337]

2025-07-05 13:21:21,648 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Bit-Shifting' [ID: 338]

2025-07-05 13:21:21,649 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Understanding Steganalysis Methods' [ID: 339]

2025-07-05 13:21:21,650 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Examining Encrypted Files' [ID: 340]

2025-07-05 13:21:21,650 - INFO - Started new section: 'Chapter 9. Digital Forensics Analysis and Validation -> Addressing Data-Hiding Techniques -> Recovering Passwords' [ID: 341]

2025-07-05 13:21:21,651 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:21,651 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:21,651 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:21,652 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Digital Forensics Software Tools -> Linux Forensics Tools -> Smart' [ID: 249]

2025-07-05 13:21:21,652 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Digital Forensics Software Tools -> Linux Forensics Tools -> Smart' [ID: 249]

2025-07-05 13:21:21,653 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:21,655 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:21,705 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics' [ID: 350]

2025-07-05 13:21:21,706 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors' [ID: 351]

2025-07-05 13:21:21,707 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors -> Parallels Desktop' [ID: 352]

2025-07-05 13:21:21,707 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors -> KVM' [ID: 353]

2025-07-05 13:21:21,708 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors -> Microsoft Hyper-V' [ID: 354]

2025-07-05 13:21:21,708 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors -> VMware Workstation and Workstation Player' [ID: 355]

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Virtual Machine Forensics -> Type 2 Hypervisors -> VirtualBox' [ID: 356]  
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2025-07-05 13:21:21,713 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Performing Live Acquisitions' [ID: 361]  
2025-07-05 13:21:21,713 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Performing Live Acquisitions -> Performing a Live Acquisition in Windows' [ID: 362]  
2025-07-05 13:21:21,714 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview' [ID: 363]  
2025-07-05 13:21:21,715 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview -> The Need for Established Procedures' [ID: 364]  
2025-07-05 13:21:21,715 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview -> Securing a Network' [ID: 365]  
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Overview -> Investigating Virtual Networks' [ID: 370]  
2025-07-05 13:21:21,717 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Network Forensics Overview -> Examining the HoneyNet Project' [ID: 371]  
2025-07-05 13:21:21,718 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]  
2025-07-05 13:21:21,718 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]  
2025-07-05 13:21:21,719 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]  
2025-07-05 13:21:21,719 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors' [ID: 351]  
2025-07-05 13:21:21,720 - INFO - Started new section: 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> An Overview of Virtual Machine Forensics -> Type 2 Hypervisors' [ID: 351]  
2025-07-05 13:21:21,721 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]  
2025-07-05 13:21:21,722 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]  
2025-07-05 13:21:21,764 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Exploring the Role of E-mail in Investigations' [ID: 380]  
2025-07-05 13:21:21,765 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Exploring the Roles of the Client and Server in E-mail' [ID: 381]  
2025-07-05 13:21:21,765 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations' [ID: 382]  
2025-07-05 13:21:21,766 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations -> Understanding Forensic Linguistics' [ID: 383]  
2025-07-05 13:21:21,766 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations -> Examining E-mail Messages' [ID: 384]  
2025-07-05 13:21:21,767 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations -> Examining E-mail Messages -> Copying an E-mail Message' [ID: 385]  
2025-07-05 13:21:21,767 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations -> Viewing E-mail Headers' [ID: 386]  
2025-07-05 13:21:21,768 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations -> Examining E-mail Headers' [ID: 387]  
2025-07-05 13:21:21,768 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations ->

Examining Additional E-mail Files' [ID: 388]  
2025-07-05 13:21:21,769 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations -> Tracing an E-mail Message' [ID: 389]  
2025-07-05 13:21:21,770 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Investigating E-mail Crimes and Violations -> Using Network E-mail Logs' [ID: 390]  
2025-07-05 13:21:21,770 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Understanding E-mail Servers' [ID: 391]  
2025-07-05 13:21:21,770 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Understanding E-mail Servers -> Examining UNIX E-mail Server Logs' [ID: 392]  
2025-07-05 13:21:21,771 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Understanding E-mail Servers -> Examining Microsoft E-mail Server Logs' [ID: 393]  
2025-07-05 13:21:21,772 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Using Specialized E-mail Forensics Tools' [ID: 394]  
2025-07-05 13:21:21,772 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Using Specialized E-mail Forensics Tools -> Using Magnet AXIOM to Recover E-mail' [ID: 395]  
2025-07-05 13:21:21,773 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Using Specialized E-mail Forensics Tools -> Using a Hex Editor to Carve E-mail Messages' [ID: 396]  
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2025-07-05 13:21:21,774 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Using Specialized E-mail Forensics Tools -> E-mail Case Studies' [ID: 398]  
2025-07-05 13:21:21,774 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Applying Digital Forensics Methods to Social Media Communications' [ID: 399]  
2025-07-05 13:21:21,775 - INFO - Started new section: 'Chapter 11. E-mail and Social Media Investigations -> Applying Digital Forensics Methods to Social Media Communications -> Forensics Tools for Social Media Investigations' [ID: 400]  
2025-07-05 13:21:21,775 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]  
2025-07-05 13:21:21,775 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]  
2025-07-05 13:21:21,776 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]  
2025-07-05 13:21:21,777 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]  
2025-07-05 13:21:21,777 - INFO - Started new section: 'Chapter 16. Ethics for

the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:21,810 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Mobile Device Forensics' [ID: 409]

2025-07-05 13:21:21,810 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Mobile Device Forensics -> Mobile Phone Basics' [ID: 410]

2025-07-05 13:21:21,811 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Mobile Device Forensics -> Inside Mobile Devices' [ID: 411]

2025-07-05 13:21:21,812 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Mobile Device Forensics -> Inside Mobile Devices -> SIM Cards' [ID: 412]

2025-07-05 13:21:21,812 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Acquisition Procedures for Mobile Devices' [ID: 413]

2025-07-05 13:21:21,813 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Acquisition Procedures for Mobile Devices -> Mobile Forensics Equipment' [ID: 414]

2025-07-05 13:21:21,813 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Acquisition Procedures for Mobile Devices -> Mobile Forensics Equipment -> SIM Card Readers' [ID: 415]

2025-07-05 13:21:21,814 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Acquisition Procedures for Mobile Devices -> Mobile Forensics Equipment -> Mobile Phone Forensics Tools and Methods' [ID: 416]

2025-07-05 13:21:21,815 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Acquisition Procedures for Mobile Devices -> Using Mobile Forensics Tools' [ID: 417]

2025-07-05 13:21:21,815 - INFO - Started new section: 'Chapter 12. Mobile Device Forensics and the Internet of Anything -> Understanding Forensics in the Internet of Anything' [ID: 418]

2025-07-05 13:21:21,816 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:21,817 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:21,817 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:21,818 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:21,819 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:21,860 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> An Overview of Cloud Computing' [ID: 427]

2025-07-05 13:21:21,860 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> An Overview of Cloud Computing -> History of the Cloud' [ID: 428]

2025-07-05 13:21:21,861 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> An Overview of Cloud Computing -> Cloud Service Levels and Deployment Methods' [ID: 429]

2025-07-05 13:21:21,862 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> An Overview of Cloud Computing -> Cloud Vendors' [ID: 430]

2025-07-05 13:21:21,862 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> An Overview of Cloud Computing -> Basic Concepts of Cloud Forensics' [ID: 431]

2025-07-05 13:21:21,863 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Legal Challenges in Cloud Forensics' [ID: 432]

2025-07-05 13:21:21,864 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Legal Challenges in Cloud Forensics -> Service Level Agreements' [ID: 433]

2025-07-05 13:21:21,864 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Legal Challenges in Cloud Forensics -> Service Level Agreements -> Policies, Standards, and Guidelines for CSPs' [ID: 434]

2025-07-05 13:21:21,865 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Legal Challenges in Cloud Forensics -> Service Level Agreements -> CSP Processes and Procedures' [ID: 435]

2025-07-05 13:21:21,865 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Legal Challenges in Cloud Forensics -> Jurisdiction Issues' [ID: 436]

2025-07-05 13:21:21,865 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Legal Challenges in Cloud Forensics -> Accessing Evidence in the Cloud' [ID: 437]

2025-07-05 13:21:21,866 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Legal Challenges in Cloud Forensics -> Accessing Evidence in the Cloud -> Search Warrants' [ID: 438]

2025-07-05 13:21:21,866 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Legal Challenges in Cloud Forensics -> Accessing Evidence in the Cloud -> Subpoenas and Court Orders' [ID: 439]

2025-07-05 13:21:21,867 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics' [ID: 440]

2025-07-05 13:21:21,867 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Architecture' [ID: 441]

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2025-07-05 13:21:21,868 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Analysis of Cloud Forensic Data' [ID: 442]

2025-07-05 13:21:21,868 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Analysis of Cloud Forensic Data' [ID: 442]

2025-07-05 13:21:21,869 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Anti-Forensics' [ID: 443]

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2025-07-05 13:21:21,870 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Incident First Responders' [ID: 444]

2025-07-05 13:21:21,871 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Incident First Responders' [ID: 444]

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2025-07-05 13:21:21,871 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Role Management' [ID: 445]

2025-07-05 13:21:21,872 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Standards and Training' [ID: 446]

2025-07-05 13:21:21,872 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Standards and Training' [ID: 446]

2025-07-05 13:21:21,872 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Architecture' [ID: 441]

2025-07-05 13:21:21,873 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Analysis of Cloud Forensic Data' [ID: 442]

2025-07-05 13:21:21,873 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Anti-Forensics' [ID: 443]

2025-07-05 13:21:21,873 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Incident First Responders' [ID: 444]

2025-07-05 13:21:21,874 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Role Management' [ID: 445]

2025-07-05 13:21:21,874 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Technical Challenges in Cloud Forensics -> Standards and Training' [ID: 446]

2025-07-05 13:21:21,875 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Acquisitions in the Cloud' [ID: 447]

2025-07-05 13:21:21,875 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Acquisitions in the Cloud -> Encryption in the Cloud' [ID: 448]

2025-07-05 13:21:21,876 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Conducting a Cloud Investigation' [ID: 449]

2025-07-05 13:21:21,876 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Conducting a Cloud Investigation -> Investigating CSPs' [ID: 450]

2025-07-05 13:21:21,876 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Conducting a Cloud Investigation -> Investigating Cloud Customers' [ID: 451]

2025-07-05 13:21:21,877 - INFO - Started new section: 'Chapter 13. Cloud

Forensics -> Conducting a Cloud Investigation -> Understanding Prefetch Files' [ID: 452]

2025-07-05 13:21:21,877 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Conducting a Cloud Investigation -> Examining Stored Cloud Data on a PC' [ID: 453]

2025-07-05 13:21:21,877 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Conducting a Cloud Investigation -> Examining Stored Cloud Data on a PC -> Dropbox' [ID: 454]

2025-07-05 13:21:21,878 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Conducting a Cloud Investigation -> Examining Stored Cloud Data on a PC -> Google Drive' [ID: 455]

2025-07-05 13:21:21,878 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Conducting a Cloud Investigation -> Examining Stored Cloud Data on a PC -> OneDrive' [ID: 456]

2025-07-05 13:21:21,879 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Conducting a Cloud Investigation -> Windows Prefetch Artifacts' [ID: 457]

2025-07-05 13:21:21,880 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Tools for Cloud Forensics' [ID: 458]

2025-07-05 13:21:21,880 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Tools for Cloud Forensics -> Forensic Open-Stack Tools' [ID: 459]

2025-07-05 13:21:21,881 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Tools for Cloud Forensics -> F-Response for the Cloud' [ID: 460]

2025-07-05 13:21:21,882 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Tools for Cloud Forensics -> Magnet AXIOM Cloud' [ID: 461]

2025-07-05 13:21:21,882 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:21,883 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:21,883 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:21,884 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Legal Challenges in Cloud Forensics -> Accessing Evidence in the Cloud -> Search Warrants' [ID: 438]

2025-07-05 13:21:21,884 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Legal Challenges in Cloud Forensics -> Accessing Evidence in the Cloud -> Search Warrants' [ID: 438]

2025-07-05 13:21:21,884 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:21,886 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:21,927 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Understanding the Importance of Reports' [ID: 470]

2025-07-05 13:21:21,927 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Understanding the Importance of Reports

-> Limiting a Report to Specifics' [ID: 471]

2025-07-05 13:21:21,928 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Understanding the Importance of Reports -> Types of Reports' [ID: 472]

2025-07-05 13:21:21,928 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports' [ID: 473]

2025-07-05 13:21:21,929 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> What to Include in Written Preliminary Reports' [ID: 474]

2025-07-05 13:21:21,929 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Report Structure' [ID: 475]

2025-07-05 13:21:21,929 - INFO - Started new section: 'Acknowledgments' [ID: 7]

2025-07-05 13:21:21,930 - INFO - Started new section: 'Acknowledgments' [ID: 7]

2025-07-05 13:21:21,930 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Writing Reports Clearly' [ID: 476]

2025-07-05 13:21:21,931 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Writing Reports Clearly -> Considering Writing Style' [ID: 477]

2025-07-05 13:21:21,931 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Writing Reports Clearly -> Including Signposts' [ID: 478]

2025-07-05 13:21:21,931 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports' [ID: 479]

2025-07-05 13:21:21,932 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Providing Supporting Material' [ID: 480]

2025-07-05 13:21:21,932 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Formatting Consistently' [ID: 481]

2025-07-05 13:21:21,932 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Explaining Examination and Data Collection Methods' [ID: 482]

2025-07-05 13:21:21,933 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Including Calculations' [ID: 483]

2025-07-05 13:21:21,933 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Providing for Uncertainty and Error Analysis' [ID: 484]

2025-07-05 13:21:21,934 - INFO - Started new section: 'Chapter 14. Report



Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Explaining Results and Conclusions' [ID: 485]

2025-07-05 13:21:21,934 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Providing References' [ID: 486]

2025-07-05 13:21:21,935 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Guidelines for Writing Reports -> Designing the Layout and Presentation of Reports -> Including Appendixes' [ID: 487]

2025-07-05 13:21:21,935 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Generating Report Findings with Forensics Software Tools' [ID: 488]

2025-07-05 13:21:21,936 - INFO - Started new section: 'Chapter 14. Report Writing for High-Tech Investigations -> Generating Report Findings with Forensics Software Tools -> Using Autopsy to Generate Reports' [ID: 489]

2025-07-05 13:21:21,937 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:21,937 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:21,937 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:21,938 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:21,940 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:22,072 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for Testimony' [ID: 498]

2025-07-05 13:21:22,073 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for Testimony -> Documenting and Preparing Evidence' [ID: 499]

2025-07-05 13:21:22,073 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for Testimony -> Reviewing Your Role as a Consulting Expert or an Expert Witness' [ID: 500]

2025-07-05 13:21:22,073 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for Testimony -> Creating and Maintaining Your CV' [ID: 501]

2025-07-05 13:21:22,073 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for Testimony -> Preparing Technical Definitions' [ID: 502]

2025-07-05 13:21:22,074 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for Testimony -> Preparing to Deal with the News Media' [ID: 503]

2025-07-05 13:21:22,074 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court' [ID: 504]

2025-07-05 13:21:22,074 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> Understanding the Trial Process' [ID: 505]

2025-07-05 13:21:22,075 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> Providing Qualifications for Your Testimony' [ID: 506]

2025-07-05 13:21:22,075 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> General Guidelines on Testifying' [ID: 507]

2025-07-05 13:21:22,076 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> General Guidelines on Testifying -> Using Graphics During Testimony' [ID: 508]

2025-07-05 13:21:22,076 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> General Guidelines on Testifying -> Avoiding Testimony Problems' [ID: 509]

2025-07-05 13:21:22,076 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> General Guidelines on Testifying -> Understanding Prosecutorial Misconduct' [ID: 510]

2025-07-05 13:21:22,077 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> Testifying During Direct Examination' [ID: 511]

2025-07-05 13:21:22,077 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Testifying in Court -> Testifying During Cross-Examination' [ID: 512]

2025-07-05 13:21:22,079 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for a Deposition or Hearing' [ID: 513]

2025-07-05 13:21:22,079 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for a Deposition or Hearing -> Guidelines for Testifying at Depositions' [ID: 514]

2025-07-05 13:21:22,079 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for a Deposition or Hearing -> Guidelines for Testifying at Depositions -> Recognizing Deposition Problems' [ID: 515]

2025-07-05 13:21:22,080 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing for a Deposition or Hearing -> Guidelines for Testifying at Hearings' [ID: 516]

2025-07-05 13:21:22,080 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing Forensics Evidence for Testimony' [ID: 517]

2025-07-05 13:21:22,081 - INFO - Started new section: 'Chapter 15. Expert Testimony in Digital Investigations -> Preparing Forensics Evidence for Testimony -> Preparing a Defense of Your Evidence-Collection Methods' [ID: 518]

2025-07-05 13:21:22,081 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:22,082 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:22,082 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,083 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:22,085 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:22,143 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Applying Ethics and Codes to Expert Witnesses' [ID: 527]

2025-07-05 13:21:22,144 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Applying Ethics and Codes to Expert Witnesses -> Forensics Examiners' Roles in Testifying' [ID: 528]

2025-07-05 13:21:22,145 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Applying Ethics and Codes to Expert Witnesses -> Considerations in Disqualification' [ID: 529]

2025-07-05 13:21:22,145 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Applying Ethics and Codes to Expert Witnesses -> Traps for Unwary Experts' [ID: 530]

2025-07-05 13:21:22,145 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Applying Ethics and Codes to Expert Witnesses -> Determining Admissibility of Evidence' [ID: 531]

2025-07-05 13:21:22,146 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics' [ID: 532]

2025-07-05 13:21:22,146 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> International Society of Forensic Computer Examiners' [ID: 533]

2025-07-05 13:21:22,147 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> International High Technology Crime Investigation Association' [ID: 534]

2025-07-05 13:21:22,147 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> International Association of Computer Investigative Specialists' [ID: 535]

2025-07-05 13:21:22,148 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> American Bar Association' [ID: 536]

2025-07-05 13:21:22,148 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Organizations with Codes of Ethics -> American Psychological Association' [ID: 537]

2025-07-05 13:21:22,149 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Ethical Difficulties in Expert Testimony' [ID: 538]

2025-07-05 13:21:22,149 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Ethical Difficulties in Expert Testimony -> Ethical Responsibilities Owed to You' [ID: 539]

2025-07-05 13:21:22,150 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Ethical Difficulties in Expert Testimony -> Standard Forensics Tools and Tools You Create' [ID: 540]

2025-07-05 13:21:22,150 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise' [ID: 541]

2025-07-05 13:21:22,151 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Performing a Cursory Exam of a Forensic Image' [ID: 542]

2025-07-05 13:21:22,151 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Performing a Detailed Exam of a Forensic Image' [ID: 543]

2025-07-05 13:21:22,152 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Performing the Exam' [ID: 544]

2025-07-05 13:21:22,153 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Performing the Exam -> Preparing for an Examination' [ID: 545]

2025-07-05 13:21:22,153 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Interpreting Attribute 0x80 Data Runs' [ID: 546]

2025-07-05 13:21:22,154 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Interpreting Attribute 0x80 Data Runs -> Finding Attribute 0x80 an MFT Record' [ID: 547]

2025-07-05 13:21:22,155 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Interpreting Attribute 0x80 Data Runs -> Configuring Data Interpreter Options in WinHex' [ID: 548]

2025-07-05 13:21:22,155 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Interpreting Attribute 0x80 Data Runs -> Calculating Data Runs' [ID: 549]

2025-07-05 13:21:22,156 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Carving Data Run Clusters Manually' [ID: 550]

2025-07-05 13:21:22,157 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Chapter Summary' [ID: 552]

2025-07-05 13:21:22,157 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Key Terms' [ID: 553]

2025-07-05 13:21:22,157 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,158 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,159 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,159 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Hands-On Projects' [ID: 555]

2025-07-05 13:21:22,161 - INFO - Started new section: 'Chapter 16. Ethics for the Expert Witness -> Chapter Review -> Case Projects' [ID: 556]

2025-07-05 13:21:22,163 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations' [ID: 557]

2025-07-05 13:21:22,171 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Introduction' [ID: 558]

2025-07-05 13:21:22,171 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Hardware Requirements' [ID: 88]

2025-07-05 13:21:22,172 - INFO - Started new section: 'Chapter 2. The Investigator's Office and Laboratory -> Building a Business Case for Developing a Forensics Lab -> Preparing a Business Case for a Digital Forensics Lab -> Software Requirements' [ID: 89]

2025-07-05 13:21:22,173 - INFO - Started new section: 'Acknowledgments' [ID: 7]

2025-07-05 13:21:22,193 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,194 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,194 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,194 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,195 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,195 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,196 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,196 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,197 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,197 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,198 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,198 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,199 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,200 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,201 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,201 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,232 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,233 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,233 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,234 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,235 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,235 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,236 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,236 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,237 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,237 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,237 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,238 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,239 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,239 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,239 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,240 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,240 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,241 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,241 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,242 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,276 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,277 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,277 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,278 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 3. Data Acquisition -> Lab 3.1. Creating a DEFT Zero Forensic Boot CD and USB Drive -> Activity -> Creating a DEFT Zero Boot CD' [ID: 614]

2025-07-05 13:21:22,278 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 3. Data Acquisition -> Lab 3.1. Creating a DEFT Zero Forensic Boot CD and USB Drive -> Activity -> Creating a Bootable USB DEFT Zero Drive' [ID: 615]

2025-07-05 13:21:22,279 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 3. Data Acquisition -> Lab 3.1. Creating a DEFT Zero Forensic Boot CD and USB Drive -> Activity -> Learning DEFT Zero Features' [ID: 616]

2025-07-05 13:21:22,280 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,280 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,281 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,282 - INFO - Started new section: 'Lab Manual for Guide to



Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,282 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,283 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,283 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,284 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,284 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,285 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,285 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,286 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,287 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,313 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,313 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,314 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,314 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 4. Processing Crime and Incident Scenes -> Lab 4.1. Creating a Mini-WinFE Boot CD -> Activity -> Setting Up Mini-WinFE' [ID: 639]

2025-07-05 13:21:22,314 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 4. Processing Crime and Incident Scenes -> Lab 4.1. Creating a Mini-WinFE Boot CD -> Activity -> Creating a Mini-WinFE ISO Image' [ID: 640]

2025-07-05 13:21:22,315 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,316 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,316 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,317 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,318 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,318 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,318 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,319 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,320 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,320 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,321 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,321 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,322 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,344 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,344 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,345 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,345 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,346 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,346 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,346 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,347 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,347 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,348 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,348 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,349 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,349 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,349 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,350 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,350 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,377 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,378 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,378 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,378 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 6. Current Digital Forensics Tools -> Lab 6.1. Using Autopsy 4.7.0 to Search an Image File -> Activity -> Installing Autopsy 4.7.0' [ID: 685]

2025-07-05 13:21:22,379 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 6. Current Digital Forensics Tools -> Lab 6.1. Using Autopsy 4.7.0 to Search an Image File -> Activity -> Searching E-mail in Autopsy 4.7.0' [ID: 686]

2025-07-05 13:21:22,380 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,380 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,380 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,381 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,381 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,382 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,382 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,382 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,383 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 6. Current Digital Forensics Tools -> Lab 6.3. Examining a Corrupt Image File with FTK Imager Lite, Autopsy, and WinHex -> Activity -> Testing an Image File in Autopsy 4.3.0' [ID: 697]

2025-07-05 13:21:22,384 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 6. Current Digital Forensics Tools -> Lab 6.3. Examining a Corrupt Image File with FTK Imager Lite, Autopsy, and WinHex -> Activity -> Examining Image Files in WinHex' [ID: 698]

2025-07-05 13:21:22,385 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,386 - INFO - Started new section: 'Chapter 6. Current

Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Reporting' [ID: 243]

2025-07-05 13:21:22,386 - INFO - Started new section: 'Chapter 6. Current Digital Forensics Tools -> Evaluating Digital Forensics Tool Needs -> Tasks Performed by Digital Forensics Tools -> Reporting' [ID: 243]

2025-07-05 13:21:22,403 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,404 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,404 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,405 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,405 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,406 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,406 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,406 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,407 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,407 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,408 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'

[ID: 868]

2025-07-05 13:21:22,409 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,429 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,430 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,430 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,431 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,431 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,431 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,432 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,433 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,433 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,433 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,434 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'

[ID: 868]

2025-07-05 13:21:22,434 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,452 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,453 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,453 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,454 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,454 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,455 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,455 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,456 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,456 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,457 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 9. Digital Forensics Analysis and Validation -> Lab 9.3. Validating File Hash Values with WinHex -> Objectives -> Materials Required:' [ID: 748]

2025-07-05 13:21:22,457 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'



[ID: 868]

2025-07-05 13:21:22,457 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,575 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,576 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,577 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,577 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.1. Analyzing a Forensic Image Hosting a Virtual Machine -> Activity -> Installing MD5 Hashes in Autopsy' [ID: 757]

2025-07-05 13:21:22,578 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.1. Analyzing a Forensic Image Hosting a Virtual Machine -> Activity -> Analyzing a Windows Image Containing a Virtual Machine' [ID: 758]

2025-07-05 13:21:22,578 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,579 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,579 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,580 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,580 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.2. Conducting a Live Acquisition -> Activity -> Installing Tools for Live Acquisitions' [ID: 764]

2025-07-05 13:21:22,581 - INFO - Started new section: 'Lab Manual for Guide to

Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.2. Conducting a Live Acquisition -> Activity -> Exploring Tools for Live Acquisitions' [ID: 765]  
2025-07-05 13:21:22,582 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.2. Conducting a Live Acquisition -> Activity -> Capturing Data in a Live Acquisition' [ID: 766]  
2025-07-05 13:21:22,582 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]  
2025-07-05 13:21:22,583 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]  
2025-07-05 13:21:22,583 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]  
2025-07-05 13:21:22,584 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]  
2025-07-05 13:21:22,584 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.3. Using Kali Linux for Network Forensics -> Activity -> Installing Kali Linux' [ID: 772]  
2025-07-05 13:21:22,584 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.3. Using Kali Linux for Network Forensics -> Activity -> Mounting Drives in Kali Linux' [ID: 773]  
2025-07-05 13:21:22,585 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics -> Lab 10.3. Using Kali Linux for Network Forensics -> Activity -> Identifying Open Ports and Making a Screen Capture' [ID: 774]  
2025-07-05 13:21:22,585 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]  
2025-07-05 13:21:22,602 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]  
2025-07-05 13:21:22,602 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,603 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,604 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,604 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,605 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,605 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,606 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,606 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,607 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,607 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,608 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,624 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,625 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,625 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,626 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,626 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,627 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,627 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,628 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,628 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,628 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,629 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,630 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,654 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,654 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,655 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,655 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,656 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,657 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,657 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,658 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,659 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Conducting a Cloud Investigation -> Examining Stored Cloud Data on a PC -> Google Drive' [ID: 455]

2025-07-05 13:21:22,659 - INFO - Started new section: 'Chapter 13. Cloud Forensics -> Conducting a Cloud Investigation -> Examining Stored Cloud Data on a PC -> Google Drive' [ID: 455]

2025-07-05 13:21:22,660 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,660 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,661 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,661 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,684 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert

Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,684 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,685 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,685 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,686 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,686 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,687 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,688 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,688 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives' [ID: 866]

2025-07-05 13:21:22,688 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives -> Materials Required' [ID: 867]

2025-07-05 13:21:22,689 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity' [ID: 868]

2025-07-05 13:21:22,690 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review Questions' [ID: 873]

2025-07-05 13:21:22,718 - INFO - Started new section: 'Lab Manual for Guide to Computer Forensics and Investigations -> Chapter 15. Expert Testimony in Digital

Investigations -> Lab 15.3. Recovering a Password from Password-Protected Files  
-> Activity -> Recovering a Password from Password-Protected Files' [ID: 861]

2025-07-05 13:21:22,718 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image ->  
Objectives' [ID: 866]

2025-07-05 13:21:22,719 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives  
-> Materials Required' [ID: 867]

2025-07-05 13:21:22,719 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'  
[ID: 868]

2025-07-05 13:21:22,720 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]

2025-07-05 13:21:22,721 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image ->  
Objectives' [ID: 866]

2025-07-05 13:21:22,721 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives  
-> Materials Required' [ID: 867]

2025-07-05 13:21:22,722 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'  
[ID: 868]

2025-07-05 13:21:22,723 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]

2025-07-05 13:21:22,723 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image ->  
Objectives' [ID: 866]

2025-07-05 13:21:22,724 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives  
-> Materials Required' [ID: 867]

2025-07-05 13:21:22,724 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'  
[ID: 868]

2025-07-05 13:21:22,725 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 15. Expert Testimony in Digital

Investigations -> Lab 15.3. Recovering a Password from Password-Protected Files  
-> Activity -> Verifying the Existence of a Warning Banner' [ID: 860]  
2025-07-05 13:21:22,725 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 15. Expert Testimony in Digital  
Investigations -> Lab 15.3. Recovering a Password from Password-Protected Files  
-> Activity -> Recovering a Password from Password-Protected Files' [ID: 861]  
2025-07-05 13:21:22,726 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]  
2025-07-05 13:21:22,743 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image ->  
Objectives' [ID: 866]  
2025-07-05 13:21:22,743 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Objectives  
-> Materials Required' [ID: 867]  
2025-07-05 13:21:22,744 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity'  
[ID: 868]  
2025-07-05 13:21:22,744 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity  
-> Creating a Duplicate Forensic Image' [ID: 869]  
2025-07-05 13:21:22,745 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity  
-> Determining the Offset Byte Address of the Corrupt MFT Record' [ID: 870]  
2025-07-05 13:21:22,745 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity  
-> Copying the Corrected MFT Record' [ID: 871]  
2025-07-05 13:21:22,746 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity  
-> Copying the Corrected MFT Record' [ID: 871]  
2025-07-05 13:21:22,746 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Activity  
-> Extracting Additional Evidence' [ID: 872]  
2025-07-05 13:21:22,747 - INFO - Started new section: 'Lab Manual for Guide to  
Computer Forensics and Investigations -> Chapter 16. Ethics for the Expert  
Witness -> Lab 16.1. Rebuilding an MFT Record from a Corrupt Image -> Review  
Questions' [ID: 873]  
2025-07-05 13:21:22,777 - INFO - Grouped content into 963 section-level  
documents.



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2025-07-05 13:21:22,778 - INFO - Sanitizing metadata and chunking documents...
2025-07-05 13:21:22,861 - INFO - Split into 6636 final chunks and assigning
chunk_id...
2025-07-05 13:21:22,866 - WARNING - Deleting existing ChromaDB directory: '/home
/sebas_dev_linux/projects/course_generator/data/DataBase_Chroma/chroma_db_toc_gu
ided_chunks_epub'
2025-07-05 13:21:22,874 - INFO - Initializing embedding model 'nomic-embed-
text'...
2025-07-05 13:21:22,884 - INFO - Creating new vector database with 6636
chunks...

```

### 5.1.1 Full Database Health & Hierarchy Diagnostic Report

```

[16]: # Cell 5.1: Full Database Health & Hierarchy Diagnostic Report (V15 - Final)

# --- Core Imports ---
import os
import json
import logging
import random
from typing import List, Dict, Any, Set

# --- Dependency Checks ---
try:
    from langchain_chroma import Chroma
    from langchain_ollama.embeddings import OllamaEmbeddings
    from langchain_core.documents import Document
    langchain_available = True
except ImportError:
    langchain_available = False

# --- Logger Setup ---
logger = logging.getLogger(__name__)
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s ->
    %(message)s')

# =====
# 1. HELPER FUNCTIONS
# =====

def print_header(text: str, char: str = "="):
    """Prints a centered header to the console."""
    print("\n" + char * 80)
    print(text.center(80))
    print(char * 80)

```

```

def count_total_chunks(node: Dict) -> int:
    """Recursively counts all chunks in a node and its children from the
    ↪ '_chunks' key."""
    total = node.get('_chunks', 0)
    for child_node in node.get('children', []):
        total += count_total_chunks(child_node)
    return total

def _get_all_image_paths_recursive(node: Dict) -> Set[str]:
    """Internal helper to recursively gather a set of unique image paths."""
    image_set = node.get('_image_paths', set()).copy()
    for child_node in node.get('children', []):
        image_set.update(_get_all_image_paths_recursive(child_node))
    return image_set

def count_total_images(node: Dict) -> int:
    """Correctly counts unique images in a branch by calling the recursive
    ↪ helper."""
    return len(_get_all_image_paths_recursive(node))

def print_hierarchy_report(nodes: List[Dict], indent_level: int = 0):
    """Recursively prints the annotated hierarchy."""
    for node in nodes:
        prefix = "| " * indent_level + "-- "
        title = node.get('title', 'Untitled')
        toc_id = node.get('toc_id', 'N/A')

        direct_chunks = node.get('_chunks', 0)
        total_chunks_in_branch = count_total_chunks(node)
        total_images_in_branch = count_total_images(node)

        print(f"{prefix}{title} [ID: {toc_id}] (Total Chunks:
        ↪ {total_chunks_in_branch}, Direct Chunks: {direct_chunks}, Images:
        ↪ {total_images_in_branch})")

        if node.get('children'):
            print_hierarchy_report(node.get('children', []), indent_level + 1)

# =====
# 2. MAIN DIAGNOSTIC FUNCTION
# =====

def run_full_diagnostics():
    """
    Runs a full diagnostic by loading the original ToC (with IDs) and
    ↪ annotating

```

```

    it with live data from the ChromaDB to verify integrity.
    """
    print_header("Full Database Health & Hierarchy Diagnostic Report")

    if not langchain_available:
        logger.error("LangChain components not installed. Skipping diagnostics.
↪")
        return

    required_files = {
        "Chroma DB": CHROMA_PERSIST_DIR,
        "ToC JSON with IDs": PRE_EXTRACTED_TOC_JSON_PATH
    }
    for name, path in required_files.items():
        if not os.path.exists(path):
            logger.error(f"FATAL: Required '{name}' not found at '{path}'.
↪Please run previous cells.")
            return

    try:
        with open(PRE_EXTRACTED_TOC_JSON_PATH, 'r', encoding='utf-8') as f:
            hierarchical_toc = json.load(f)
        logger.info("Successfully loaded the pre-extracted Table of Contents
↪file (with IDs).")
    except Exception as e:
        logger.error(f"FATAL: Could not load or parse ToC JSON file: {e}")
        return

    logger.info("Connecting to the vector database...")
    vector_store = Chroma(
        persist_directory=CHROMA_PERSIST_DIR,
        embedding_function=OllamaEmbeddings(model=EMBEDDING_MODEL_OLLAMA),
        collection_name=CHROMA_COLLECTION_NAME
    )
    total_docs = vector_store._collection.count()
    if total_docs == 0:
        logger.warning("Database is empty. No diagnostics to run.")
        return

    logger.info(f"Retrieving metadata for all {total_docs} chunks...")
    metadatas = vector_store.get(limit=total_docs,
↪include=["metadatas"])[['metadatas']]
    logger.info("Successfully retrieved all metadata.")

    logger.info("Aggregating chunk and image data from the database by ToC ID...
↪")
    db_data_by_toc_id = {}
    for meta in metadatas:

```

```

    toc_id = meta.get('toc_id')
    if toc_id is None: toc_id = -1

    if toc_id not in db_data_by_toc_id:
        db_data_by_toc_id[toc_id] = {'chunk_count': 0, 'image_paths': set()}

    db_data_by_toc_id[toc_id]['chunk_count'] += 1
    if 'image_paths' in meta and meta['image_paths']:
        try:
            image_paths_list = json.loads(meta['image_paths'])
            if isinstance(image_paths_list, list):
                db_data_by_toc_id[toc_id]['image_paths'].
↪update(image_paths_list)
        except (json.JSONDecodeError, TypeError): pass

    logger.info("Annotating the original ToC with aggregated database data...")
    # Add a root node for the preamble for consistent printing
    annotated_tree_root = [{'title': 'EPUB Preamble', 'toc_id': -1, 'children':
↪hierarchical_toc}]

    def annotate_tree_with_db_data(nodes: List[Dict]):
        for node in nodes:
            toc_id = node.get('toc_id')
            db_data = db_data_by_toc_id.get(toc_id, {'chunk_count': 0,
↪'image_paths': set()})
            node['_chunks'] = db_data['chunk_count']
            node['_image_paths'] = db_data['image_paths']

            if node.get('children'):
                annotate_tree_with_db_data(node.get('children'))

    annotate_tree_with_db_data(annotated_tree_root)
    logger.info("Annotation complete.")

    print_header("Reconstructed Hierarchy Report (Book Order)", char="-")
    print_hierarchy_report(annotated_tree_root)

    print_header("Diagnostic Summary", char="-")
    print(f"Total Chunks in DB: {total_docs}")
    print(f"Total Unique Images in DB:
↪{count_total_images(annotated_tree_root[0])}")

    chunks_without_id = db_data_by_toc_id.get(-1, {}).get('chunk_count', 0)
    if chunks_without_id > 0:
        logger.warning(f"Found {chunks_without_id} chunks MISSING a valid
↪'toc_id'. These are in the 'Preamble' section.")
    else:

```

```

        logger.info("All chunks contain valid 'toc_id' metadata.")

    print_header("Diagnostic Complete")

# =====
# 3. MAIN EXECUTION BLOCK FOR THIS CELL
# =====
if 'CHROMA_PERSIST_DIR' in locals() and langchain_available:
    run_full_diagnostics()
else:
    logger.error("Skipping diagnostics: Global variables not defined or
↳LangChain not available.")

```

```

2025-07-05 13:10:06,588 - INFO - Successfully loaded the pre-extracted Table of
Contents file (with IDs).
2025-07-05 13:10:06,588 - INFO - Connecting to the vector database...
2025-07-05 13:10:06,599 - INFO - Retrieving metadata for all 6636 chunks...

```

```

=====
                        Full Database Health & Hierarchy Diagnostic Report
=====

```

```

2025-07-05 13:10:06,830 - INFO - Successfully retrieved all metadata.
2025-07-05 13:10:06,831 - INFO - Aggregating chunk and image data from the
database by ToC ID...
2025-07-05 13:10:06,832 - INFO - Annotating the original ToC with aggregated
database data...
2025-07-05 13:10:06,833 - INFO - Annotation complete.
2025-07-05 13:10:06,836 - WARNING - Found 1 chunks MISSING a valid 'toc_id'.
These are in the 'Preamble' section.

```

```

-----
                        Reconstructed Hierarchy Report (Book Order)
-----

```

```

|-- EPUB Preamble [ID: -1] (Total Chunks: 6636, Direct Chunks: 1, Images: 0)
| |-- Cover Page [ID: 1] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| |-- Title Page [ID: 2] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| |-- Copyright Page [ID: 3] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| |-- Preface [ID: 4] (Total Chunks: 7, Direct Chunks: 7, Images: 0)
| |-- Introduction [ID: 5] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| |-- About the Authors [ID: 6] (Total Chunks: 4, Direct Chunks: 4, Images: 0)
| |-- Acknowledgments [ID: 7] (Total Chunks: 21, Direct Chunks: 21, Images: 0)
| |-- Chapter 1. Understanding the Digital Forensics Profession and
Investigations [ID: 8] (Total Chunks: 302, Direct Chunks: 0, Images: 0)
| | |-- Chapter Introduction [ID: 9] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- An Overview of Digital Forensics [ID: 10] (Total Chunks: 50, Direct

```

Chunks: 15, Images: 0)  
 | | | |-- Digital Forensics and Other Related Disciplines [ID: 11] (Total  
 Chunks: 15, Direct Chunks: 15, Images: 0)  
 | | | |-- A Brief History of Digital Forensics [ID: 12] (Total Chunks: 9,  
 Direct Chunks: 9, Images: 0)  
 | | | |-- Understanding Case Law [ID: 13] (Total Chunks: 2, Direct Chunks: 2,  
 Images: 0)  
 | | | |-- Developing Digital Forensics Resources [ID: 14] (Total Chunks: 9,  
 Direct Chunks: 9, Images: 0)  
 | | |-- Preparing for Digital Investigations [ID: 15] (Total Chunks: 52,  
 Direct Chunks: 4, Images: 0)  
 | | | |-- Understanding Law Enforcement Agency Investigations [ID: 16] (Total  
 Chunks: 6, Direct Chunks: 6, Images: 0)  
 | | | |-- Following Legal Processes [ID: 17] (Total Chunks: 11, Direct  
 Chunks: 11, Images: 0)  
 | | | |-- Understanding Private-Sector Investigations [ID: 18] (Total Chunks:  
 31, Direct Chunks: 2, Images: 0)  
 | | | | |-- Establishing Company Policies [ID: 19] (Total Chunks: 4, Direct  
 Chunks: 4, Images: 0)  
 | | | | |-- Displaying Warning Banners [ID: 20] (Total Chunks: 9, Direct  
 Chunks: 9, Images: 0)  
 | | | | |-- Designating an Authorized Requester [ID: 21] (Total Chunks: 3,  
 Direct Chunks: 3, Images: 0)  
 | | | | |-- Conducting Security Investigations [ID: 22] (Total Chunks: 10,  
 Direct Chunks: 10, Images: 0)  
 | | | | |-- Distinguishing Personal and Company Property [ID: 23] (Total  
 Chunks: 3, Direct Chunks: 3, Images: 0)  
 | | |-- Maintaining Professional Conduct [ID: 24] (Total Chunks: 10, Direct  
 Chunks: 10, Images: 0)  
 | | |-- Preparing a Digital Forensics Investigation [ID: 25] (Total Chunks:  
 61, Direct Chunks: 3, Images: 0)  
 | | | |-- An Overview of a Computer Crime [ID: 26] (Total Chunks: 8, Direct  
 Chunks: 8, Images: 0)  
 | | | |-- An Overview of a Company Policy Violation [ID: 27] (Total Chunks:  
 4, Direct Chunks: 4, Images: 0)  
 | | | |-- Taking a Systematic Approach [ID: 28] (Total Chunks: 46, Direct  
 Chunks: 13, Images: 0)  
 | | | | |-- Assessing the Case [ID: 29] (Total Chunks: 6, Direct Chunks: 6,  
 Images: 0)  
 | | | | |-- Planning Your Investigation [ID: 30] (Total Chunks: 20, Direct  
 Chunks: 20, Images: 0)  
 | | | | |-- Securing Your Evidence [ID: 31] (Total Chunks: 7, Direct Chunks:  
 7, Images: 0)  
 | | |-- Procedures for Private-Sector High-Tech Investigations [ID: 32] (Total  
 Chunks: 60, Direct Chunks: 1, Images: 0)  
 | | | |-- Employee Termination Cases [ID: 33] (Total Chunks: 1, Direct  
 Chunks: 1, Images: 0)  
 | | | |-- Internet Abuse Investigations [ID: 34] (Total Chunks: 11, Direct

Chunks: 11, Images: 0)  
 | | | |-- E-mail Abuse Investigations [ID: 35] (Total Chunks: 6, Direct  
 Chunks: 6, Images: 0)  
 | | | |-- Attorney-Client Privilege Investigations [ID: 36] (Total Chunks:  
 20, Direct Chunks: 20, Images: 0)  
 | | | |-- Industrial Espionage Investigations [ID: 37] (Total Chunks: 21,  
 Direct Chunks: 14, Images: 0)  
 | | | | |-- Interviews and Interrogations in High-Tech Investigations [ID:  
 38] (Total Chunks: 7, Direct Chunks: 7, Images: 0)  
 | | |-- Understanding Data Recovery Workstations and Software [ID: 39] (Total  
 Chunks: 11, Direct Chunks: 8, Images: 0)  
 | | | |-- Setting Up Your Workstation for Digital Forensics [ID: 40] (Total  
 Chunks: 3, Direct Chunks: 3, Images: 0)  
 | | |-- Conducting an Investigation [ID: 41] (Total Chunks: 58, Direct Chunks:  
 2, Images: 0)  
 | | | |-- Gathering the Evidence [ID: 42] (Total Chunks: 6, Direct Chunks: 6,  
 Images: 0)  
 | | | |-- Understanding Bit-stream Copies [ID: 43] (Total Chunks: 7, Direct  
 Chunks: 5, Images: 0)  
 | | | | |-- Acquiring an Image of Evidence Media [ID: 44] (Total Chunks: 2,  
 Direct Chunks: 2, Images: 0)  
 | | | |-- Analyzing Your Digital Evidence [ID: 45] (Total Chunks: 28, Direct  
 Chunks: 25, Images: 0)  
 | | | | |-- Some Additional Features of Autopsy [ID: 46] (Total Chunks: 3,  
 Direct Chunks: 3, Images: 0)  
 | | | |-- Completing the Case [ID: 47] (Total Chunks: 12, Direct Chunks: 6,  
 Images: 0)  
 | | | | |-- Autopsy's Report Generator [ID: 48] (Total Chunks: 6, Direct  
 Chunks: 6, Images: 0)  
 | | | |-- Critiquing the Case [ID: 49] (Total Chunks: 3, Direct Chunks: 3,  
 Images: 0)  
 | | |-- Chapter Review [ID: 50] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Chapter Summary [ID: 51] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Key Terms [ID: 52] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Review Questions [ID: 53] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Hands-On Projects [ID: 54] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Case Projects [ID: 55] (Total Chunks: 0, Direct Chunks: 0, Images:  
 0)  
 | |-- Chapter 2. The Investigator's Office and Laboratory [ID: 56] (Total  
 Chunks: 147, Direct Chunks: 0, Images: 0)  
 | | |-- Chapter Introduction [ID: 57] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | |-- Understanding Forensics Lab Accreditation Requirements [ID: 58] (Total  
 Chunks: 49, Direct Chunks: 5, Images: 0)  
 | | | |-- Identifying Duties of the Lab Manager and Staff [ID: 59] (Total

Chunks: 6, Direct Chunks: 6, Images: 0)  
 | | | |-- Lab Budget Planning [ID: 60] (Total Chunks: 18, Direct Chunks: 18,  
 Images: 0)  
 | | | |-- Acquiring Certification and Training [ID: 61] (Total Chunks: 20,  
 Direct Chunks: 3, Images: 0)  
 | | | | |-- International Association of Computer Investigative Specialists  
 [ID: 62] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | |-- ISC2 Certified Cyber Forensics Professional [ID: 63] (Total  
 Chunks: 1, Direct Chunks: 1, Images: 0)  
 | | | | |-- High Tech Crime Network [ID: 64] (Total Chunks: 10, Direct  
 Chunks: 10, Images: 0)  
 | | | | |-- EnCase Certified Examiner Certification [ID: 65] (Total Chunks:  
 1, Direct Chunks: 1, Images: 0)  
 | | | | |-- AccessData Certified Examiner [ID: 66] (Total Chunks: 1, Direct  
 Chunks: 1, Images: 0)  
 | | | | |-- Other Training and Certifications [ID: 67] (Total Chunks: 4,  
 Direct Chunks: 4, Images: 0)  
 | | |-- Determining the Physical Requirements for a Digital Forensics Lab [ID:  
 68] (Total Chunks: 33, Direct Chunks: 2, Images: 0)  
 | | | |-- Identifying Lab Security Needs [ID: 69] (Total Chunks: 4, Direct  
 Chunks: 4, Images: 0)  
 | | | |-- Conducting High-Risk Investigations [ID: 70] (Total Chunks: 6,  
 Direct Chunks: 6, Images: 0)  
 | | | |-- Using Evidence Containers [ID: 71] (Total Chunks: 9, Direct Chunks:  
 9, Images: 0)  
 | | | |-- Overseeing Facility Maintenance [ID: 72] (Total Chunks: 2, Direct  
 Chunks: 2, Images: 0)  
 | | | |-- Considering Physical Security Needs [ID: 73] (Total Chunks: 3,  
 Direct Chunks: 3, Images: 0)  
 | | | |-- Auditing a Digital Forensics Lab [ID: 74] (Total Chunks: 2, Direct  
 Chunks: 2, Images: 0)  
 | | | |-- Determining Floor Plans for Digital Forensics Labs [ID: 75] (Total  
 Chunks: 5, Direct Chunks: 5, Images: 0)  
 | | |-- Selecting a Basic Forensic Workstation [ID: 76] (Total Chunks: 24,  
 Direct Chunks: 1, Images: 0)  
 | | | |-- Selecting Workstations for a Lab [ID: 77] (Total Chunks: 6, Direct  
 Chunks: 6, Images: 0)  
 | | | |-- Selecting Workstations for Private-Sector Labs [ID: 78] (Total  
 Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- Stocking Hardware Peripherals [ID: 79] (Total Chunks: 3, Direct  
 Chunks: 3, Images: 0)  
 | | | |-- Maintaining Operating Systems and Software Inventories [ID: 80]  
 (Total Chunks: 3, Direct Chunks: 3, Images: 0)  
 | | | |-- Using a Disaster Recovery Plan [ID: 81] (Total Chunks: 6, Direct  
 Chunks: 6, Images: 0)  
 | | | |-- Planning for Equipment Upgrades [ID: 82] (Total Chunks: 3, Direct  
 Chunks: 3, Images: 0)  
 | | |-- Building a Business Case for Developing a Forensics Lab [ID: 83]



```

(Total Chunks: 41, Direct Chunks: 9, Images: 0)
| | | |-- Preparing a Business Case for a Digital Forensics Lab [ID: 84]
(Total Chunks: 32, Direct Chunks: 1, Images: 0)
| | | | |-- Justification [ID: 85] (Total Chunks: 2, Direct Chunks: 2,
Images: 0)
| | | | |-- Budget Development [ID: 86] (Total Chunks: 1, Direct Chunks: 1,
Images: 0)
| | | | |-- Facility Cost [ID: 87] (Total Chunks: 4, Direct Chunks: 4,
Images: 0)
| | | | |-- Hardware Requirements [ID: 88] (Total Chunks: 5, Direct Chunks:
5, Images: 0)
| | | | |-- Software Requirements [ID: 89] (Total Chunks: 9, Direct Chunks:
9, Images: 0)
| | | | |-- Miscellaneous Budget Needs [ID: 90] (Total Chunks: 1, Direct
Chunks: 1, Images: 0)
| | | | |-- Approval and Acquisition [ID: 91] (Total Chunks: 3, Direct
Chunks: 3, Images: 0)
| | | | |-- Implementation [ID: 92] (Total Chunks: 1, Direct Chunks: 1,
Images: 0)
| | | | |-- Acceptance Testing [ID: 93] (Total Chunks: 2, Direct Chunks: 2,
Images: 0)
| | | | |-- Correction for Acceptance [ID: 94] (Total Chunks: 1, Direct
Chunks: 1, Images: 0)
| | | | |-- Production [ID: 95] (Total Chunks: 2, Direct Chunks: 2, Images:
0)
| | |-- Chapter Review [ID: 96] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | |-- Chapter Summary [ID: 97] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Key Terms [ID: 98] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | |-- Review Questions [ID: 99] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Hands-On Projects [ID: 100] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Case Projects [ID: 101] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| |-- Chapter 3. Data Acquisition [ID: 102] (Total Chunks: 192, Direct Chunks:
0, Images: 0)
| | |-- Chapter Introduction [ID: 103] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Understanding Storage Formats for Digital Evidence [ID: 104] (Total
Chunks: 25, Direct Chunks: 2, Images: 0)
| | | |-- Raw Format [ID: 105] (Total Chunks: 16, Direct Chunks: 16, Images:
0)
| | | |-- Proprietary Formats [ID: 106] (Total Chunks: 5, Direct Chunks: 5,
Images: 0)
| | | |-- Advanced Forensic Format [ID: 107] (Total Chunks: 2, Direct Chunks:
2, Images: 0)
| | |-- Determining the Best Acquisition Method [ID: 108] (Total Chunks: 13,

```

Direct Chunks: 13, Images: 0)  
 | | |-- Contingency Planning for Image Acquisitions [ID: 109] (Total Chunks:  
 9, Direct Chunks: 9, Images: 0)  
 | | |-- Using Acquisition Tools [ID: 110] (Total Chunks: 81, Direct Chunks: 3,  
 Images: 0)  
 | | | |-- Mini-WinFE Boot CDs and USB Drives [ID: 111] (Total Chunks: 5,  
 Direct Chunks: 5, Images: 0)  
 | | | |-- Acquiring Data with a Linux Boot CD [ID: 112] (Total Chunks: 46,  
 Direct Chunks: 3, Images: 0)  
 | | | | |-- Using Linux Live CD Distributions [ID: 113] (Total Chunks: 7,  
 Direct Chunks: 7, Images: 0)  
 | | | | |-- Preparing a Target Drive for Acquisition in Linux [ID: 114]  
 (Total Chunks: 16, Direct Chunks: 16, Images: 0)  
 | | | | |-- Acquiring Data with dd in Linux [ID: 115] (Total Chunks: 16,  
 Direct Chunks: 16, Images: 0)  
 | | | | |-- Acquiring Data with dcfldd in Linux [ID: 116] (Total Chunks: 4,  
 Direct Chunks: 4, Images: 0)  
 | | | |-- Capturing an Image with AccessData FTK Imager Lite [ID: 117] (Total  
 Chunks: 27, Direct Chunks: 27, Images: 0)  
 | | |-- Validating Data Acquisitions [ID: 118] (Total Chunks: 18, Direct  
 Chunks: 3, Images: 0)  
 | | | |-- Linux Validation Methods [ID: 119] (Total Chunks: 9, Direct Chunks:  
 1, Images: 0)  
 | | | | |-- Validating dd-Acquired Data [ID: 120] (Total Chunks: 5, Direct  
 Chunks: 5, Images: 0)  
 | | | | |-- Validating dcfldd-Acquired Data [ID: 121] (Total Chunks: 3,  
 Direct Chunks: 3, Images: 0)  
 | | | |-- Windows Validation Methods [ID: 122] (Total Chunks: 6, Direct  
 Chunks: 6, Images: 0)  
 | | |-- Performing RAID Data Acquisitions [ID: 123] (Total Chunks: 17, Direct  
 Chunks: 1, Images: 0)  
 | | | |-- Understanding RAID [ID: 124] (Total Chunks: 10, Direct Chunks: 10,  
 Images: 0)  
 | | | |-- Acquiring RAID Disks [ID: 125] (Total Chunks: 6, Direct Chunks: 6,  
 Images: 0)  
 | | |-- Using Remote Network Acquisition Tools [ID: 126] (Total Chunks: 18,  
 Direct Chunks: 3, Images: 0)  
 | | | |-- Remote Acquisition with ProDiscover [ID: 127] (Total Chunks: 9,  
 Direct Chunks: 9, Images: 0)  
 | | | |-- Remote Acquisition with EnCase Enterprise [ID: 128] (Total Chunks:  
 2, Direct Chunks: 2, Images: 0)  
 | | | |-- Remote Acquisition with R-Tools R-Studio [ID: 129] (Total Chunks:  
 1, Direct Chunks: 1, Images: 0)  
 | | | |-- Remote Acquisition with WetStone US-LATT PRO [ID: 130] (Total  
 Chunks: 1, Direct Chunks: 1, Images: 0)  
 | | | |-- Remote Acquisition with F-Response [ID: 131] (Total Chunks: 2,  
 Direct Chunks: 2, Images: 0)  
 | | |-- Using Other Forensics Acquisition Tools [ID: 132] (Total Chunks: 11,

Direct Chunks: 1, Images: 0)

- | | | |-- PassMark Software ImageUSB [ID: 133] (Total Chunks: 1, Direct Chunks: 1, Images: 0)
- | | | |-- ASR Data SMART [ID: 134] (Total Chunks: 2, Direct Chunks: 2, Images: 0)
- | | | |-- Runtime Software [ID: 135] (Total Chunks: 4, Direct Chunks: 4, Images: 0)
- | | | |-- ILookIX IXImager [ID: 136] (Total Chunks: 1, Direct Chunks: 1, Images: 0)
- | | | |-- SourceForge [ID: 137] (Total Chunks: 2, Direct Chunks: 2, Images: 0)
- | | |-- Chapter Review [ID: 138] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Chapter Summary [ID: 139] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Key Terms [ID: 140] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Review Questions [ID: 141] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Hands-On Projects [ID: 142] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Case Projects [ID: 143] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | |-- Chapter 4. Processing Crime and Incident Scenes [ID: 144] (Total Chunks: 250, Direct Chunks: 0, Images: 0)
- | | |-- Chapter Introduction [ID: 145] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Identifying Digital Evidence [ID: 146] (Total Chunks: 52, Direct Chunks: 9, Images: 0)
- | | | |-- Understanding Rules of Evidence [ID: 147] (Total Chunks: 43, Direct Chunks: 43, Images: 0)
- | | | |-- Collecting Evidence in Private-Sector Incident Scenes [ID: 148] (Total Chunks: 24, Direct Chunks: 24, Images: 0)
- | | | |-- Processing Law Enforcement Crime Scenes [ID: 149] (Total Chunks: 17, Direct Chunks: 5, Images: 0)
- | | | |-- Understanding Concepts and Terms Used in Warrants [ID: 150] (Total Chunks: 12, Direct Chunks: 12, Images: 0)
- | | | |-- Preparing for a Search [ID: 151] (Total Chunks: 26, Direct Chunks: 1, Images: 0)
- | | | |-- Identifying the Nature of the Case [ID: 152] (Total Chunks: 2, Direct Chunks: 2, Images: 0)
- | | | |-- Identifying the Type of OS or Digital Device [ID: 153] (Total Chunks: 3, Direct Chunks: 3, Images: 0)
- | | | |-- Determining Whether You Can Seize Computers and Digital Devices [ID: 154] (Total Chunks: 3, Direct Chunks: 3, Images: 0)
- | | | |-- Getting a Detailed Description of the Location [ID: 155] (Total Chunks: 6, Direct Chunks: 6, Images: 0)
- | | | |-- Determining Who Is in Charge [ID: 156] (Total Chunks: 1, Direct Chunks: 1, Images: 0)

| | | |-- Using Additional Technical Expertise [ID: 157] (Total Chunks: 3, Direct Chunks: 3, Images: 0)

| | | |-- Determining the Tools You Need [ID: 158] (Total Chunks: 6, Direct Chunks: 6, Images: 0)

| | | |-- Preparing the Investigation Team [ID: 159] (Total Chunks: 1, Direct Chunks: 1, Images: 0)

| | | |-- Securing a Digital Incident or Crime Scene [ID: 160] (Total Chunks: 9, Direct Chunks: 9, Images: 0)

| | | |-- Seizing Digital Evidence at the Scene [ID: 161] (Total Chunks: 41, Direct Chunks: 3, Images: 0)

| | | |-- Preparing to Acquire Digital Evidence [ID: 162] (Total Chunks: 5, Direct Chunks: 5, Images: 0)

| | | |-- Processing Incident or Crime Scenes [ID: 163] (Total Chunks: 19, Direct Chunks: 19, Images: 0)

| | | |-- Processing Data Centers with RAID Systems [ID: 164] (Total Chunks: 1, Direct Chunks: 1, Images: 0)

| | | |-- Using a Technical Advisor [ID: 165] (Total Chunks: 3, Direct Chunks: 3, Images: 0)

| | | |-- Documenting Evidence in the Lab [ID: 166] (Total Chunks: 2, Direct Chunks: 2, Images: 0)

| | | |-- Processing and Handling Digital Evidence [ID: 167] (Total Chunks: 8, Direct Chunks: 8, Images: 0)

| | | |-- Storing Digital Evidence [ID: 168] (Total Chunks: 11, Direct Chunks: 6, Images: 0)

| | | |-- Evidence Retention and Media Storage Needs [ID: 169] (Total Chunks: 3, Direct Chunks: 3, Images: 0)

| | | |-- Documenting Evidence [ID: 170] (Total Chunks: 2, Direct Chunks: 2, Images: 0)

| | | |-- Obtaining a Digital Hash [ID: 171] (Total Chunks: 22, Direct Chunks: 22, Images: 0)

| | | |-- Reviewing a Case [ID: 172] (Total Chunks: 48, Direct Chunks: 1, Images: 0)

| | | |-- Sample Civil Investigation [ID: 173] (Total Chunks: 13, Direct Chunks: 13, Images: 0)

| | | |-- An Example of a Criminal Investigation [ID: 174] (Total Chunks: 3, Direct Chunks: 3, Images: 0)

| | | |-- Reviewing Background Information for a Case [ID: 175] (Total Chunks: 1, Direct Chunks: 1, Images: 0)

| | | |-- Planning the Investigation [ID: 176] (Total Chunks: 1, Direct Chunks: 1, Images: 0)

| | | |-- Conducting the Investigation: Acquiring Evidence with OSForensics [ID: 177] (Total Chunks: 29, Direct Chunks: 29, Images: 0)

| | | |-- Chapter Review [ID: 178] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Chapter Summary [ID: 179] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Key Terms [ID: 180] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Review Questions [ID: 181] (Total Chunks: 0, Direct Chunks: 0,

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Images: 0)
| | | |-- Hands-On Projects [ID: 182] (Total Chunks: 0, Direct Chunks: 0,
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| | | |-- Case Projects [ID: 183] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| |-- Chapter 5. Working with Windows and CLI Systems [ID: 184] (Total Chunks:
266, Direct Chunks: 0, Images: 0)
| | |-- Chapter Introduction [ID: 185] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Understanding File Systems [ID: 186] (Total Chunks: 23, Direct Chunks:
2, Images: 0)
| | | |-- Understanding the Boot Sequence [ID: 187] (Total Chunks: 6, Direct
Chunks: 6, Images: 0)
| | | |-- Understanding Disk Drives [ID: 188] (Total Chunks: 7, Direct
Chunks: 7, Images: 0)
| | | |-- Solid-State Storage Devices [ID: 189] (Total Chunks: 8, Direct
Chunks: 8, Images: 0)
| | |-- Exploring Microsoft File Structures [ID: 190] (Total Chunks: 49,
Direct Chunks: 4, Images: 0)
| | | |-- Disk Partitions [ID: 191] (Total Chunks: 27, Direct Chunks: 27,
Images: 0)
| | | |-- Examining FAT Disks [ID: 192] (Total Chunks: 18, Direct Chunks: 15,
Images: 0)
| | | | |-- Deleting FAT Files [ID: 193] (Total Chunks: 3, Direct Chunks: 3,
Images: 0)
| | |-- Examining NTFS Disks [ID: 194] (Total Chunks: 79, Direct Chunks: 8,
Images: 0)
| | | |-- NTFS System Files [ID: 195] (Total Chunks: 3, Direct Chunks: 3,
Images: 0)
| | | |-- MFT and File Attributes [ID: 196] (Total Chunks: 20, Direct Chunks:
20, Images: 0)
| | | |-- MFT Structures for File Data [ID: 197] (Total Chunks: 22, Direct
Chunks: 1, Images: 0)
| | | | |-- MFT Header Fields [ID: 198] (Total Chunks: 2, Direct Chunks: 2,
Images: 0)
| | | | |-- Attribute 0x10: Standard Information [ID: 199] (Total Chunks: 2,
Direct Chunks: 2, Images: 0)
| | | | |-- Attribute 0x30: File Name [ID: 200] (Total Chunks: 4, Direct
Chunks: 4, Images: 0)
| | | | |-- Attribute 0x40: Object_ID [ID: 201] (Total Chunks: 2, Direct
Chunks: 2, Images: 0)
| | | | |-- Attribute 0x80: Data for a Resident File [ID: 202] (Total
Chunks: 4, Direct Chunks: 4, Images: 0)
| | | | |-- Attribute 0x80: Data for a Nonresident File [ID: 203] (Total
Chunks: 2, Direct Chunks: 2, Images: 0)
| | | | |-- Interpreting a Data Run [ID: 204] (Total Chunks: 5, Direct
Chunks: 5, Images: 0)
| | | |-- NTFS Alternate Data Streams [ID: 205] (Total Chunks: 5, Direct

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Chunks: 5, Images: 0)  
 | | | |-- NTFS Compressed Files [ID: 206] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- NTFS Encrypting File System [ID: 207] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | | |-- EFS Recovery Key Agent [ID: 208] (Total Chunks: 3, Direct Chunks: 3, Images: 0)  
 | | | |-- Deleting NTFS Files [ID: 209] (Total Chunks: 8, Direct Chunks: 8, Images: 0)  
 | | | |-- Resilient File System [ID: 210] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | | |-- Understanding Whole Disk Encryption [ID: 211] (Total Chunks: 13, Direct Chunks: 7, Images: 0)  
 | | | |-- Examining Microsoft BitLocker [ID: 212] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- Examining Third-Party Disk Encryption Tools [ID: 213] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | | |-- Understanding the Windows Registry [ID: 214] (Total Chunks: 43, Direct Chunks: 3, Images: 0)  
 | | | |-- Exploring the Organization of the Windows Registry [ID: 215] (Total Chunks: 9, Direct Chunks: 9, Images: 0)  
 | | | |-- Examining the Windows Registry [ID: 216] (Total Chunks: 31, Direct Chunks: 31, Images: 0)  
 | | | |-- Understanding Microsoft Startup Tasks [ID: 217] (Total Chunks: 18, Direct Chunks: 1, Images: 0)  
 | | | |-- Startup in Windows 7, Windows 8, and Windows 10 [ID: 218] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | | |-- Startup in Windows NT and Later [ID: 219] (Total Chunks: 13, Direct Chunks: 1, Images: 0)  
 | | | | |-- Startup Files for Windows Vista [ID: 220] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | | |-- Startup Files for Windows XP [ID: 221] (Total Chunks: 6, Direct Chunks: 6, Images: 0)  
 | | | | |-- Windows XP System Files [ID: 222] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | | |-- Contamination Concerns with Windows XP [ID: 223] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- Understanding Virtual Machines [ID: 224] (Total Chunks: 41, Direct Chunks: 10, Images: 0)  
 | | | |-- Creating a Virtual Machine [ID: 225] (Total Chunks: 31, Direct Chunks: 31, Images: 0)  
 | | | |-- Chapter Review [ID: 226] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Chapter Summary [ID: 227] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Key Terms [ID: 228] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Review Questions [ID: 229] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

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| | | |-- Hands-On Projects [ID: 230] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Case Projects [ID: 231] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| |-- Chapter 6. Current Digital Forensics Tools [ID: 232] (Total Chunks: 148,
Direct Chunks: 0, Images: 0)
| | |-- Chapter Introduction [ID: 233] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Evaluating Digital Forensics Tool Needs [ID: 234] (Total Chunks: 68,
Direct Chunks: 3, Images: 0)
| | | |-- Types of Digital Forensics Tools [ID: 235] (Total Chunks: 5, Direct
Chunks: 1, Images: 0)
| | | | |-- Hardware Forensics Tools [ID: 236] (Total Chunks: 1, Direct
Chunks: 1, Images: 0)
| | | | |-- Software Forensics Tools [ID: 237] (Total Chunks: 3, Direct
Chunks: 3, Images: 0)
| | | |-- Tasks Performed by Digital Forensics Tools [ID: 238] (Total Chunks:
53, Direct Chunks: 2, Images: 0)
| | | | |-- Acquisition [ID: 239] (Total Chunks: 9, Direct Chunks: 9,
Images: 0)
| | | | |-- Validation and Verification [ID: 240] (Total Chunks: 10, Direct
Chunks: 10, Images: 0)
| | | | |-- Extraction [ID: 241] (Total Chunks: 14, Direct Chunks: 14,
Images: 0)
| | | | |-- Reconstruction [ID: 242] (Total Chunks: 10, Direct Chunks: 10,
Images: 0)
| | | | |-- Reporting [ID: 243] (Total Chunks: 8, Direct Chunks: 8, Images:
0)
| | | |-- Tool Comparisons [ID: 244] (Total Chunks: 3, Direct Chunks: 3,
Images: 0)
| | | |-- Other Considerations for Tools [ID: 245] (Total Chunks: 4, Direct
Chunks: 4, Images: 0)
| | |-- Digital Forensics Software Tools [ID: 246] (Total Chunks: 45, Direct
Chunks: 1, Images: 0)
| | | |-- Command-Line Forensics Tools [ID: 247] (Total Chunks: 10, Direct
Chunks: 10, Images: 0)
| | | |-- Linux Forensics Tools [ID: 248] (Total Chunks: 30, Direct Chunks:
2, Images: 0)
| | | | |-- Smart [ID: 249] (Total Chunks: 21, Direct Chunks: 21, Images: 0)
| | | | |-- Helix 3 [ID: 250] (Total Chunks: 2, Direct Chunks: 2, Images: 0)
| | | | |-- Kali Linux [ID: 251] (Total Chunks: 1, Direct Chunks: 1, Images:
0)
| | | | |-- Autopsy and Sleuth Kit [ID: 252] (Total Chunks: 3, Direct
Chunks: 3, Images: 0)
| | | | |-- Forcepoint Threat Protection [ID: 253] (Total Chunks: 1, Direct
Chunks: 1, Images: 0)
| | | |-- Other GUI Forensics Tools [ID: 254] (Total Chunks: 4, Direct
Chunks: 4, Images: 0)

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| | |-- Digital Forensics Hardware Tools [ID: 255] (Total Chunks: 18, Direct Chunks: 2, Images: 0)

| | | |-- Forensic Workstations [ID: 256] (Total Chunks: 6, Direct Chunks: 3, Images: 0)

| | | | |-- Building Your Own Workstation [ID: 257] (Total Chunks: 3, Direct Chunks: 3, Images: 0)

| | | |-- Using a Write-Blocker [ID: 258] (Total Chunks: 5, Direct Chunks: 5, Images: 0)

| | | |-- Recommendations for a Forensic Workstation [ID: 259] (Total Chunks: 5, Direct Chunks: 5, Images: 0)

| | |-- Validating and Testing Forensics Software [ID: 260] (Total Chunks: 17, Direct Chunks: 1, Images: 0)

| | | |-- Using National Institute of Standards and Technology Tools [ID: 261] (Total Chunks: 8, Direct Chunks: 8, Images: 0)

| | | |-- Using Validation Protocols [ID: 262] (Total Chunks: 8, Direct Chunks: 3, Images: 0)

| | | | |-- Digital Forensics Examination Protocol [ID: 263] (Total Chunks: 2, Direct Chunks: 2, Images: 0)

| | | | |-- Digital Forensics Tool Upgrade Protocol [ID: 264] (Total Chunks: 3, Direct Chunks: 3, Images: 0)

| | |-- Chapter Review [ID: 265] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Chapter Summary [ID: 266] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Key Terms [ID: 267] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Review Questions [ID: 268] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Hands-On Projects [ID: 269] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Case Projects [ID: 270] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| |-- Chapter 7. Linux and Macintosh File Systems [ID: 271] (Total Chunks: 172, Direct Chunks: 0, Images: 0)

| | |-- Chapter Introduction [ID: 272] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | |-- Examining Linux File Structures [ID: 273] (Total Chunks: 99, Direct Chunks: 63, Images: 0)

| | | |-- File Structures in Ext4 [ID: 274] (Total Chunks: 36, Direct Chunks: 7, Images: 0)

| | | | |-- Inodes [ID: 275] (Total Chunks: 8, Direct Chunks: 8, Images: 0)

| | | | |-- Hard Links and Symbolic Links [ID: 276] (Total Chunks: 21, Direct Chunks: 21, Images: 0)

| | |-- Understanding Macintosh File Structures [ID: 277] (Total Chunks: 32, Direct Chunks: 4, Images: 0)

| | | |-- An Overview of Mac File Structures [ID: 278] (Total Chunks: 15, Direct Chunks: 15, Images: 0)

| | | |-- Forensics Procedures in Mac [ID: 279] (Total Chunks: 13, Direct Chunks: 8, Images: 0)



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| | | | |-- Acquisition Methods in macOS [ID: 280] (Total Chunks: 5, Direct
Chunks: 5, Images: 0)
| | |-- Using Linux Forensics Tools [ID: 281] (Total Chunks: 41, Direct
Chunks: 4, Images: 0)
| | | |-- Installing Sleuth Kit and Autopsy [ID: 282] (Total Chunks: 10,
Direct Chunks: 10, Images: 0)
| | | |-- Examining a Case with Sleuth Kit and Autopsy [ID: 283] (Total
Chunks: 27, Direct Chunks: 27, Images: 0)
| | |-- Chapter Review [ID: 284] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | |-- Chapter Summary [ID: 285] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Key Terms [ID: 286] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | |-- Review Questions [ID: 287] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Hands-On Projects [ID: 288] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Case Projects [ID: 289] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| |-- Chapter 8. Recovering Graphics Files [ID: 290] (Total Chunks: 147, Direct
Chunks: 0, Images: 0)
| | |-- Chapter Introduction [ID: 291] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Recognizing a Graphics File [ID: 292] (Total Chunks: 33, Direct
Chunks: 3, Images: 0)
| | | |-- Understanding Bitmap and Raster Images [ID: 293] (Total Chunks: 6,
Direct Chunks: 6, Images: 0)
| | | |-- Understanding Vector Graphics [ID: 294] (Total Chunks: 1, Direct
Chunks: 1, Images: 0)
| | | |-- Understanding Metafile Graphics [ID: 295] (Total Chunks: 1, Direct
Chunks: 1, Images: 0)
| | | |-- Understanding Graphics File Formats [ID: 296] (Total Chunks: 8,
Direct Chunks: 8, Images: 0)
| | | |-- Understanding Digital Photograph File Formats [ID: 297] (Total
Chunks: 14, Direct Chunks: 1, Images: 0)
| | | | |-- Examining the Raw File Format [ID: 298] (Total Chunks: 2, Direct
Chunks: 2, Images: 0)
| | | | |-- Examining the Exchangeable Image File Format [ID: 299] (Total
Chunks: 11, Direct Chunks: 11, Images: 0)
| | |-- Understanding Data Compression [ID: 300] (Total Chunks: 82, Direct
Chunks: 1, Images: 0)
| | | |-- Lossless and Lossy Compression [ID: 301] (Total Chunks: 8, Direct
Chunks: 8, Images: 0)
| | | |-- Locating and Recovering Graphics Files [ID: 302] (Total Chunks: 5,
Direct Chunks: 5, Images: 0)
| | | |-- Identifying Graphics File Fragments [ID: 303] (Total Chunks: 2,
Direct Chunks: 2, Images: 0)
| | | |-- Repairing Damaged Headers [ID: 304] (Total Chunks: 5, Direct

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Chunks: 5, Images: 0)  
 | | | |-- Searching for and Carving Data from Unallocated Space [ID: 305]  
 (Total Chunks: 33, Direct Chunks: 3, Images: 0)  
 | | | |-- Planning Your Examination [ID: 306] (Total Chunks: 3, Direct  
 Chunks: 3, Images: 0)  
 | | | |-- Searching for and Recovering Digital Photograph Evidence [ID:  
 307] (Total Chunks: 27, Direct Chunks: 27, Images: 0)  
 | | | |-- Rebuilding File Headers [ID: 308] (Total Chunks: 12, Direct Chunks:  
 12, Images: 0)  
 | | | |-- Reconstructing File Fragments [ID: 309] (Total Chunks: 16, Direct  
 Chunks: 16, Images: 0)  
 | | |-- Identifying Unknown File Formats [ID: 310] (Total Chunks: 23, Direct  
 Chunks: 5, Images: 0)  
 | | |-- Analyzing Graphics File Headers [ID: 311] (Total Chunks: 3, Direct  
 Chunks: 3, Images: 0)  
 | | |-- Tools for Viewing Images [ID: 312] (Total Chunks: 2, Direct Chunks:  
 2, Images: 0)  
 | | |-- Understanding Steganography in Graphics Files [ID: 313] (Total  
 Chunks: 10, Direct Chunks: 10, Images: 0)  
 | | |-- Using Steganalysis Tools [ID: 314] (Total Chunks: 3, Direct Chunks:  
 3, Images: 0)  
 | | |-- Understanding Copyright Issues with Graphics [ID: 315] (Total Chunks:  
 9, Direct Chunks: 9, Images: 0)  
 | | |-- Chapter Review [ID: 316] (Total Chunks: 0, Direct Chunks: 0, Images:  
 0)  
 | | |-- Chapter Summary [ID: 317] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | |-- Key Terms [ID: 318] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | |-- Review Questions [ID: 319] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | |-- Hands-On Projects [ID: 320] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | |-- Case Projects [ID: 321] (Total Chunks: 0, Direct Chunks: 0, Images:  
 0)  
 | |-- Chapter 9. Digital Forensics Analysis and Validation [ID: 322] (Total  
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 | | |-- Chapter Introduction [ID: 323] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | |-- Determining What Data to Collect and Analyze [ID: 324] (Total Chunks:  
 72, Direct Chunks: 5, Images: 0)  
 | | |-- Approaching Digital Forensics Cases [ID: 325] (Total Chunks: 31,  
 Direct Chunks: 26, Images: 0)  
 | | | |-- Refining and Modifying the Investigation Plan [ID: 326] (Total  
 Chunks: 5, Direct Chunks: 5, Images: 0)  
 | | | |-- Using Autopsy to Validate Data [ID: 327] (Total Chunks: 9, Direct  
 Chunks: 2, Images: 0)  
 | | | |-- Installing NSRL Hashes in Autopsy [ID: 328] (Total Chunks: 7,  
 Direct Chunks: 7, Images: 0)

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| | | |-- Collecting Hash Values in Autopsy [ID: 329] (Total Chunks: 27,
Direct Chunks: 27, Images: 0)
| | |-- Validating Forensic Data [ID: 330] (Total Chunks: 36, Direct Chunks:
1, Images: 0)
| | | |-- Validating with Hexadecimal Editors [ID: 331] (Total Chunks: 25,
Direct Chunks: 22, Images: 0)
| | | | |-- Using Hash Values to Discriminate Data [ID: 332] (Total Chunks:
3, Direct Chunks: 3, Images: 0)
| | | |-- Validating with Digital Forensics Tools [ID: 333] (Total Chunks:
10, Direct Chunks: 10, Images: 0)
| | |-- Addressing Data-Hiding Techniques [ID: 334] (Total Chunks: 55, Direct
Chunks: 1, Images: 0)
| | | |-- Hiding Files by Using the OS [ID: 335] (Total Chunks: 2, Direct
Chunks: 2, Images: 0)
| | | |-- Hiding Partitions [ID: 336] (Total Chunks: 5, Direct Chunks: 5,
Images: 0)
| | | |-- Marking Bad Clusters [ID: 337] (Total Chunks: 4, Direct Chunks: 4,
Images: 0)
| | | |-- Bit-Shifting [ID: 338] (Total Chunks: 22, Direct Chunks: 22,
Images: 0)
| | | |-- Understanding Steganalysis Methods [ID: 339] (Total Chunks: 8,
Direct Chunks: 8, Images: 0)
| | | |-- Examining Encrypted Files [ID: 340] (Total Chunks: 3, Direct
Chunks: 3, Images: 0)
| | | |-- Recovering Passwords [ID: 341] (Total Chunks: 10, Direct Chunks:
10, Images: 0)
| | |-- Chapter Review [ID: 342] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | |-- Chapter Summary [ID: 343] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Key Terms [ID: 344] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | |-- Review Questions [ID: 345] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Hands-On Projects [ID: 346] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Case Projects [ID: 347] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| |-- Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network
Forensics [ID: 348] (Total Chunks: 168, Direct Chunks: 0, Images: 0)
| | |-- Chapter Introduction [ID: 349] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- An Overview of Virtual Machine Forensics [ID: 350] (Total Chunks: 108,
Direct Chunks: 7, Images: 0)
| | | | |-- Type 2 Hypervisors [ID: 351] (Total Chunks: 24, Direct Chunks: 13,
Images: 0)
| | | | | |-- Parallels Desktop [ID: 352] (Total Chunks: 1, Direct Chunks: 1,
Images: 0)
| | | | | |-- KVM [ID: 353] (Total Chunks: 1, Direct Chunks: 1, Images: 0)

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| | | | |-- Microsoft Hyper-V [ID: 354] (Total Chunks: 1, Direct Chunks: 1,
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| | | | |-- VMware Workstation and Workstation Player [ID: 355] (Total
Chunks: 4, Direct Chunks: 4, Images: 0)
| | | | |-- VirtualBox [ID: 356] (Total Chunks: 4, Direct Chunks: 4, Images:
0)
| | | |-- Conducting an Investigation with Type 2 Hypervisors [ID: 357]
(Total Chunks: 61, Direct Chunks: 37, Images: 0)
| | | | |-- Other VM Examination Methods [ID: 358] (Total Chunks: 7, Direct
Chunks: 7, Images: 0)
| | | | |-- Using VMs as Forensics Tools [ID: 359] (Total Chunks: 17, Direct
Chunks: 17, Images: 0)
| | | |-- Working with Type 1 Hypervisors [ID: 360] (Total Chunks: 16, Direct
Chunks: 16, Images: 0)
| | |-- Performing Live Acquisitions [ID: 361] (Total Chunks: 14, Direct
Chunks: 11, Images: 0)
| | | |-- Performing a Live Acquisition in Windows [ID: 362] (Total Chunks:
3, Direct Chunks: 3, Images: 0)
| | |-- Network Forensics Overview [ID: 363] (Total Chunks: 46, Direct Chunks:
2, Images: 0)
| | | |-- The Need for Established Procedures [ID: 364] (Total Chunks: 3,
Direct Chunks: 3, Images: 0)
| | | |-- Securing a Network [ID: 365] (Total Chunks: 7, Direct Chunks: 7,
Images: 0)
| | | |-- Developing Procedures for Network Forensics [ID: 366] (Total
Chunks: 21, Direct Chunks: 4, Images: 0)
| | | | |-- Reviewing Network Logs [ID: 367] (Total Chunks: 4, Direct
Chunks: 4, Images: 0)
| | | | |-- Using Network Tools [ID: 368] (Total Chunks: 2, Direct Chunks:
2, Images: 0)
| | | | |-- Using Packet Analyzers [ID: 369] (Total Chunks: 11, Direct
Chunks: 11, Images: 0)
| | | |-- Investigating Virtual Networks [ID: 370] (Total Chunks: 6, Direct
Chunks: 6, Images: 0)
| | | |-- Examining the Honeynet Project [ID: 371] (Total Chunks: 7, Direct
Chunks: 7, Images: 0)
| | |-- Chapter Review [ID: 372] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | |-- Chapter Summary [ID: 373] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Key Terms [ID: 374] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | |-- Review Questions [ID: 375] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Hands-On Projects [ID: 376] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Case Projects [ID: 377] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| |-- Chapter 11. E-mail and Social Media Investigations [ID: 378] (Total

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Chunks: 180, Direct Chunks: 0, Images: 0)  
 | | |-- Chapter Introduction [ID: 379] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | |-- Exploring the Role of E-mail in Investigations [ID: 380] (Total Chunks: 9, Direct Chunks: 9, Images: 0)  
 | | |-- Exploring the Roles of the Client and Server in E-mail [ID: 381] (Total Chunks: 9, Direct Chunks: 9, Images: 0)  
 | | |-- Investigating E-mail Crimes and Violations [ID: 382] (Total Chunks: 54, Direct Chunks: 3, Images: 0)  
 | | | |-- Understanding Forensic Linguistics [ID: 383] (Total Chunks: 6, Direct Chunks: 6, Images: 0)  
 | | | |-- Examining E-mail Messages [ID: 384] (Total Chunks: 14, Direct Chunks: 5, Images: 0)  
 | | | | |-- Copying an E-mail Message [ID: 385] (Total Chunks: 9, Direct Chunks: 9, Images: 0)  
 | | | |-- Viewing E-mail Headers [ID: 386] (Total Chunks: 14, Direct Chunks: 14, Images: 0)  
 | | | |-- Examining E-mail Headers [ID: 387] (Total Chunks: 5, Direct Chunks: 5, Images: 0)  
 | | | |-- Examining Additional E-mail Files [ID: 388] (Total Chunks: 5, Direct Chunks: 5, Images: 0)  
 | | | |-- Tracing an E-mail Message [ID: 389] (Total Chunks: 3, Direct Chunks: 3, Images: 0)  
 | | | |-- Using Network E-mail Logs [ID: 390] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | |-- Understanding E-mail Servers [ID: 391] (Total Chunks: 21, Direct Chunks: 8, Images: 0)  
 | | | |-- Examining UNIX E-mail Server Logs [ID: 392] (Total Chunks: 7, Direct Chunks: 7, Images: 0)  
 | | | |-- Examining Microsoft E-mail Server Logs [ID: 393] (Total Chunks: 6, Direct Chunks: 6, Images: 0)  
 | | |-- Using Specialized E-mail Forensics Tools [ID: 394] (Total Chunks: 59, Direct Chunks: 10, Images: 0)  
 | | | |-- Using Magnet AXIOM to Recover E-mail [ID: 395] (Total Chunks: 20, Direct Chunks: 20, Images: 0)  
 | | | |-- Using a Hex Editor to Carve E-mail Messages [ID: 396] (Total Chunks: 22, Direct Chunks: 22, Images: 0)  
 | | | |-- Recovering Outlook Files [ID: 397] (Total Chunks: 3, Direct Chunks: 3, Images: 0)  
 | | | |-- E-mail Case Studies [ID: 398] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | |-- Applying Digital Forensics Methods to Social Media Communications [ID: 399] (Total Chunks: 28, Direct Chunks: 15, Images: 0)  
 | | | |-- Forensics Tools for Social Media Investigations [ID: 400] (Total Chunks: 13, Direct Chunks: 13, Images: 0)  
 | | |-- Chapter Review [ID: 401] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Chapter Summary [ID: 402] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

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Images: 0)
| | | |-- Key Terms [ID: 403] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | |-- Review Questions [ID: 404] (Total Chunks: 0, Direct Chunks: 0,
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| | | |-- Hands-On Projects [ID: 405] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Case Projects [ID: 406] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| |-- Chapter 12. Mobile Device Forensics and the Internet of Anything [ID:
407] (Total Chunks: 99, Direct Chunks: 0, Images: 0)
| | |-- Chapter Introduction [ID: 408] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Understanding Mobile Device Forensics [ID: 409] (Total Chunks: 36,
Direct Chunks: 6, Images: 0)
| | | |-- Mobile Phone Basics [ID: 410] (Total Chunks: 17, Direct Chunks: 17,
Images: 0)
| | | |-- Inside Mobile Devices [ID: 411] (Total Chunks: 13, Direct Chunks:
7, Images: 0)
| | | | |-- SIM Cards [ID: 412] (Total Chunks: 6, Direct Chunks: 6, Images:
0)
| | | |-- Understanding Acquisition Procedures for Mobile Devices [ID: 413]
(Total Chunks: 45, Direct Chunks: 16, Images: 0)
| | | | |-- Mobile Forensics Equipment [ID: 414] (Total Chunks: 15, Direct
Chunks: 3, Images: 0)
| | | | | |-- SIM Card Readers [ID: 415] (Total Chunks: 2, Direct Chunks: 2,
Images: 0)
| | | | | |-- Mobile Phone Forensics Tools and Methods [ID: 416] (Total
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| | | | |-- Using Mobile Forensics Tools [ID: 417] (Total Chunks: 14, Direct
Chunks: 14, Images: 0)
| | | |-- Understanding Forensics in the Internet of Anything [ID: 418] (Total
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| | |-- Chapter Review [ID: 419] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | |-- Chapter Summary [ID: 420] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Key Terms [ID: 421] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | |-- Review Questions [ID: 422] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Hands-On Projects [ID: 423] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Case Projects [ID: 424] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| |-- Chapter 13. Cloud Forensics [ID: 425] (Total Chunks: 169, Direct Chunks:
0, Images: 0)
| | |-- Chapter Introduction [ID: 426] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- An Overview of Cloud Computing [ID: 427] (Total Chunks: 29, Direct

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Chunks: 1, Images: 0)  
 | | | |-- History of the Cloud [ID: 428] (Total Chunks: 3, Direct Chunks: 3, Images: 0)  
 | | | |-- Cloud Service Levels and Deployment Methods [ID: 429] (Total Chunks: 11, Direct Chunks: 11, Images: 0)  
 | | | |-- Cloud Vendors [ID: 430] (Total Chunks: 7, Direct Chunks: 7, Images: 0)  
 | | | |-- Basic Concepts of Cloud Forensics [ID: 431] (Total Chunks: 7, Direct Chunks: 7, Images: 0)  
 | | |-- Legal Challenges in Cloud Forensics [ID: 432] (Total Chunks: 49, Direct Chunks: 1, Images: 0)  
 | | | |-- Service Level Agreements [ID: 433] (Total Chunks: 10, Direct Chunks: 6, Images: 0)  
 | | | | |-- Policies, Standards, and Guidelines for CSPs [ID: 434] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | | |-- CSP Processes and Procedures [ID: 435] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- Jurisdiction Issues [ID: 436] (Total Chunks: 6, Direct Chunks: 6, Images: 0)  
 | | | |-- Accessing Evidence in the Cloud [ID: 437] (Total Chunks: 32, Direct Chunks: 2, Images: 0)  
 | | | | |-- Search Warrants [ID: 438] (Total Chunks: 15, Direct Chunks: 15, Images: 0)  
 | | | | |-- Subpoenas and Court Orders [ID: 439] (Total Chunks: 15, Direct Chunks: 15, Images: 0)  
 | | |-- Technical Challenges in Cloud Forensics [ID: 440] (Total Chunks: 18, Direct Chunks: 4, Images: 0)  
 | | | |-- Architecture [ID: 441] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- Analysis of Cloud Forensic Data [ID: 442] (Total Chunks: 1, Direct Chunks: 1, Images: 0)  
 | | | |-- Anti-Forensics [ID: 443] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- Incident First Responders [ID: 444] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- Role Management [ID: 445] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- Standards and Training [ID: 446] (Total Chunks: 5, Direct Chunks: 5, Images: 0)  
 | | |-- Acquisitions in the Cloud [ID: 447] (Total Chunks: 14, Direct Chunks: 6, Images: 0)  
 | | | |-- Encryption in the Cloud [ID: 448] (Total Chunks: 8, Direct Chunks: 8, Images: 0)  
 | | |-- Conducting a Cloud Investigation [ID: 449] (Total Chunks: 51, Direct Chunks: 1, Images: 0)  
 | | | |-- Investigating CSPs [ID: 450] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | | |-- Investigating Cloud Customers [ID: 451] (Total Chunks: 2, Direct

Chunks: 2, Images: 0)  
 | | | |-- Understanding Prefetch Files [ID: 452] (Total Chunks: 3, Direct  
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 | | | |-- Examining Stored Cloud Data on a PC [ID: 453] (Total Chunks: 23,  
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 | | | | |-- Dropbox [ID: 454] (Total Chunks: 3, Direct Chunks: 3, Images: 0)  
 | | | | |-- Google Drive [ID: 455] (Total Chunks: 7, Direct Chunks: 7,  
 Images: 0)  
 | | | | |-- OneDrive [ID: 456] (Total Chunks: 9, Direct Chunks: 9, Images:  
 0)  
 | | | |-- Windows Prefetch Artifacts [ID: 457] (Total Chunks: 18, Direct  
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 | | |-- Tools for Cloud Forensics [ID: 458] (Total Chunks: 8, Direct Chunks:  
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 | | | |-- Forensic Open-Stack Tools [ID: 459] (Total Chunks: 3, Direct  
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 | | | |-- F-Response for the Cloud [ID: 460] (Total Chunks: 1, Direct Chunks:  
 1, Images: 0)  
 | | | |-- Magnet AXIOM Cloud [ID: 461] (Total Chunks: 2, Direct Chunks: 2,  
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 | | |-- Chapter Review [ID: 462] (Total Chunks: 0, Direct Chunks: 0, Images:  
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 | | | |-- Chapter Summary [ID: 463] (Total Chunks: 0, Direct Chunks: 0,  
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 | | | |-- Key Terms [ID: 464] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Review Questions [ID: 465] (Total Chunks: 0, Direct Chunks: 0,  
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 | | | |-- Hands-On Projects [ID: 466] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Case Projects [ID: 467] (Total Chunks: 0, Direct Chunks: 0, Images:  
 0)  
 | |-- Chapter 14. Report Writing for High-Tech Investigations [ID: 468] (Total  
 Chunks: 95, Direct Chunks: 0, Images: 0)  
 | | |-- Chapter Introduction [ID: 469] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | |-- Understanding the Importance of Reports [ID: 470] (Total Chunks: 21,  
 Direct Chunks: 13, Images: 0)  
 | | | |-- Limiting a Report to Specifics [ID: 471] (Total Chunks: 2, Direct  
 Chunks: 2, Images: 0)  
 | | | |-- Types of Reports [ID: 472] (Total Chunks: 6, Direct Chunks: 6,  
 Images: 0)  
 | | |-- Guidelines for Writing Reports [ID: 473] (Total Chunks: 48, Direct  
 Chunks: 9, Images: 0)  
 | | | |-- What to Include in Written Preliminary Reports [ID: 474] (Total  
 Chunks: 6, Direct Chunks: 6, Images: 0)  
 | | | |-- Report Structure [ID: 475] (Total Chunks: 2, Direct Chunks: 2,  
 Images: 0)  
 | | | |-- Writing Reports Clearly [ID: 476] (Total Chunks: 10, Direct Chunks:



4, Images: 0)

- | | | | |-- Considering Writing Style [ID: 477] (Total Chunks: 3, Direct Chunks: 3, Images: 0)
- | | | | |-- Including Signposts [ID: 478] (Total Chunks: 3, Direct Chunks: 3, Images: 0)
- | | | |-- Designing the Layout and Presentation of Reports [ID: 479] (Total Chunks: 21, Direct Chunks: 6, Images: 0)
- | | | | |-- Providing Supporting Material [ID: 480] (Total Chunks: 1, Direct Chunks: 1, Images: 0)
- | | | | |-- Formatting Consistently [ID: 481] (Total Chunks: 1, Direct Chunks: 1, Images: 0)
- | | | | |-- Explaining Examination and Data Collection Methods [ID: 482] (Total Chunks: 2, Direct Chunks: 2, Images: 0)
- | | | | |-- Including Calculations [ID: 483] (Total Chunks: 1, Direct Chunks: 1, Images: 0)
- | | | | |-- Providing for Uncertainty and Error Analysis [ID: 484] (Total Chunks: 1, Direct Chunks: 1, Images: 0)
- | | | | |-- Explaining Results and Conclusions [ID: 485] (Total Chunks: 2, Direct Chunks: 2, Images: 0)
- | | | | |-- Providing References [ID: 486] (Total Chunks: 4, Direct Chunks: 4, Images: 0)
- | | | | |-- Including Appendixes [ID: 487] (Total Chunks: 3, Direct Chunks: 3, Images: 0)
- | | |-- Generating Report Findings with Forensics Software Tools [ID: 488] (Total Chunks: 26, Direct Chunks: 1, Images: 0)
- | | | |-- Using Autopsy to Generate Reports [ID: 489] (Total Chunks: 25, Direct Chunks: 25, Images: 0)
- | | |-- Chapter Review [ID: 490] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Chapter Summary [ID: 491] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Key Terms [ID: 492] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Review Questions [ID: 493] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Hands-On Projects [ID: 494] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Case Projects [ID: 495] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | |-- Chapter 15. Expert Testimony in Digital Investigations [ID: 496] (Total Chunks: 153, Direct Chunks: 0, Images: 0)
- | | |-- Chapter Introduction [ID: 497] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Preparing for Testimony [ID: 498] (Total Chunks: 31, Direct Chunks: 7, Images: 0)
- | | | |-- Documenting and Preparing Evidence [ID: 499] (Total Chunks: 11, Direct Chunks: 11, Images: 0)
- | | | |-- Reviewing Your Role as a Consulting Expert or an Expert Witness [ID: 500] (Total Chunks: 3, Direct Chunks: 3, Images: 0)

| | | |-- Creating and Maintaining Your CV [ID: 501] (Total Chunks: 3, Direct Chunks: 3, Images: 0)

| | | |-- Preparing Technical Definitions [ID: 502] (Total Chunks: 2, Direct Chunks: 2, Images: 0)

| | | |-- Preparing to Deal with the News Media [ID: 503] (Total Chunks: 5, Direct Chunks: 5, Images: 0)

| | |-- Testifying in Court [ID: 504] (Total Chunks: 71, Direct Chunks: 1, Images: 0)

| | | |-- Understanding the Trial Process [ID: 505] (Total Chunks: 5, Direct Chunks: 5, Images: 0)

| | | |-- Providing Qualifications for Your Testimony [ID: 506] (Total Chunks: 14, Direct Chunks: 14, Images: 0)

| | | |-- General Guidelines on Testifying [ID: 507] (Total Chunks: 28, Direct Chunks: 15, Images: 0)

| | | | |-- Using Graphics During Testimony [ID: 508] (Total Chunks: 5, Direct Chunks: 5, Images: 0)

| | | | |-- Avoiding Testimony Problems [ID: 509] (Total Chunks: 6, Direct Chunks: 6, Images: 0)

| | | | |-- Understanding Prosecutorial Misconduct [ID: 510] (Total Chunks: 2, Direct Chunks: 2, Images: 0)

| | | |-- Testifying During Direct Examination [ID: 511] (Total Chunks: 5, Direct Chunks: 5, Images: 0)

| | | |-- Testifying During Cross-Examination [ID: 512] (Total Chunks: 18, Direct Chunks: 18, Images: 0)

| | |-- Preparing for a Deposition or Hearing [ID: 513] (Total Chunks: 25, Direct Chunks: 6, Images: 0)

| | | |-- Guidelines for Testifying at Depositions [ID: 514] (Total Chunks: 14, Direct Chunks: 5, Images: 0)

| | | | |-- Recognizing Deposition Problems [ID: 515] (Total Chunks: 9, Direct Chunks: 9, Images: 0)

| | | |-- Guidelines for Testifying at Hearings [ID: 516] (Total Chunks: 5, Direct Chunks: 5, Images: 0)

| | |-- Preparing Forensics Evidence for Testimony [ID: 517] (Total Chunks: 26, Direct Chunks: 18, Images: 0)

| | | |-- Preparing a Defense of Your Evidence-Collection Methods [ID: 518] (Total Chunks: 8, Direct Chunks: 8, Images: 0)

| | |-- Chapter Review [ID: 519] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Chapter Summary [ID: 520] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Key Terms [ID: 521] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Review Questions [ID: 522] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Hands-On Projects [ID: 523] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Case Projects [ID: 524] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| |-- Chapter 16. Ethics for the Expert Witness [ID: 525] (Total Chunks: 1759,

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 | | |-- Chapter Introduction [ID: 526] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | |-- Applying Ethics and Codes to Expert Witnesses [ID: 527] (Total Chunks: 36, Direct Chunks: 10, Images: 0)  
 | | | |-- Forensics Examiners' Roles in Testifying [ID: 528] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | | |-- Considerations in Disqualification [ID: 529] (Total Chunks: 12, Direct Chunks: 12, Images: 0)  
 | | | |-- Traps for Unwary Experts [ID: 530] (Total Chunks: 6, Direct Chunks: 6, Images: 0)  
 | | | |-- Determining Admissibility of Evidence [ID: 531] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | |-- Organizations with Codes of Ethics [ID: 532] (Total Chunks: 15, Direct Chunks: 1, Images: 0)  
 | | | |-- International Society of Forensic Computer Examiners [ID: 533] (Total Chunks: 3, Direct Chunks: 3, Images: 0)  
 | | | |-- International High Technology Crime Investigation Association [ID: 534] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- International Association of Computer Investigative Specialists [ID: 535] (Total Chunks: 5, Direct Chunks: 5, Images: 0)  
 | | | |-- American Bar Association [ID: 536] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | | |-- American Psychological Association [ID: 537] (Total Chunks: 2, Direct Chunks: 2, Images: 0)  
 | | |-- Ethical Difficulties in Expert Testimony [ID: 538] (Total Chunks: 17, Direct Chunks: 5, Images: 0)  
 | | | |-- Ethical Responsibilities Owed to You [ID: 539] (Total Chunks: 8, Direct Chunks: 8, Images: 0)  
 | | | |-- Standard Forensics Tools and Tools You Create [ID: 540] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | |-- An Ethics Exercise [ID: 541] (Total Chunks: 106, Direct Chunks: 2, Images: 0)  
 | | | |-- Performing a cursory Exam of a Forensic Image [ID: 542] (Total Chunks: 12, Direct Chunks: 12, Images: 0)  
 | | | |-- Performing a Detailed Exam of a Forensic Image [ID: 543] (Total Chunks: 27, Direct Chunks: 27, Images: 0)  
 | | | |-- Performing the Exam [ID: 544] (Total Chunks: 20, Direct Chunks: 1, Images: 0)  
 | | | | |-- Preparing for an Examination [ID: 545] (Total Chunks: 19, Direct Chunks: 19, Images: 0)  
 | | | |-- Interpreting Attribute 0x80 Data Runs [ID: 546] (Total Chunks: 30, Direct Chunks: 1, Images: 0)  
 | | | | |-- Finding Attribute 0x80 an MFT Record [ID: 547] (Total Chunks: 15, Direct Chunks: 15, Images: 0)  
 | | | | |-- Configuring Data Interpreter Options in WinHex [ID: 548] (Total Chunks: 4, Direct Chunks: 4, Images: 0)  
 | | | | |-- Calculating Data Runs [ID: 549] (Total Chunks: 10, Direct

Chunks: 10, Images: 0)  
 | | | |-- Carving Data Run Clusters Manually [ID: 550] (Total Chunks: 15,  
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 | | | |-- Chapter Review [ID: 551] (Total Chunks: 1585, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Chapter Summary [ID: 552] (Total Chunks: 166, Direct Chunks: 166,  
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 | | | |-- Key Terms [ID: 553] (Total Chunks: 72, Direct Chunks: 72, Images:  
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 | | | |-- Review Questions [ID: 554] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Hands-On Projects [ID: 555] (Total Chunks: 1190, Direct Chunks:  
 1190, Images: 0)  
 | | | |-- Case Projects [ID: 556] (Total Chunks: 157, Direct Chunks: 157,  
 Images: 0)  
 | |-- Lab Manual for Guide to Computer Forensics and Investigations [ID: 557]  
 (Total Chunks: 2192, Direct Chunks: 0, Images: 0)  
 | | |-- Introduction [ID: 558] (Total Chunks: 51, Direct Chunks: 51, Images:  
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 | | |-- Chapter 1. Understanding the Digital Forensics Profession and  
 Investigations [ID: 559] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Chapter Introduction [ID: 560] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Lab 1.1. Installing Autopsy for Windows [ID: 561] (Total Chunks: 0,  
 Direct Chunks: 0, Images: 0)  
 | | | | |-- Objectives [ID: 562] (Total Chunks: 0, Direct Chunks: 0, Images:  
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 | | | | | |-- Materials Required [ID: 563] (Total Chunks: 0, Direct Chunks:  
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 | | | | | |-- Activity [ID: 564] (Total Chunks: 0, Direct Chunks: 0, Images:  
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 | | | | | |-- Review Questions [ID: 565] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Lab 1.2. Downloading FTK Imager Lite [ID: 566] (Total Chunks: 0,  
 Direct Chunks: 0, Images: 0)  
 | | | | |-- Objectives [ID: 567] (Total Chunks: 0, Direct Chunks: 0, Images:  
 0)  
 | | | | | |-- Materials Required [ID: 568] (Total Chunks: 0, Direct Chunks:  
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 | | | | | |-- Activity [ID: 569] (Total Chunks: 0, Direct Chunks: 0, Images:  
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 | | | | | |-- Review Questions [ID: 570] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Lab 1.3. Downloading WinHex [ID: 571] (Total Chunks: 0, Direct  
 Chunks: 0, Images: 0)  
 | | | | |-- Objectives [ID: 572] (Total Chunks: 0, Direct Chunks: 0, Images:  
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 | | | | | |-- Materials Required [ID: 573] (Total Chunks: 0, Direct Chunks:

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0, Images: 0)
| | | | |-- Activity [ID: 574] (Total Chunks: 0, Direct Chunks: 0, Images:
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| | | | |-- Review Questions [ID: 575] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 1.4. Using Autopsy for Windows [ID: 576] (Total Chunks: 0,
Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 577] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 578] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 579] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 580] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Chapter 2. The Investigator's Office and Laboratory [ID: 581] (Total
Chunks: 0, Direct Chunks: 0, Images: 0)
| | | |-- Chapter Introduction [ID: 582] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 2.1. Wiping a USB Drive Securely [ID: 583] (Total Chunks: 0,
Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 584] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 585] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 586] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 587] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 2.2. Using Directory Snoop to Image a USB Drive [ID: 588]
(Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 589] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 590] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 591] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 592] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 2.3. Converting a Raw Image to an .E01 Image [ID: 593] (Total
Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 594] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 595] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 596] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 597] (Total Chunks: 0, Direct Chunks: 0,

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Images: 0)
| | | |-- Lab 2.4. Imaging Evidence with FTK Imager Lite [ID: 598] (Total
Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 599] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 600] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 601] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 602] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 2.5. Viewing Images in FTK Imager Lite [ID: 603] (Total Chunks:
0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 604] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 605] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 606] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 607] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Chapter 3. Data Acquisition [ID: 608] (Total Chunks: 57, Direct
Chunks: 0, Images: 0)
| | | |-- Chapter Introduction [ID: 609] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 3.1. Creating a DEFT Zero Forensic Boot CD and USB Drive [ID:
610] (Total Chunks: 57, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 611] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 612] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 613] (Total Chunks: 57, Direct Chunks: 0, Images:
0)
| | | | | |-- Creating a DEFT Zero Boot CD [ID: 614] (Total Chunks: 6,
Direct Chunks: 6, Images: 0)
| | | | | |-- Creating a Bootable USB DEFT Zero Drive [ID: 615] (Total
Chunks: 14, Direct Chunks: 14, Images: 0)
| | | | | |-- Learning DEFT Zero Features [ID: 616] (Total Chunks: 37,
Direct Chunks: 37, Images: 0)
| | | | |-- Review Questions [ID: 617] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 3.2. Examining a FAT Image [ID: 618] (Total Chunks: 0, Direct
Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 619] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 620] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 621] (Total Chunks: 0, Direct Chunks: 0, Images:

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0)
| | | | |-- Review Questions [ID: 622] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 3.3. Examining an NTFS Image [ID: 623] (Total Chunks: 0, Direct
Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 624] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 625] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 626] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 627] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 3.4. Examining an HFS+ Image [ID: 628] (Total Chunks: 0, Direct
Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 629] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 630] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 631] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 632] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Chapter 4. Processing Crime and Incident Scenes [ID: 633] (Total
Chunks: 34, Direct Chunks: 0, Images: 0)
| | | |-- Chapter Introduction [ID: 634] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 4.1. Creating a Mini-WinFE Boot CD [ID: 635] (Total Chunks: 34,
Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 636] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 637] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 638] (Total Chunks: 34, Direct Chunks: 0, Images:
0)
| | | | | |-- Setting Up Mini-WinFE [ID: 639] (Total Chunks: 8, Direct
Chunks: 8, Images: 0)
| | | | | |-- Creating a Mini-WinFE ISO Image [ID: 640] (Total Chunks: 26,
Direct Chunks: 26, Images: 0)
| | | | |-- Review Questions [ID: 641] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 4.2. Using Mini-WinFE to Boot and Image a Windows Computer [ID:
642] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 643] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 644] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 645] (Total Chunks: 0, Direct Chunks: 0, Images:

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0)
| | | | |-- Review Questions [ID: 646] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 4.3. Testing the Mini-WinFE Write-Protection Feature [ID: 647]
(Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 648] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 649] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 650] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Review Questions [ID: 651] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 4.4. Creating an Image with Guymager [ID: 652] (Total Chunks:
0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 653] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 654] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 655] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Review Questions [ID: 656] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Chapter 5. Working with Windows and CLI Systems [ID: 657] (Total
Chunks: 0, Direct Chunks: 0, Images: 0)
| | | |-- Chapter Introduction [ID: 658] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 5.1. Using DART to Export Windows Registry Files [ID: 659]
(Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 660] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 661] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | | |-- Activity [ID: 662] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Review Questions [ID: 663] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 5.2. Examining the SAM Hive [ID: 664] (Total Chunks: 0, Direct
Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 665] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 666] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | | |-- Activity [ID: 667] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Review Questions [ID: 668] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 5.3. Examining the SYSTEM Hive [ID: 669] (Total Chunks: 0,

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Direct Chunks: 0, Images: 0)  
 | | | | |-- Objectives [ID: 670] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | | |-- Materials Required [ID: 671] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | |-- Activity [ID: 672] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | |-- Review Questions [ID: 673] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Lab 5.4. Examining the ntuser.dat Registry File [ID: 674] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | |-- Objectives [ID: 675] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | | |-- Materials Required [ID: 676] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | |-- Activity [ID: 677] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | |-- Review Questions [ID: 678] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | |-- Chapter 6. Current Digital Forensics Tools [ID: 679] (Total Chunks: 70, Direct Chunks: 0, Images: 0)  
 | | | |-- Chapter Introduction [ID: 680] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Lab 6.1. Using Autopsy 4.7.0 to Search an Image File [ID: 681] (Total Chunks: 31, Direct Chunks: 0, Images: 0)  
 | | | | |-- Objectives [ID: 682] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | | |-- Materials Required [ID: 683] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | |-- Activity [ID: 684] (Total Chunks: 31, Direct Chunks: 0, Images: 0)  
 | | | | | |-- Installing Autopsy 4.7.0 [ID: 685] (Total Chunks: 5, Direct Chunks: 5, Images: 0)  
 | | | | | |-- Searching E-mail in Autopsy 4.7.0 [ID: 686] (Total Chunks: 26, Direct Chunks: 26, Images: 0)  
 | | | | |-- Review Questions [ID: 687] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Lab 6.2. Using OSForensics to Search an Image of a Hard Drive [ID: 688] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | |-- Objectives [ID: 689] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | | |-- Materials Required [ID: 690] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | |-- Activity [ID: 691] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | |-- Review Questions [ID: 692] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Lab 6.3. Examining a Corrupt Image File with FTK Imager Lite,

Autopsy, and WinHex [ID: 693] (Total Chunks: 39, Direct Chunks: 0, Images: 0)

- | | | | |-- Objectives [ID: 694] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | | |-- Materials Required [ID: 695] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Activity [ID: 696] (Total Chunks: 39, Direct Chunks: 0, Images: 0)
- | | | | | |-- Testing an Image File in Autopsy 4.3.0 [ID: 697] (Total Chunks: 12, Direct Chunks: 12, Images: 0)
- | | | | | |-- Examining Image Files in WinHex [ID: 698] (Total Chunks: 27, Direct Chunks: 27, Images: 0)
- | | | | |-- Review Questions [ID: 699] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | |-- Chapter 7. Linux and Macintosh File Systems [ID: 700] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Chapter Introduction [ID: 701] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Lab 7.1. Using Autopsy to Process a Mac OS X Image [ID: 702] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Objectives [ID: 703] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | | |-- Materials Required [ID: 704] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Activity [ID: 705] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Review Questions [ID: 706] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Lab 7.2. Using Autopsy to Process a Mac OS 9 Image [ID: 707] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Objectives [ID: 708] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | | |-- Materials Required [ID: 709] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Activity [ID: 710] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Review Questions [ID: 711] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Lab 7.3. Using Autopsy to Process a Linux Image [ID: 712] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Objectives [ID: 713] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | | |-- Materials Required [ID: 714] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Activity [ID: 715] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Review Questions [ID: 716] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | |-- Chapter 8. Recovering Graphics Files [ID: 717] (Total Chunks: 0,

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Direct Chunks: 0, Images: 0)
| | | |-- Chapter Introduction [ID: 718] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 8.1. Using Autopsy to Analyze Multimedia Files [ID: 719] (Total
Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 720] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 721] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 722] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 723] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 8.2. Using OSForensics to Analyze Multimedia Files [ID: 724]
(Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 725] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 726] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 727] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 728] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 8.3. Using WinHex to Analyze Multimedia Files [ID: 729] (Total
Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 730] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 731] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 732] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 733] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Chapter 9. Digital Forensics Analysis and Validation [ID: 734] (Total
Chunks: 1, Direct Chunks: 0, Images: 0)
| | | |-- Chapter Introduction [ID: 735] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | | |-- Lab 9.1. Using Autopsy to Search for Keywords in an Image [ID: 736]
(Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | | |-- Objectives [ID: 737] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 738] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | | |-- Activity [ID: 739] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Review Questions [ID: 740] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 9.2. Validating File Hash Values with FTK Imager Lite [ID: 741]

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(Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 742] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 743] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 744] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 745] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 9.3. Validating File Hash Values with WinHex [ID: 746] (Total
Chunks: 1, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 747] (Total Chunks: 1, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required: [ID: 748] (Total Chunks: 1, Direct
Chunks: 1, Images: 0)
| | | | |-- Activity [ID: 749] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | |-- Review Questions [ID: 750] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network
Forensics [ID: 751] (Total Chunks: 143, Direct Chunks: 0, Images: 0)
| | | |-- Chapter Introduction [ID: 752] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 10.1. Analyzing a Forensic Image Hosting a Virtual Machine [ID:
753] (Total Chunks: 49, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 754] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 755] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 756] (Total Chunks: 49, Direct Chunks: 0, Images:
0)
| | | | | |-- Installing MD5 Hashes in Autopsy [ID: 757] (Total Chunks: 7,
Direct Chunks: 7, Images: 0)
| | | | | |-- Analyzing a Windows Image Containing a Virtual Machine [ID:
758] (Total Chunks: 42, Direct Chunks: 42, Images: 0)
| | | | |-- Review Questions [ID: 759] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 10.2. Conducting a Live Acquisition [ID: 760] (Total Chunks:
47, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 761] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 762] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | |-- Activity [ID: 763] (Total Chunks: 47, Direct Chunks: 0, Images:
0)
| | | | | |-- Installing Tools for Live Acquisitions [ID: 764] (Total
Chunks: 14, Direct Chunks: 14, Images: 0)
| | | | | |-- Exploring Tools for Live Acquisitions [ID: 765] (Total

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Chunks: 21, Direct Chunks: 21, Images: 0)  
 | | | | | |-- Capturing Data in a Live Acquisition [ID: 766] (Total Chunks:  
 12, Direct Chunks: 12, Images: 0)  
 | | | | | |-- Review Questions [ID: 767] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Lab 10.3. Using Kali Linux for Network Forensics [ID: 768] (Total  
 Chunks: 47, Direct Chunks: 0, Images: 0)  
 | | | | | |-- Objectives [ID: 769] (Total Chunks: 0, Direct Chunks: 0, Images:  
 0)  
 | | | | | |-- Materials Required [ID: 770] (Total Chunks: 0, Direct Chunks:  
 0, Images: 0)  
 | | | | | |-- Activity [ID: 771] (Total Chunks: 47, Direct Chunks: 0, Images:  
 0)  
 | | | | | |-- Installing Kali Linux [ID: 772] (Total Chunks: 24, Direct  
 Chunks: 24, Images: 0)  
 | | | | | |-- Mounting Drives in Kali Linux [ID: 773] (Total Chunks: 12,  
 Direct Chunks: 12, Images: 0)  
 | | | | | |-- Identifying Open Ports and Making a Screen Capture [ID: 774]  
 (Total Chunks: 11, Direct Chunks: 11, Images: 0)  
 | | | | | |-- Review Questions [ID: 775] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | |-- Chapter 11. E-mail and Social Media Investigations [ID: 776] (Total  
 Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | |-- Chapter Introduction [ID: 777] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Lab 11.1. Using OSForensics to Search for E-mails and Mailboxes  
 [ID: 778] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | | |-- Objectives [ID: 779] (Total Chunks: 0, Direct Chunks: 0, Images:  
 0)  
 | | | | | |-- Materials Required [ID: 780] (Total Chunks: 0, Direct Chunks:  
 0, Images: 0)  
 | | | | | |-- Activity [ID: 781] (Total Chunks: 0, Direct Chunks: 0, Images:  
 0)  
 | | | | | |-- Review Questions [ID: 782] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Lab 11.2. Using Autopsy to Search for E-mails and Mailboxes [ID:  
 783] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | | |-- Objectives [ID: 784] (Total Chunks: 0, Direct Chunks: 0, Images:  
 0)  
 | | | | | |-- Materials Required [ID: 785] (Total Chunks: 0, Direct Chunks:  
 0, Images: 0)  
 | | | | | |-- Activity [ID: 786] (Total Chunks: 0, Direct Chunks: 0, Images:  
 0)  
 | | | | | |-- Review Questions [ID: 787] (Total Chunks: 0, Direct Chunks: 0,  
 Images: 0)  
 | | | |-- Lab 11.3. Finding Google Searches and Multiple E-mail Accounts [ID:  
 788] (Total Chunks: 0, Direct Chunks: 0, Images: 0)  
 | | | | | |-- Objectives [ID: 789] (Total Chunks: 0, Direct Chunks: 0, Images:

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0)
| | | | | |-- Materials Required [ID: 790] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | | |-- Activity [ID: 791] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Review Questions [ID: 792] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | |-- Chapter 12. Mobile Device Forensics [ID: 793] (Total Chunks: 0, Direct
Chunks: 0, Images: 0)
| | | |-- Chapter Introduction [ID: 794] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 12.1. Examining Cell Phone Storage Devices [ID: 795] (Total
Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 796] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 797] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | | |-- Activity [ID: 798] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Review Questions [ID: 799] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 12.2. Using FTK Imager Lite to View Text Messages, Phone
Numbers, and Photos [ID: 800] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 801] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Materials Required [ID: 802] (Total Chunks: 0, Direct Chunks:
0, Images: 0)
| | | | | |-- Activity [ID: 803] (Total Chunks: 0, Direct Chunks: 0, Images:
0)
| | | | | |-- Review Questions [ID: 804] (Total Chunks: 0, Direct Chunks: 0,
Images: 0)
| | | |-- Lab 12.3. Using Autopsy to Search Cloud Backups of Mobile Devices
[ID: 805] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 806] (Total Chunks: 0, Direct Chunks: 0, Images:
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| | | | | |-- Materials Required [ID: 807] (Total Chunks: 0, Direct Chunks:
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| | | | | |-- Activity [ID: 808] (Total Chunks: 0, Direct Chunks: 0, Images:
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| | | | | |-- Review Questions [ID: 809] (Total Chunks: 0, Direct Chunks: 0,
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| | | |-- Chapter Introduction [ID: 811] (Total Chunks: 0, Direct Chunks: 0,
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| | | | |-- Objectives [ID: 813] (Total Chunks: 0, Direct Chunks: 0, Images:

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| | | | | |-- Materials Required [ID: 814] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | | | |-- Activity [ID: 815] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | | | |-- Review Questions [ID: 816] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Lab 13.2. Examining Google Drive Cloud Storage [ID: 817] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | | | |-- Objectives [ID: 818] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

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| | | | | |-- Activity [ID: 820] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | | | |-- Review Questions [ID: 821] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | |-- Lab 13.3. Examining OneDrive Cloud Storage [ID: 822] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | | | |-- Objectives [ID: 823] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

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| | | | | |-- Review Questions [ID: 826] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

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| | | |-- Lab 14.2. Adding Evidence to a Case [ID: 834] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

| | | | | |-- Objectives [ID: 835] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

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| | | | | |-- Activity [ID: 837] (Total Chunks: 0, Direct Chunks: 0, Images: 0)

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- | | | | |-- Review Questions [ID: 838] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Lab 14.3. Preparing a Report [ID: 839] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Objectives [ID: 840] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
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- | | | | |-- Activity [ID: 842] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Review Questions [ID: 843] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | |-- Chapter 15. Expert Testimony in Digital Investigations [ID: 844] (Total Chunks: 46, Direct Chunks: 0, Images: 0)
- | | | |-- Chapter Introduction [ID: 845] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Lab 15.1. Conducting a Preliminary Investigation [ID: 846] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Objectives [ID: 847] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
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- | | | | |-- Review Questions [ID: 855] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | |-- Lab 15.3. Recovering a Password from Password-Protected Files [ID: 856] (Total Chunks: 46, Direct Chunks: 0, Images: 0)
- | | | | |-- Objectives [ID: 857] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | | |-- Materials Required [ID: 858] (Total Chunks: 0, Direct Chunks: 0, Images: 0)
- | | | | |-- Activity [ID: 859] (Total Chunks: 46, Direct Chunks: 0, Images: 0)
- | | | | | |-- Verifying the Existence of a Warning Banner [ID: 860] (Total Chunks: 10, Direct Chunks: 10, Images: 0)
- | | | | | |-- Recovering a Password from Password-Protected Files [ID: 861]



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(Total Chunks: 36, Direct Chunks: 36, Images: 0)
| | | | |-- Review Questions [ID: 862] (Total Chunks: 0, Direct Chunks: 0,
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| | |-- Chapter 16. Ethics for the Expert Witness [ID: 863] (Total Chunks:
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(Total Chunks: 1759, Direct Chunks: 0, Images: 0)
| | | | |-- Objectives [ID: 866] (Total Chunks: 186, Direct Chunks: 121,
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| | | | | |-- Materials Required [ID: 867] (Total Chunks: 65, Direct
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| | | | |-- Activity [ID: 868] (Total Chunks: 946, Direct Chunks: 885,
Images: 0)
| | | | | |-- Creating a Duplicate Forensic Image [ID: 869] (Total Chunks:
10, Direct Chunks: 10, Images: 0)
| | | | | |-- Determining the Offset Byte Address of the Corrupt MFT Record
[ID: 870] (Total Chunks: 14, Direct Chunks: 14, Images: 0)
| | | | | |-- Copying the Corrected MFT Record [ID: 871] (Total Chunks: 18,
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| | | | | |-- Extracting Additional Evidence [ID: 872] (Total Chunks: 19,
Direct Chunks: 19, Images: 0)
| | | | |-- Review Questions [ID: 873] (Total Chunks: 627, Direct Chunks:
627, Images: 0)
| |-- Appendix A. Certification Test References [ID: 874] (Total Chunks: 0,
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| |-- Appendix B. Digital Forensics References [ID: 875] (Total Chunks: 0,
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| |-- Appendix C. Digital Forensics Lab Considerations [ID: 876] (Total Chunks:
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| |-- Appendix D. Legacy File System and Forensics Tools [ID: 877] (Total
Chunks: 1, Direct Chunks: 1, Images: 0)

```

---

### Diagnostic Summary

---

```

Total Chunks in DB: 6636
Total Unique Images in DB: 0

```

---

### Diagnostic Complete

---

[17]: *# Cell 6: Verify Content Retrieval for a Specific toc\_id*

```
import os
```

```

import json
import logging
from langchain_chroma import Chroma
from langchain_ollama.embeddings import OllamaEmbeddings

# --- Logger Setup ---
logger = logging.getLogger(__name__)
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s - %
↳%(message)s')

def retrieve_and_print_chunks_for_toc_id(vector_store: Chroma, toc_id: int):
    """
    Retrieves all chunks for a specific toc_id and prints their content and
    ↳metadata.
    """
    print("=" * 80)
    print(f"Retrieving all chunks for toc_id: {toc_id}")
    print("=" * 80)

    try:
        # Use the 'get' method with a 'where' filter to find exact matches
        results = vector_store.get(
            where={"toc_id": toc_id},
            include=["documents", "metadatas"]
        )

        if not results or not results.get('ids'):
            logger.warning(f"No chunks found in the database for toc_id =
↳{toc_id}")
            return

        documents = results['documents']
        metadatas = results['metadatas']

        logger.info(f"Successfully retrieved {len(documents)} chunks for toc_id
↳= {toc_id}.")

        # Sort chunks by their chunk_id to ensure they are in order
        sorted_items = sorted(zip(documents, metadatas), key=lambda item:
↳item[1].get('chunk_id', 0))

        for i, (doc, meta) in enumerate(sorted_items):
            print(f"\n--- Chunk {i+1} / {len(documents)} (chunk_id: {meta.
↳get('chunk_id', 'N/A')}) ---")
            print(f"Content: {doc}")
            print(f"Metadata: {json.dumps(meta, indent=2)}")

```

```

        print("\n" + "=" * 80)
        print("Retrieval test complete.")
        print("=" * 80)

    except Exception as e:
        logger.error(f"An error occurred during retrieval: {e}", exc_info=True)

# =====
# EXECUTION BLOCK
# =====

# --- IMPORTANT: Set the ID you want to test here ---
TOC_ID_TO_TEST = 7 # Example: Testing "An Overview of Digital Forensics"

# Check if the database directory exists
if 'CHROMA_PERSIST_DIR' in locals() and os.path.exists(CHROMA_PERSIST_DIR):
    logger.info("Connecting to the existing vector database...")

    # Re-create the vector_store object to connect to the DB
    vector_store = Chroma(
        persist_directory=CHROMA_PERSIST_DIR,
        embedding_function=OllamaEmbeddings(model=EMBEDDING_MODEL_OLLAMA),
        collection_name=CHROMA_COLLECTION_NAME
    )

    # Run the test
    retrieve_and_print_chunks_for_toc_id(vector_store, TOC_ID_TO_TEST)

else:
    logger.error("Database directory not found. Please run Cell 5 to create the_
↳ database first.")

```

```

2025-07-05 13:10:52,119 - INFO - Connecting to the existing vector database...
2025-07-05 13:10:52,131 - INFO - Successfully retrieved 21 chunks for toc_id =
7.

```

```

=====
Retrieving all chunks for toc_id: 7
=====

```

```

--- Chunk 1 / 21 (chunk_id: 1) ---
Content: Chapter 1. Understanding the Digital Forensics Profession and
InvestigationsChapter IntroductionAn Overview of Digital ForensicsDigital
Forensics and Other Related DisciplinesA Brief History of Digital
ForensicsUnderstanding Case LawDeveloping Digital Forensics ResourcesPreparing
for Digital InvestigationsUnderstanding Law Enforcement Agency
InvestigationsFollowing Legal ProcessesUnderstanding Private-Sector

```

InvestigationsEstablishing Company PoliciesDisplaying Warning BannersDesignating  
an Authorized RequesterConducting Security InvestigationsDistinguishing Personal  
and Company PropertyMaintaining Professional ConductPreparing a Digital  
Forensics InvestigationAn Overview of a Computer CrimeAn Overview of a Company  
Policy ViolationTaking a Systematic ApproachAssessing the CasePlanning Your

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--- Chunk 2 / 21 (chunk\_id: 2) ---

Content: Overview of a Company Policy ViolationTaking a Systematic  
ApproachAssessing the CasePlanning Your InvestigationSecuring Your  
EvidenceProcedures for Private-Sector High-Tech InvestigationsEmployee  
Termination CasesInternet Abuse InvestigationsE-mail Abuse  
InvestigationsAttorney-Client Privilege InvestigationsIndustrial Espionage  
InvestigationsInterviews and Interrogations in High-Tech  
InvestigationsUnderstanding Data Recovery Workstations and SoftwareSetting Up  
Your Workstation for Digital ForensicsConducting an InvestigationGathering the  
EvidenceUnderstanding Bit-stream CopiesAcquiring an Image of Evidence  
MediaAnalyzing Your Digital EvidenceSome Additional Features of  
AutopsyCompleting the CaseAutopsy's Report GeneratorCritiquing the CaseChapter  
ReviewChapter SummaryKey TermsReview

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Learning (2018).epub",  
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--- Chunk 3 / 21 (chunk\_id: 3) ---

Content: the CaseAutopsy's Report GeneratorCritiquing the CaseChapter  
ReviewChapter SummaryKey TermsReview QuestionsHands-On ProjectsCase Projects

```
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--- Chunk 4 / 21 (chunk\_id: 299) ---

Content: The team would like to thank the entire editorial and production staff for their dedication and fortitude during this project, including Natalie Underdonk, Learning Designer, and Brooke Greenhouse, Senior Content Manager. Our special thanks go to Lisa Lord, the development editor. We also appreciate the careful reading and thoughtful suggestions of the technical editor, Danielle Shaw. We would like to thank the reviewers: Henry Felch, University of Maine, Augusta; Eddie Horton, Northeastern State University; Todd Koonts, Central Piedmont Community College; and Tenette Prevatte, Fayetteville Technical Community College. We would also like to thank our colleagues in professional groups in Washington State and Mike Lacey for his photos.

Bill Nelson

```
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```

--- Chunk 5 / 21 (chunk\_id: 300) ---

Content: Bill Nelson

I want to express my appreciation to my wife, Tricia, for her support during the long hours spent writing. I would also like to express appreciation to my co-authors along with our editor, Lisa Lord; technical editor, Danielle Shaw; and book reviewers for the team effort in producing this book. Special thanks for the support and encouragement from my digital forensics colleagues: Franklin Clark, retired investigator for the Pierce County Prosecutor's Office, Tacoma, Washington; John Sgromolo of Verizon; Stefan Fleischmann of X-Ways; Gordon Ross, formerly of Net Nanny; and Gordon Mitchell of Future Focus, Inc. In addition, special thanks to colleagues Troy Larson of Microsoft and Brett Shavers.

Amelia Phillips

```
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--- Chunk 6 / 21 (chunk\_id: 301) ---

Content: My deepest gratitude goes to my co-author Bill Nelson. I want to reiterate the thanks to Lisa Lord for her patience and support and to all the

people who have helped us in the past, including Teresa Mobley, Ron Godfrey, Deb Buser, and Detective Melissa Rogers. Acknowledgments go to my many past and present students who have helped with research on what's happening in the field of digital forensics. Special thanks go to Jens Kircher at X-Ways, who contributed to the Macintosh and Linux chapter, for his insight into these OSs. Thanks to my friends in Namibia, without whom I would not have such a thorough understanding of the different laws on digital evidence and privacy, and special thanks to Dr. Jack Bermingham (President Emeritus of Highline College), Dr. Jeff Wagnitz, Alice Madsen, and

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--- Chunk 7 / 21 (chunk\_id: 302) ---

Content: Dr. Jack Bermingham (President Emeritus of Highline College), Dr. Jeff Wagnitz, Alice Madsen, and Dr. Rolita Ezeonu, who have funded and supported me as I experienced what it means to get a Ph.D., write two textbooks, create a bachelor's program, and work full time. Thanks go to my friends and family members for their support, and the most special thanks go to my aunties, who were all at some point in their lives great teachers and set an excellent example for me. Without them, this would not be possible.

```
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--- Chunk 8 / 21 (chunk\_id: 303) ---

Content: Christopher K. Steuart

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--- Chunk 9 / 21 (chunk\_id: 304) ---

Content: I would like to express my appreciation to my wife, Josephine, son,

Alexander, and daughter, Isobel, for their enthusiastic support of my commitment to this book, even as it consumed time and energy that they deserved. I also want to express my thanks to my parents, William and Mary, for their support of my education and development of the skills needed for this project. I thank my co-authors for inviting me to join them in this project. I would like to express my appreciation to the Boy Scouts of America for providing me with the first of many leadership opportunities in my life. I want to recognize Lieutenant General (then Captain) Edward Soriano for seeing the potential in me as a young soldier and encouraging me in learning the skills required to administer, communicate with, and

```
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--- Chunk 10 / 21 (chunk\_id: 305) ---

Content: soldier and encouraging me in learning the skills required to administer, communicate with, and command an organization within the structure of law, regulation, and personal commitment. I must also thank the faculty of Drake University Law School, particularly Professor James A. Albert, for encouraging me to think and write creatively about the law. I also note the contribution of Diane Gagon and the staff of the Church of Scientology in Seattle, Washington, in supporting my better understanding of commitment to myself and others.

```
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--- Chunk 11 / 21 (chunk\_id: 306) ---

Content: Chapter 1.

Understanding the Digital Forensics Profession and Investigations

After reading this chapter and completing the exercises, you will be able to:

Describe the field of digital forensics

Explain how to prepare for computer investigations and summarize the difference between public-sector and private-sector investigations

Explain the importance of maintaining professional conduct

Describe how to prepare a digital forensics investigation by taking a systematic approach

Describe procedures for private-sector digital investigations

Explain requirements for data recovery workstations and software

Summarize how to conduct an investigation, including critiquing a case

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--- Chunk 12 / 21 (chunk\_id: 307) ---

Content: Summarize how to conduct an investigation, including critiquing a case

In the past several years, the field of computer forensics has developed significantly, including new terminology. This chapter introduces you to computer forensics or, as it's now typically called, digital forensics and discusses issues of importance in the industry. This book blends traditional investigative methods with classic systems analysis problem-solving techniques and applies them to investigations involving computers and other digital media and systems. Understanding these disciplines combined with the use of the forensics tools will make you a skilled digital forensics examiner.

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--- Chunk 13 / 21 (chunk\_id: 308) ---

Content: This chapter also gives you an overview of how to manage a digital investigation and use standard problem-solving techniques. You learn about the problems and challenges forensics examiners face when preparing and processing investigations, including the ideas and questions they must consider. To perform the activities and projects in this chapter, you work with forensic disk images from small USB drives and then can apply the same techniques to a large disk.

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--- Chunk 14 / 21 (chunk\_id: 3905) ---  
Content: Appendixes

## Appendixes

Each section should have a title indicating what you're discussing, so make sure it conveys the essential point of the section. For example, the body of your report might be titled "Investigation Findings for Superior Bicycles, Inc.: Intellectual Property Theft."

```
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--- Chunk 15 / 21 (chunk\_id: 3906) ---

Content: If the report is long and complex, you should include an abstract. Typically, more people read the abstract than the entire report, so writing one for your report is important. The abstract and table of contents give readers an overview of the report and its points so that they can decide what parts they need to review. An abstract simply condenses the report's key points to focus on the essential information. It should be one or two paragraphs totaling about 150 to 200 words. Remember that the abstract should describe the examination or investigation and present the report's main ideas in a summarized form. Informative abstracts don't duplicate references or tables of results. As with any research paper, write the abstract last.

```
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--- Chunk 16 / 21 (chunk\_id: 3907) ---

Content: The body consists of the introduction and discussion sections. The introduction should state the report's purpose (the questions to be answered)

and show that you're aware of its terms of reference. You should also state any methods used and any limitations and indicate how the report is structured. It's important to justify why you're writing the report, so make sure you answer the question "What is the problem?" You should also give readers a map of what you're delivering. Introduce the problem, moving from broader issues to the specific problem, finishing the introduction with the precise aims of the report (key questions). Craft this introduction carefully, setting up the processes you used to develop the information in logical order. Refer to relevant facts, ideas, and theories as

```
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--- Chunk 17 / 21 (chunk\_id: 3908) ---

Content: used to develop the information in logical order. Refer to relevant facts, ideas, and theories as well as related research by other authors. Organize discussion sections logically under headings to reflect how you classify information and to ensure that your information remains relevant to the investigation.

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--- Chunk 18 / 21 (chunk\_id: 3909) ---

Content: Two other main sections are the conclusion and supporting materials (references and appendixes). The conclusion starts by referring to the report's purpose, states the main points, draws conclusions, and possibly renders an opinion. References and appendixes list the supporting material to which your work refers. Follow a style manual's guidelines on format for presenting references, such as Gregg Reference Manual: A Manual of Style, Grammar, Usage, and Formatting; The Chicago Manual of Style: The Essential Guide for Writers, Editors, and Publishers; or MLA Style Manual and Guide to Scholarly Publishing from the Modern Language Association. Appendixes provide additional resource material not included in the body of the report.

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--- Chunk 19 / 21 (chunk\_id: 4820) ---

Content: I would like to thank the entire editorial and production staff for their dedication and fortitude during this project, including Natalie Onderdonk, Learning Designer, and Brooke Greenhouse, Content Manager. My special thanks go to Lisa Lord, the development editor, and I appreciate the careful testing of the technical editor, Danielle Shaw. I would also like to thank colleagues in professional groups in Washington State, Mike Lacey for his photos, and the following digital forensics colleagues for their support and encouragement: Franklin Clark, retired investigator for the Pierce County Prosecutor's Office, Tacoma, Washington; John Sgromolo of Verizon; Stefan Fleischmann of X-Ways; Gordon Ross, formerly of Net Nanny; and Gordon Mitchell of Future Focus, Inc. In addition, my special

```
Metadata: {
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  "toc_id": 7,
  "source": "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to
Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub"
}
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--- Chunk 20 / 21 (chunk\_id: 4821) ---

Content: Ross, formerly of Net Nanny; and Gordon Mitchell of Future Focus, Inc. In addition, my special thanks to colleagues Troy Larson of Microsoft and Brett Shavers. Finally, I want to express my appreciation to my wife, Tricia, for her support during the long hours spent writing.

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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub",
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  "toc_id": 7
}
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--- Chunk 21 / 21 (chunk\_id: 4822) ---

Content: Chapter 1.

Understanding the Digital Forensics Profession and Investigations

Labs included in this chapter:

Lab 1.1

Installing Autopsy for Windows

Installing Autopsy for Windows

Lab 1.2

Downloading FTK Imager Lite

Downloading FTK Imager Lite

Lab 1.3

Downloading WinHex

Downloading WinHex

Lab 1.4

Using Autopsy for Windows

Using Autopsy for Windows

Note

Before starting this chapter, create a work folder for files you use in these labs, if you haven't done so already. You might want to name it "Lab" to differentiate it from your work folder for textbook projects. Then create a subfolder of your work folder named Ch01. In labs, you'll see it referred to as "Work" or "your work folder."

Lab 1.1.

Installing Autopsy for Windows

Metadata: {

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    "chunk\_id": 4822,

    "toc\_id": 7,

    "source": "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to Computer Forensics and Investigations\_ Processing Digital Evidence-Cengage Learning (2018).epub"

}

=====  
Retrieval test complete.  
=====

[18]: *# Cell 6: Verify Content Retrieval for a Specific toc\_id with Reassembled Text*

```
import os
import json
import logging
from langchain_chroma import Chroma
```

```

from langchain_ollama.embeddings import OllamaEmbeddings

# --- Logger Setup ---
logger = logging.getLogger(__name__)
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s - %
↳ %(message)s')

def retrieve_and_print_chunks_for_toc_id(vector_store: Chroma, toc_id: int):
    """
    Retrieves all chunks for a specific toc_id, prints the reassembled text,
    and then lists the metadata for each individual chunk.
    """
    print("=" * 80)
    print(f"Retrieving all chunks for toc_id: {toc_id}")
    print("=" * 80)

    try:
        # Use the 'get' method with a 'where' filter to find exact matches
        results = vector_store.get(
            where={"toc_id": toc_id},
            include=["documents", "metadatas"]
        )

        if not results or not results.get('ids'):
            logger.warning(f"No chunks found in the database for toc_id = %
↳ {toc_id}")
            return

        documents = results['documents']
        metadatas = results['metadatas']

        logger.info(f"Successfully retrieved {len(documents)} chunks for toc_id %
↳ {toc_id}.")

        # Sort chunks by their chunk_id to ensure they are in the correct order
        sorted_items = sorted(zip(documents, metadatas), key=lambda item: %
↳ item[1].get('chunk_id', 0))

        # --- NEW: Reassemble and print the full text ---
        all_chunk_texts = [item[0] for item in sorted_items]
        reassembled_text = "\n".join(all_chunk_texts)

        print("\n" + "#" * 28 + " Reassembled Text " + "#" * 28)
        print(reassembled_text)
        print("#" * 80)

        # --- Print individual chunk details for verification ---

```

```

        print("\n" + "-" * 25 + " Individual Chunk Details " + "-" * 24)
        for i, (doc, meta) in enumerate(sorted_items):
            print(f"\n[ Chunk {i+1} / {len(documents)} | chunk_id: {meta.get('chunk_id', 'N/A')} ]")
            # Show a preview to keep the log clean
            content_preview = doc.replace('\n', ' ').strip()
            print(f"  Content Preview: '{content_preview[:200]}...'")
            print(f"  Metadata: {json.dumps(meta, indent=2)}")

        print("\n" + "=" * 80)
        print("Retrieval test complete.")
        print("=" * 80)

    except Exception as e:
        logger.error(f"An error occurred during retrieval: {e}", exc_info=True)

# =====
# EXECUTION BLOCK
# =====

# --- IMPORTANT: Set the ID you want to test here ---
# Example: ToC ID 10 is "An Overview of Digital Forensics"
# Example: ToC ID 11 is "Digital Forensics and Other Related Disciplines"
TOC_ID_TO_TEST = 7

# Check if the database directory exists
if 'CHROMA_PERSIST_DIR' in locals() and os.path.exists(CHROMA_PERSIST_DIR):
    logger.info("Connecting to the existing vector database...")

    vector_store = Chroma(
        persist_directory=CHROMA_PERSIST_DIR,
        embedding_function=OllamaEmbeddings(model=EMBEDDING_MODEL_OLLAMA),
        collection_name=CHROMA_COLLECTION_NAME
    )

    retrieve_and_print_chunks_for_toc_id(vector_store, TOC_ID_TO_TEST)

else:
    logger.error("Database directory not found. Please run Cell 5 to create the database first.")

```

```

2025-07-05 13:11:03,379 - INFO - Connecting to the existing vector database...
2025-07-05 13:11:03,392 - INFO - Successfully retrieved 21 chunks for toc_id = 7.

```

```

=====
Retrieving all chunks for toc_id: 7
=====

```

##### Reassembled Text #####

Chapter 1. Understanding the Digital Forensics Profession and  
InvestigationsChapter IntroductionAn Overview of Digital ForensicsDigital  
Forensics and Other Related DisciplinesA Brief History of Digital  
ForensicsUnderstanding Case LawDeveloping Digital Forensics ResourcesPreparing  
for Digital InvestigationsUnderstanding Law Enforcement Agency  
InvestigationsFollowing Legal ProcessesUnderstanding Private-Sector  
InvestigationsEstablishing Company PoliciesDisplaying Warning BannersDesignating  
an Authorized RequesterConducting Security InvestigationsDistinguishing Personal  
and Company PropertyMaintaining Professional ConductPreparing a Digital  
Forensics InvestigationAn Overview of a Computer CrimeAn Overview of a Company  
Policy ViolationTaking a Systematic ApproachAssessing the CasePlanning Your  
Overview of a Company Policy ViolationTaking a Systematic ApproachAssessing the  
CasePlanning Your InvestigationSecuring Your EvidenceProcedures for Private-  
Sector High-Tech InvestigationsEmployee Termination CasesInternet Abuse  
InvestigationsE-mail Abuse InvestigationsAttorney-Client Privilege  
InvestigationsIndustrial Espionage InvestigationsInterviews and Interrogations  
in High-Tech InvestigationsUnderstanding Data Recovery Workstations and  
SoftwareSetting Up Your Workstation for Digital ForensicsConducting an  
InvestigationGathering the EvidenceUnderstanding Bit-stream CopiesAcquiring an  
Image of Evidence MediaAnalyzing Your Digital EvidenceSome Additional Features  
of AutopsyCompleting the CaseAutopsy's Report GeneratorCritiquing the  
CaseChapter ReviewChapter SummaryKey TermsReview  
the CaseAutopsy's Report GeneratorCritiquing the CaseChapter ReviewChapter  
SummaryKey TermsReview QuestionsHands-On ProjectsCase Projects  
The team would like to thank the entire editorial and production staff for their  
dedication and fortitude during this project, including Natalie Onderdonk,  
Learning Designer, and Brooke Greenhouse, Senior Content Manager. Our special  
thanks go to Lisa Lord, the development editor. We also appreciate the careful  
reading and thoughtful suggestions of the technical editor, Danielle Shaw. We  
would like to thank the reviewers: Henry Felch, University of Maine, Augusta;  
Eddie Horton, Northeastern State University; Todd Koonts, Central Piedmont  
Community College; and Tenette Prevatte, Fayetteville Technical Community  
College. We would also like to thank our colleagues in professional groups in  
Washington State and Mike Lacey for his photos.

Bill Nelson  
Bill Nelson

I want to express my appreciation to my wife, Tricia, for her support during the  
long hours spent writing. I would also like to express appreciation to my co-  
authors along with our editor, Lisa Lord; technical editor, Danielle Shaw; and  
book reviewers for the team effort in producing this book. Special thanks for  
the support and encouragement from my digital forensics colleagues: Franklin  
Clark, retired investigator for the Pierce County Prosecutor's Office, Tacoma,  
Washington; John Sgromolo of Verizon; Stefan Fleischmann of X-Ways; Gordon Ross,  
formerly of Net Nanny; and Gordon Mitchell of Future Focus, Inc. In addition,

special thanks to colleagues Troy Larson of Microsoft and Brett Shavers.

Amelia Phillips

My deepest gratitude goes to my co-author Bill Nelson. I want to reiterate the thanks to Lisa Lord for her patience and support and to all the people who have helped us in the past, including Teresa Mobley, Ron Godfrey, Deb Buser, and Detective Melissa Rogers. Acknowledgments go to my many past and present students who have helped with research on what's happening in the field of digital forensics. Special thanks go to Jens Kircher at X-Ways, who contributed to the Macintosh and Linux chapter, for his insight into these OSs. Thanks to my friends in Namibia, without whom I would not have such a thorough understanding of the different laws on digital evidence and privacy, and special thanks to Dr. Jack Bermingham (President Emeritus of Highline College), Dr. Jeff Wagnitz, Alice Madsen, and

Dr. Jack Bermingham (President Emeritus of Highline College), Dr. Jeff Wagnitz, Alice Madsen, and Dr. Rolita Ezeonu, who have funded and supported me as I experienced what it means to get a Ph.D., write two textbooks, create a bachelor's program, and work full time. Thanks go to my friends and family members for their support, and the most special thanks go to my aunties, who were all at some point in their lives great teachers and set an excellent example for me. Without them, this would not be possible.

Christopher K. Steuart

I would like to express my appreciation to my wife, Josephine, son, Alexander, and daughter, Isobel, for their enthusiastic support of my commitment to this book, even as it consumed time and energy that they deserved. I also want to express my thanks to my parents, William and Mary, for their support of my education and development of the skills needed for this project. I thank my co-authors for inviting me to join them in this project. I would like to express my appreciation to the Boy Scouts of America for providing me with the first of many leadership opportunities in my life. I want to recognize Lieutenant General (then Captain) Edward Soriano for seeing the potential in me as a young soldier and encouraging me in learning the skills required to administer, communicate with, and

soldier and encouraging me in learning the skills required to administer, communicate with, and command an organization within the structure of law, regulation, and personal commitment. I must also thank the faculty of Drake University Law School, particularly Professor James A. Albert, for encouraging me to think and write creatively about the law. I also note the contribution of Diane Gagon and the staff of the Church of Scientology in Seattle, Washington, in supporting my better understanding of commitment to myself and others.

Chapter 1.

Understanding the Digital Forensics Profession and Investigations

After reading this chapter and completing the exercises, you will be able to:

Describe the field of digital forensics

Explain how to prepare for computer investigations and summarize the difference



between public-sector and private-sector investigations

Explain the importance of maintaining professional conduct

Describe how to prepare a digital forensics investigation by taking a systematic approach

Describe procedures for private-sector digital investigations

Explain requirements for data recovery workstations and software

Summarize how to conduct an investigation, including critiquing a case

Summarize how to conduct an investigation, including critiquing a case

In the past several years, the field of computer forensics has developed significantly, including new terminology. This chapter introduces you to computer forensics or, as it's now typically called, digital forensics and discusses issues of importance in the industry. This book blends traditional investigative methods with classic systems analysis problem-solving techniques and applies them to investigations involving computers and other digital media and systems. Understanding these disciplines combined with the use of the forensics tools will make you a skilled digital forensics examiner. This chapter also gives you an overview of how to manage a digital investigation and use standard problem-solving techniques. You learn about the problems and challenges forensics examiners face when preparing and processing investigations, including the ideas and questions they must consider. To perform the activities and projects in this chapter, you work with forensic disk images from small USB drives and then can apply the same techniques to a large disk.

Appendixes

## Appendixes

Each section should have a title indicating what you're discussing, so make sure it conveys the essential point of the section. For example, the body of your report might be titled "Investigation Findings for Superior Bicycles, Inc.: Intellectual Property Theft."

If the report is long and complex, you should include an abstract. Typically, more people read the abstract than the entire report, so writing one for your report is important. The abstract and table of contents give readers an overview of the report and its points so that they can decide what parts they need to review. An abstract simply condenses the report's key points to focus on the essential information. It should be one or two paragraphs totaling about 150 to 200 words. Remember that the abstract should describe the examination or investigation and present the report's main ideas in a summarized form. Informative abstracts don't duplicate references or tables of results. As with any research paper, write the abstract last.

The body consists of the introduction and discussion sections. The introduction should state the report's purpose (the questions to be answered) and show that

you're aware of its terms of reference. You should also state any methods used and any limitations and indicate how the report is structured. It's important to justify why you're writing the report, so make sure you answer the question "What is the problem?" You should also give readers a map of what you're delivering. Introduce the problem, moving from broader issues to the specific problem, finishing the introduction with the precise aims of the report (key questions). Craft this introduction carefully, setting up the processes you used to develop the information in logical order. Refer to relevant facts, ideas, and theories as

used to develop the information in logical order. Refer to relevant facts, ideas, and theories as well as related research by other authors. Organize discussion sections logically under headings to reflect how you classify information and to ensure that your information remains relevant to the investigation.

Two other main sections are the conclusion and supporting materials (references and appendixes). The conclusion starts by referring to the report's purpose, states the main points, draws conclusions, and possibly renders an opinion. References and appendixes list the supporting material to which your work refers. Follow a style manual's guidelines on format for presenting references, such as Gregg Reference Manual: A Manual of Style, Grammar, Usage, and Formatting; The Chicago Manual of Style: The Essential Guide for Writers, Editors, and Publishers; or MLA Style Manual and Guide to Scholarly Publishing from the Modern Language Association. Appendixes provide additional resource material not included in the body of the report.

I would like to thank the entire editorial and production staff for their dedication and fortitude during this project, including Natalie Onderdonk, Learning Designer, and Brooke Greenhouse, Content Manager. My special thanks go to Lisa Lord, the development editor, and I appreciate the careful testing of the technical editor, Danielle Shaw. I would also like to thank colleagues in professional groups in Washington State, Mike Lacey for his photos, and the following digital forensics colleagues for their support and encouragement: Franklin Clark, retired investigator for the Pierce County Prosecutor's Office, Tacoma, Washington; John Sgromolo of Verizon; Stefan Fleischmann of X-Ways; Gordon Ross, formerly of Net Nanny; and Gordon Mitchell of Future Focus, Inc. In addition, my special

Ross, formerly of Net Nanny; and Gordon Mitchell of Future Focus, Inc. In addition, my special thanks to colleagues Troy Larson of Microsoft and Brett Shavers. Finally, I want to express my appreciation to my wife, Tricia, for her support during the long hours spent writing.

Chapter 1.

Understanding the Digital Forensics Profession and Investigations

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Installing Autopsy for Windows

Lab 1.2  
Downloading FTK Imager Lite

Downloading FTK Imager Lite

Lab 1.3  
Downloading WinHex

Downloading WinHex

Lab 1.4  
Using Autopsy for Windows

Using Autopsy for Windows

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Lab 1.1.  
Installing Autopsy for Windows

#####

----- Individual Chunk Details -----

```
[ Chunk 1 / 21 | chunk_id: 1 ]
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and InvestigationsChapter IntroductionAn Overview of Digital ForensicsDigital
Forensics and Other Related DisciplinesA Brief History of Digita...'
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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
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ApproachAssessing the CasePlanning Your InvestigationSecuring Your
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ReviewChapter SummaryKey TermsReview QuestionsHands-On ProjectsCase Projects...'
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including Natalie Onderdonk, Learning Designer, and Brooke Greenhouse, Se...'
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Tricia, for her support during the long hours spent writing. I would also like
to express appreciation to my co-authors along with our editor...'
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```

want to reiterate the thanks to Lisa Lord for her patience and support and to all the people who have helped us in the past, including Teresa M...'

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[ Chunk 8 / 21 | chunk\_id: 303 ]

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[ Chunk 10 / 21 | chunk\_id: 305 ]

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```
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[ Chunk 11 / 21 | chunk\_id: 306 ]

Content Preview: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations After reading this chapter and completing the exercises, you will be able to: Describe the field of digital forensics E...'

```
Metadata: {  
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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage  
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[ Chunk 12 / 21 | chunk\_id: 307 ]

Content Preview: 'Summarize how to conduct an investigation, including critiquing a case In the past several years, the field of computer forensics has developed significantly, including new terminology. This chapter ...'

```
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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage  
Learning (2018).epub"  
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[ Chunk 13 / 21 | chunk\_id: 308 ]

Content Preview: 'This chapter also gives you an overview of how to manage a digital investigation and use standard problem-solving techniques. You learn about the problems and challenges forensics examiners face when ...'

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Metadata: {  
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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage  
Learning (2018).epub",  
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[ Chunk 14 / 21 | chunk_id: 3905 ]
Content Preview: 'Appendixes Appendixes Each section should have a title
indicating what you're discussing, so make sure it conveys the essential point
of the section. For example, the body of your report might be ti...'
Metadata: {
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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub",
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[ Chunk 15 / 21 | chunk_id: 3906 ]
Content Preview: 'If the report is long and complex, you should include an
abstract. Typically, more people read the abstract than the entire report, so
writing one for your report is important. The abstract and table ...'
Metadata: {
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[ Chunk 16 / 21 | chunk_id: 3907 ]
Content Preview: 'The body consists of the introduction and discussion
sections. The introduction should state the report's purpose (the questions to
be answered) and show that you're aware of its terms of reference. Y...'
Metadata: {
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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
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}

[ Chunk 17 / 21 | chunk_id: 3908 ]
Content Preview: 'used to develop the information in logical order. Refer to
relevant facts, ideas, and theories as well as related research by other
authors. Organize discussion sections logically under headings to re...'
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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub",
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```
[ Chunk 18 / 21 | chunk_id: 3909 ]
```

Content Preview: 'Two other main sections are the conclusion and supporting materials (references and appendixes). The conclusion starts by referring to the report's purpose, states the main points, draws conclusions, ...'

```

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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
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```
[ Chunk 19 / 21 | chunk_id: 4820 ]
```

Content Preview: 'I would like to thank the entire editorial and production staff for their dedication and fortitude during this project, including Natalie Onderdonk, Learning Designer, and Brooke Greenhouse, Content M...'

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Metadata: {
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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
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```
[ Chunk 20 / 21 | chunk_id: 4821 ]
```

Content Preview: 'Ross, formerly of Net Nanny; and Gordon Mitchell of Future Focus, Inc. In addition, my special thanks to colleagues Troy Larson of Microsoft and Brett Shavers. Finally, I want to express my appreciati...'

```

Metadata: {
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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub"
}

```

```
[ Chunk 21 / 21 | chunk_id: 4822 ]
```



Content Preview: 'Chapter 1. Understanding the Digital Forensics Profession and Investigations Labs included in this chapter: Lab 1.1 Installing Autopsy for Windows Installing Autopsy for Windows Lab 1.2 Downloadi...'

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Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub"
}
```

```
=====
Retrieval test complete.
=====
```

## 6 test 1

```
[10]: # Cell 5.2: Test Content & Image Retrieval (with Random Topic Selection)

# --- Core Imports ---
import os
import json
import logging
import random # Make sure random is imported
from typing import List, Dict, Any

# --- Dependency Checks & Imports ---
try:
    from langchain_chroma import Chroma
    from langchain_ollama.embeddings import OllamaEmbeddings
    from langchain_core.documents import Document
    from PIL import Image
    import matplotlib.pyplot as plt
    langchain_and_viz_available = True
except ImportError as e:
    print(f"Required library not found: {e}. Please install langchain,
↳ChromaDB, Pillow, and matplotlib.")
    langchain_and_viz_available = False

# --- Logger Setup ---
logger = logging.getLogger(__name__)
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s -
↳%(message)s')

# =====
# 1. HELPER AND RETRIEVAL FUNCTIONS
```

```

# =====
# The _add_ids_and_flatten_recursive function is needed here to process the ToC
def _add_ids_and_flatten_recursive(nodes: List[Dict], current_path: List[str],
    ↪ counter: List[int], flat_list: List[Dict]):
    """Recursively traverses ToC nodes to flatten them and assign a unique,
    ↪ sequential toc_id."""
    for node in nodes:
        toc_id = counter[0]
        counter[0] += 1
        title = node.get("title", "").strip()
        if not title:
            continue

        # Check if the node is a leaf (has no children)
        is_leaf = not bool(node.get("children"))

        new_titles_path = current_path + [title]
        entry = {
            "titles_path": new_titles_path,
            "level": node.get("level"),
            "full_title_for_matching": title,
            "toc_id": toc_id,
            "is_leaf": is_leaf # Add a flag to identify leaf nodes
        }
        if "page" in node:
            entry["page"] = node["page"]

        flat_list.append(entry)

        if node.get("children"):
            _add_ids_and_flatten_recursive(node.get("children", []),
    ↪ new_titles_path, counter, flat_list)

# The retrieve_and_display_section and print_header functions remain exactly
    ↪ the same as before.
def print_header(text: str, char: str = "="):
    """Prints a centered header to the console."""
    print("\n" + char * 80)
    print(text.center(80))
    print(char * 80)

def retrieve_and_display_section(
    topic_query: str,
    vector_store: Chroma,
    flat_toc: List[Dict]
):

```

```

# ... This entire function is identical to the previous version ...
# It takes the query and does the retrieval and display.
print_header(f"Retrieval Test for Topic: '{topic_query}'")

# --- 1. Find the topic in the flattened ToC ---
target_entry = None
# Find an exact or partial match for the topic query
for entry in flat_toc:
    if topic_query.lower() in entry.get('full_title_for_matching', '').
↳lower():
        target_entry = entry
        break

if not target_entry:
    logger.error(f"Could not find topic '{topic_query}' in the Table of
↳Contents.")
    return

target_toc_id = target_entry.get('toc_id')
full_title = target_entry.get('full_title_for_matching')
logger.info(f"Found topic '{full_title}' with toc_id: {target_toc_id}")

# --- 2. Retrieve all documents for that toc_id from ChromaDB ---
try:
    retrieved_data = vector_store.get(
        where={"toc_id": target_toc_id},
        include=["metadatas", "documents"]
    )
    docs = [
        Document(page_content=doc, metadata=meta)
        for doc, meta in zip(retrieved_data['documents'],
↳retrieved_data['metadatas'])
    ]

    if not docs:
        logger.warning(f"No document chunks found for toc_id
↳{target_toc_id}. The topic might be a parent heading with no direct content.
↳")
        return

    logger.info(f"Retrieved {len(docs)} document chunks.")

except Exception as e:
    logger.error(f"An error occurred during database retrieval: {e}",
↳exc_info=True)
    return

```

```

# --- 3. Sort chunks, reassemble text, and collect images ---
docs.sort(key=lambda d: d.metadata.get('chunk_id', -1))

full_content = "\n".join([d.page_content for d in docs])

all_image_paths = set()
for d in docs:
    if 'image_paths' in d.metadata:
        try:
            paths = json.loads(d.metadata['image_paths'])
            if isinstance(paths, list):
                all_image_paths.update(paths)
        except (json.JSONDecodeError, TypeError):
            continue

sorted_image_paths = sorted(list(all_image_paths))

# --- 4. Display the results ---
print("\n" + "-"*25 + " REASSEMBLED CONTENT " + "-"*25)
print(full_content)

print("\n" + "-"*25 + " ASSOCIATED IMAGES " + "-"*26)
if not sorted_image_paths:
    print("No images found for this section.")
else:
    print(f"Found {len(sorted_image_paths)} unique image(s):")
    for path in sorted_image_paths:
        print(f"- {path}")

    try:
        first_image_path = sorted_image_paths[0]
        print(f"\nDisplaying first image: {os.path.
↪basename(first_image_path)}")

        img = Image.open(first_image_path)

        plt.figure(figsize=(8, 6))
        plt.imshow(img)
        plt.title(f"Image for '{full_title}'")
        plt.axis('off')
        plt.show()

    except FileNotFoundError:
        logger.error(f"Image file not found at path: {first_image_path}")
    except Exception as e:
        logger.error(f"Could not display image. Error: {e}")

```

```

print("-" * 80)

# =====
# 2. MAIN EXECUTION BLOCK FOR THIS CELL (with Random Topic Selection)
# =====

if langchain_and_viz_available:
    if 'CHROMA_PERSIST_DIR' in locals() and 'PRE_EXTRACTED_TOC_JSON_PATH' in_
↳ locals():

        try:
            logger.info("Connecting to the existing vector database...")
            db_retriever = Chroma(
                persist_directory=CHROMA_PERSIST_DIR,
                ↵
↳ embedding_function=OllamaEmbeddings(model=EMBEDDING_MODEL_OLLAMA),
                collection_name=CHROMA_COLLECTION_NAME
            )

            logger.info("Loading and processing Table of Contents for test case_
↳ selection...")
            with open(PRE_EXTRACTED_TOC_JSON_PATH, 'r', encoding='utf-8') as f:
                loaded_hierarchical_toc = json.load(f)

            flat_toc_for_lookup = []
            _add_ids_and_flatten_recursive(loaded_hierarchical_toc, [], [1], ↵
↳ flat_toc_for_lookup)

            # --- RANDOMLY SELECT A TEST QUERY ---
            # We want to test a "leaf" section that has actual content.
            # A good candidate is a section that is a leaf in the ToC tree.
            test_candidates = [
                entry for entry in flat_toc_for_lookup
                if entry.get('is_leaf') and entry.get("level", 0) > 0
            ]

            if not test_candidates:
                raise ValueError("Could not find any suitable leaf-node topics_
↳ to test.")

            # Select a random topic from our list of good candidates
            random_topic_entry = random.choice(test_candidates)
            test_query = random_topic_entry['full_title_for_matching']

            # --- RUN THE TEST with the random query ---
            retrieve_and_display_section(

```

```

        topic_query=test_query,
        vector_store=db_retriever,
        flat_toc=flat_toc_for_lookup
    )

    except Exception as e:
        logger.error(f"An error occurred during the test execution: {e}",
            ↪exc_info=True)

    else:
        logger.error("Required variables (CHROMA_PERSIST_DIR,
            ↪PRE_EXTRACTED_TOC_JSON_PATH) not found. Please run previous cells.")
    else:
        logger.error("Skipping test cell due to missing libraries.")

```

```

2025-07-05 13:09:48,230 - INFO - Connecting to the existing vector database...
2025-07-05 13:09:48,242 - INFO - Loading and processing Table of Contents for
test case selection...
2025-07-05 13:09:48,244 - INFO - Found topic 'Materials Required' with toc_id:
563
2025-07-05 13:09:48,246 - WARNING - No document chunks found for toc_id 563. The
topic might be a parent heading with no direct content.

```

```

=====
Retrieval Test for Topic: 'Materials Required'
=====

```

## 6.1 Test Data Base for content development

Require Description

[11]: *# Cell 6: Verify Vector Database (Final Version with Rich Diagnostic Output)*

```

import os
import json
import re
import random
import logging
from typing import List, Dict, Any, Tuple, Optional

# Third-party imports
try:
    from langchain_chroma import Chroma
    from langchain_ollama.embeddings import OllamaEmbeddings
    from langchain_core.documents import Document
    langchain_available = True
except ImportError:

```

```

    langchain_available = False

# Setup Logger for this cell
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s -\n
    ↳%(message)s')
logger = logging.getLogger(__name__)

# --- HELPER FUNCTIONS ---

def print_results(query_text: str, results: list, where_filter: Optional[Dict]↳
    ↳None):
    """
    Richly prints query results, showing the query, filter, and retrieved↳
    ↳documents.
    """
    print("\n" + "-"*10 + " DIAGNOSTIC: RETRIEVAL RESULTS " + "-"*10)
    print(f"QUERY: '{query_text}'")
    if where_filter:
        print(f"FILTER: {json.dumps(where_filter, indent=2)}")

    if not results:
        print("--> No documents were retrieved for this query and filter.")
        print("-" * 55)
        return

    print(f"--> Found {len(results)} results. Displaying top {min(len(results),↳
    ↳3)}:")
    for i, doc in enumerate(results[:3]):
        print(f"\n[ RESULT {i+1} ]")
        content_preview = doc.page_content.replace('\n', ' ').strip()
        print(f"  Content : '{content_preview[:200]}...'")
        print(f"  Metadata: {json.dumps(doc.metadata, indent=2)}")
    print("-" * 55)

# --- HELPER FUNCTIONS FOR FINDING DATA (UNCHANGED) ---
def find_deep_entry(nodes: List[Dict], current_path: List[str] = []) ->↳
    ↳Optional[Tuple[Dict, List[str]]]:
    shuffled_nodes = random.sample(nodes, len(nodes))
    for node in shuffled_nodes:
        if node.get('level', 0) >= 2 and node.get('children'): return node,↳
        ↳current_path + [node['title']]
        if node.get('children'):
            path = current_path + [node['title']]
            deep_entry = find_deep_entry(node['children'], path)

```

```

        if deep_entry: return deep_entry
    return None

def find_chapter_title_by_number(toc_data: List[Dict], chap_num: int) -> Optional[List[str]]:
    def search_nodes(nodes, num, current_path):
        for node in nodes:
            path = current_path + [node['title']]
            if re.match(rf"(Chapter\s)?{num}[.:\s]", node.get('title', ''), re.IGNORECASE): return path
            if node.get('children'):
                found_path = search_nodes(node['children'], num, path)
                if found_path: return found_path
        return None
    return search_nodes(toc_data, chap_num, [])

# --- ENHANCED TEST CASES with DIAGNOSTIC OUTPUT ---

def basic_retrieval_test(db, outline):
    print_header("Test 1: Basic Retrieval", char="-")
    try:
        logger.info("Goal: Confirm the database is live and contains thematically relevant content.")
        logger.info("Strategy: Perform a simple similarity search using the course's 'unitName'.")
        query_text = outline.get("unitInformation", {}).get("unitName", "introduction")

        logger.info(f"Action: Searching for query: '{query_text}'...")
        results = db.similarity_search(query_text, k=1)

        print_results(query_text, results) # <--- SHOW THE EVIDENCE

        logger.info("Verification: Check if at least one document was returned.")
        assert len(results) > 0, "Basic retrieval query returned no results."

        logger.info("Result: TEST 1 PASSED. The database is online and responsive.")
        return True
    except Exception as e:
        logger.error(f"Result: TEST 1 FAILED. Reason: {e}")
        return False

def deep_hierarchy_test(db, toc):

```



```

print_header("Test 2: Deep Hierarchy Retrieval", char="-")
try:
    logger.info("Goal: Verify that the multi-level hierarchical metadata_
↳was ingested correctly.")
    logger.info("Strategy: Find a random, deeply nested sub-section and use_
↳a precise filter to retrieve it.")
    deep_entry_result = find_deep_entry(toc)
    assert deep_entry_result, "Could not find a suitable deep entry (level_
↳>= 2) to test."
    node, path = deep_entry_result
    query = node['title']

    logger.info(f" - Selected random deep section: {' -> '.join(path)}")
    conditions = [{f"level_{i+1}_title": {"$eq": title}} for i, title in_
↳enumerate(path)]
    w_filter = {"$and": conditions}

    logger.info("Action: Performing a similarity search with a highly_
↳specific '$and' filter.")
    results = db.similarity_search(query, k=1, filter=w_filter)

    print_results(query, results, w_filter) # <--- SHOW THE EVIDENCE

    logger.info("Verification: Check if the precisely filtered query_
↳returned any documents.")
    assert len(results) > 0, "Deeply filtered query returned no results."

    logger.info(" Result: TEST 2 PASSED. Hierarchical metadata is_
↳structured correctly.")
    return True
except Exception as e:
    logger.error(f" Result: TEST 2 FAILED. Reason: {e}")
    return False

def advanced_alignment_test(db, outline, toc):
    print_header("Test 3: Advanced Unit Outline Alignment", char="-")
    try:
        logger.info("Goal: Ensure a weekly topic from the syllabus can be_
↳mapped to the correct textbook chapter(s).")
        logger.info("Strategy: Pick a random week, find its chapter, and query_
↳for the topic filtered by that chapter.")
        week_to_test = random.choice(outline['weeklySchedule'])
        logger.info(f" - Selected random week: Week {week_to_test['week']} -_
↳'{week_to_test['contentTopic']}'")

        reading = week_to_test.get('requiredReading', '')

```

```

        chap_nums_str = re.findall(r'\d+', reading)
        assert chap_nums_str, f"Could not find chapter numbers in required_
↳reading: '{reading}'"
        logger.info(f"    - Extracted required chapter number(s):_
↳{chap_nums_str}")

        chapter_paths = [find_chapter_title_by_number(toc, int(n)) for n in_
↳chap_nums_str]
        chapter_paths = [path for path in chapter_paths if path is not None]
        assert chapter_paths, f"Could not map chapter numbers {chap_nums_str}_
↳to a valid ToC path."

        level_1_titles = list(set([path[0] for path in chapter_paths]))
        logger.info(f"    - Mapped to top-level ToC entries: {level_1_titles}")

        or_filter = [{"level_1_title": {"$eq": title}} for title in_
↳level_1_titles]
        w_filter = {"$or": or_filter} if len(or_filter) > 1 else or_filter[0]
        query = week_to_test['contentTopic']

        logger.info("Action: Searching for the weekly topic, filtered by the_
↳mapped chapter(s).")
        results = db.similarity_search(query, k=5, filter=w_filter)

        print_results(query, results, w_filter) # <--- SHOW THE EVIDENCE

        logger.info("Verification: Check if at least one returned document is_
↳from the correct chapter.")
        assert len(results) > 0, "Alignment query returned no results for the_
↳correct section/chapter."

        logger.info("    Result: TEST 3 PASSED. The syllabus can be reliably_
↳aligned with the textbook content.")
        return True
    except Exception as e:
        logger.error(f"    Result: TEST 3 FAILED. Reason: {e}")
        return False

def content_sequence_test(db, outline):
    print_header("Test 4: Content Sequence Verification", char="-")
    try:
        logger.info("Goal: Confirm that chunks for a topic can be re-ordered to_
↳form a coherent narrative.")
        logger.info("Strategy: Retrieve several chunks for a random topic and_
↳verify their 'chunk_id' is sequential.")
        topic_query = random.choice(outline['weeklySchedule'])['contentTopic']

```

```

        logger.info(f"Action: Performing similarity search for topic:␣
↳ '{topic_query}' to get a set of chunks.")
        results = db.similarity_search(topic_query, k=10)

        print_results(topic_query, results) # <--- SHOW THE EVIDENCE

        docs_with_id = [doc for doc in results if 'chunk_id' in doc.metadata]
        assert len(docs_with_id) > 3, "Fewer than 4 retrieved chunks have a␣
↳ 'chunk_id' to test."

        chunk_ids = [doc.metadata['chunk_id'] for doc in docs_with_id]
        sorted_ids = sorted(chunk_ids)

        logger.info(f" - Retrieved and sorted chunk IDs: {sorted_ids}")
        logger.info("Verification: Check if the sorted list of chunk_ids is␣
↳ strictly increasing.")
        is_ordered = all(sorted_ids[i] >= sorted_ids[i-1] for i in range(1,␣
↳ len(sorted_ids)))
        assert is_ordered, "The retrieved chunks' chunk_ids are not in␣
↳ ascending order when sorted."

        logger.info(" Result: TEST 4 PASSED. Narrative order can be␣
↳ reconstructed using 'chunk_id'.")
        return True
    except Exception as e:
        logger.error(f" Result: TEST 4 FAILED. Reason: {e}")
        return False

# --- MAIN VERIFICATION EXECUTION ---
def run_verification():
    print_header("Database Verification Process")

    if not langchain_available:
        logger.error("LangChain libraries not found. Aborting tests.")
        return

    required_files = {
        "Chroma DB": CHROMA_PERSIST_DIR,
        "ToC JSON": PRE_EXTRACTED_TOC_JSON_PATH,
        "Parsed Outline": PARSED_UO_JSON_PATH
    }
    for name, path in required_files.items():
        if not os.path.exists(path):
            logger.error(f"Required '{name}' not found at '{path}'. Please run␣
↳ previous cells.")

```

```

        return

    with open(PRE_EXTRACTED_TOC_JSON_PATH, 'r', encoding='utf-8') as f:
        toc_data = json.load(f)
    with open(PARSED_UO_JSON_PATH, 'r', encoding='utf-8') as f:
        unit_outline_data = json.load(f)

    logger.info("Connecting to DB and initializing components...")
    embeddings = OllamaEmbeddings(model=EMBEDDING_MODEL_OLLAMA)
    vector_store = Chroma(
        persist_directory=CHROMA_PERSIST_DIR,
        embedding_function=embeddings,
        collection_name=CHROMA_COLLECTION_NAME
    )

    results_summary = [
        basic_retrieval_test(vector_store, unit_outline_data),
        deep_hierarchy_test(vector_store, toc_data),
        advanced_alignment_test(vector_store, unit_outline_data, toc_data),
        content_sequence_test(vector_store, unit_outline_data)
    ]

    passed_count = sum(filter(None, results_summary))
    failed_count = len(results_summary) - passed_count

    print_header("Verification Summary")
    print(f"Total Tests Run: {len(results_summary)}")
    print(f"Passed: {passed_count}")
    print(f"Failed: {failed_count}")
    print_header("Verification Complete", char="=")

# --- Execute Verification ---
# Assumes global variables from Cell 1 are available in the notebook's scope
run_verification()

```

2025-07-05 13:09:48,268 - INFO - Connecting to DB and initializing components...

2025-07-05 13:09:48,281 - INFO - Goal: Confirm the database is live and contains thematically relevant content.

2025-07-05 13:09:48,281 - INFO - Strategy: Perform a simple similarity search using the course's 'unitName'.

2025-07-05 13:09:48,282 - INFO - Action: Searching for query: 'Digital Forensic'...

2025-07-05 13:09:48,308 - INFO - HTTP Request: POST  
http://127.0.0.1:11434/api/embed "HTTP/1.1 200 OK"

2025-07-05 13:09:48,313 - INFO - Verification: Check if at least one document was returned.

2025-07-05 13:09:48,313 - INFO - Result: TEST 1 PASSED. The database is online

and responsive.

2025-07-05 13:09:48,314 - INFO - Goal: Verify that the multi-level hierarchical metadata was ingested correctly.

2025-07-05 13:09:48,314 - INFO - Strategy: Find a random, deeply nested subsection and use a precise filter to retrieve it.

2025-07-05 13:09:48,314 - INFO - - Selected random deep section: Chapter 16. Ethics for the Expert Witness -> An Ethics Exercise -> Interpreting Attribute 0x80 Data Runs

2025-07-05 13:09:48,315 - INFO - Action: Performing a similarity search with a highly specific '\$and' filter.

2025-07-05 13:09:48,337 - INFO - HTTP Request: POST

http://127.0.0.1:11434/api/embed "HTTP/1.1 200 OK"

2025-07-05 13:09:48,346 - INFO - Verification: Check if the precisely filtered query returned any documents.

2025-07-05 13:09:48,346 - INFO - Result: TEST 2 PASSED. Hierarchical metadata is structured correctly.

2025-07-05 13:09:48,347 - INFO - Goal: Ensure a weekly topic from the syllabus can be mapped to the correct textbook chapter(s).

2025-07-05 13:09:48,347 - INFO - Strategy: Pick a random week, find its chapter, and query for the topic filtered by that chapter.

2025-07-05 13:09:48,348 - INFO - - Selected random week: Week Week 8 - 'Digital Forensics Analysis and Validation. Virtual Machine Forensics, Live Acquisitions and Cloud Forensics.'

2025-07-05 13:09:48,348 - INFO - - Extracted required chapter number(s): ['2019', '978', '1', '337', '56894', '4', '9', '10']

2025-07-05 13:09:48,352 - INFO - - Mapped to top-level ToC entries: ['Chapter 4. Processing Crime and Incident Scenes', 'Chapter 1. Understanding the Digital Forensics Profession and Investigations', 'Chapter 9. Digital Forensics Analysis and Validation', 'Chapter 10. Virtual Machine Forensics, Live Acquisitions, and Network Forensics']

2025-07-05 13:09:48,353 - INFO - Action: Searching for the weekly topic, filtered by the mapped chapter(s).

2025-07-05 13:09:48,376 - INFO - HTTP Request: POST

http://127.0.0.1:11434/api/embed "HTTP/1.1 200 OK"

2025-07-05 13:09:48,384 - INFO - Verification: Check if at least one returned document is from the correct chapter.

2025-07-05 13:09:48,385 - INFO - Result: TEST 3 PASSED. The syllabus can be reliably aligned with the textbook content.

2025-07-05 13:09:48,386 - INFO - Goal: Confirm that chunks for a topic can be re-ordered to form a coherent narrative.

2025-07-05 13:09:48,386 - INFO - Strategy: Retrieve several chunks for a random topic and verify their 'chunk\_id' is sequential.

2025-07-05 13:09:48,387 - INFO - Action: Performing similarity search for topic: 'Current Computer Forensics Tools.' to get a set of chunks.

2025-07-05 13:09:48,411 - INFO - HTTP Request: POST

http://127.0.0.1:11434/api/embed "HTTP/1.1 200 OK"

2025-07-05 13:09:48,415 - INFO - - Retrieved and sorted chunk IDs: [57, 59, 61, 256, 258, 267, 1873, 1875, 1879, 1881]

2025-07-05 13:09:48,416 - INFO - Verification: Check if the sorted list of chunk\_ids is strictly increasing.  
2025-07-05 13:09:48,416 - INFO - Result: TEST 4 PASSED. Narrative order can be reconstructed using 'chunk\_id'.

```
=====
                        Database Verification Process
=====
```

```
-----
                        Test 1: Basic Retrieval
-----
```

----- DIAGNOSTIC: RETRIEVAL RESULTS -----

QUERY: 'Digital Forensic'

--> Found 1 results. Displaying top 1:

[ RESULT 1 ]

Content : 'An Overview of Digital ForensicsDigital Forensics and Other Related DisciplinesA Brief History of Digital ForensicsUnderstanding Case LawDeveloping Digital Forensics Resources...'

```
Metadata: {
  "level_2_title": "Chapter 16. Ethics for the Expert Witness",
  "toc_id": 864,
  "level_1_title": "Lab Manual for Guide to Computer Forensics and
Investigations",
  "source": "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to
Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub",
  "chunk_id": 4,
  "level_3_title": "Chapter Introduction"
}
```

```
-----
                        Test 2: Deep Hierarchy Retrieval
-----
```

----- DIAGNOSTIC: RETRIEVAL RESULTS -----

QUERY: 'Interpreting Attribute 0x80 Data Runs'

FILTER: {

```
  "$and": [
    {
      "level_1_title": {
        "$eq": "Chapter 16. Ethics for the Expert Witness"
      }
    },
  ],
```

```

    {
      "level_2_title": {
        "$eq": "An Ethics Exercise"
      }
    },
    {
      "level_3_title": {
        "$eq": "Interpreting Attribute 0x80 Data Runs"
      }
    }
  ]
}

```

--> Found 1 results. Displaying top 1:

```

[ RESULT 1 ]
  Content : 'Figure 16-15.           Attribute 0x80: the Beginning of the First
Data Run 6.      From the starting position of attribute 0x80 (at offset
0000BD10), count 40 hexadecimal bytes to the beginning of the ...'
  Metadata: {
    "toc_id": 547,
    "level_4_title": "Finding Attribute 0x80 an MFT Record",
    "source": "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to
Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub",
    "chunk_id": 4584,
    "level_2_title": "An Ethics Exercise",
    "level_3_title": "Interpreting Attribute 0x80 Data Runs",
    "level_1_title": "Chapter 16. Ethics for the Expert Witness"
  }
}

```

---

### Test 3: Advanced Unit Outline Alignment

---

----- DIAGNOSTIC: RETRIEVAL RESULTS -----

QUERY: 'Digital Forensics Analysis and Validation. Virtual Machine Forensics,  
Live Acquisitions and Cloud Forensics.'

```

FILTER: {
  "$or": [
    {
      "level_1_title": {
        "$eq": "Chapter 4. Processing Crime and Incident Scenes"
      }
    },
    {
      "level_1_title": {
        "$eq": "Chapter 1. Understanding the Digital Forensics Profession and

```

```

Investigations"
    }
  },
  {
    "level_1_title": {
      "$eq": "Chapter 9. Digital Forensics Analysis and Validation"
    }
  },
  {
    "level_1_title": {
      "$eq": "Chapter 10. Virtual Machine Forensics, Live Acquisitions, and
Network Forensics"
    }
  }
]
}

```

--> Found 5 results. Displaying top 3:

```

[ RESULT 1 ]
  Content : 'Forensics: A Discussion of Virtual Machines Related to Forensic
Analysis," B. Shavers, 2008, www.forensicfocus.com/downloads/virtual-machines-
forensics-analysis.pdf). Large companies might add rack se...'
  Metadata: {
    "source": "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to
Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub",
    "toc_id": 350,
    "chunk_id": 2910,
    "level_2_title": "An Overview of Virtual Machine Forensics",
    "level_1_title": "Chapter 10. Virtual Machine Forensics, Live Acquisitions,
and Network Forensics"
  }

```

```

[ RESULT 2 ]
  Content : 'Virtual machines are now common for both personal and business use,
so forensics investigators need to know how to analyze them and use them to
analyze suspect drives and systems containing malware. L...'
  Metadata: {
    "level_1_title": "Chapter 10. Virtual Machine Forensics, Live Acquisitions,
and Network Forensics",
    "level_2_title": "An Overview of Virtual Machine Forensics",
    "chunk_id": 2905,
    "toc_id": 350,
    "source": "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to
Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub"
  }

```



[ RESULT 3 ]

Content : 'According to DIBS USA, Inc., a privately owned corporation specializing in digital forensics since the 1990s (www.dibsforensics.com), digital forensics involves scientifically examining and analyzing ...'

```
Metadata: {
  "level_3_title": "Digital Forensics and Other Related Disciplines",
  "toc_id": 11,
  "level_2_title": "An Overview of Digital Forensics",
  "source": "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to
Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub",
  "level_1_title": "Chapter 1. Understanding the Digital Forensics Profession
and Investigations",
  "chunk_id": 324
}
```

-----  
-----  
Test 4: Content Sequence Verification  
-----

----- DIAGNOSTIC: RETRIEVAL RESULTS -----

QUERY: 'Current Computer Forensics Tools.'

--> Found 10 results. Displaying top 3:

[ RESULT 1 ]

Content : 'Digital forensics tools are divided into two major categories: hardware and software. Each category has subcategories discussed in more depth later in this chapter. The following sections outline basi...'

```
Metadata: {
  "level_1_title": "Chapter 6. Current Digital Forensics Tools",
  "source": "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to
Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub",
  "level_3_title": "Types of Digital Forensics Tools",
  "toc_id": 235,
  "level_2_title": "Evaluating Digital Forensics Tool Needs",
  "chunk_id": 1879
}
```

[ RESULT 2 ]

Content : 'The new generation of digital forensics experts needs more initial training because operating systems, computer and mobile device hardware, and forensics software tools are changing more quickly. This...'

```
Metadata: {
  "source": "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to
Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub",
```

```

    "level_1_title": "Lab Manual for Guide to Computer Forensics and
Investigations",
    "level_2_title": "Introduction",
    "toc_id": 558,
    "chunk_id": 258
}

```

[ RESULT 3 ]

Content : 'List some considerations for digital forensics hardware tools  
Describe methods for validating and testing forensics tools Chapter 2 outlined  
how to set up a forensics laboratory. This chapter explor...'

```

Metadata: {
    "toc_id": 556,
    "chunk_id": 1873,
    "level_1_title": "Chapter 16. Ethics for the Expert Witness",
    "level_2_title": "Chapter Review",
    "level_3_title": "Case Projects",
    "source": "Bill Nelson, Amelia Phillips, Christopher Steuart - Guide to
Computer Forensics and Investigations_ Processing Digital Evidence-Cengage
Learning (2018).epub"
}

```

-----

=====

### Verification Summary

=====

```

Total Tests Run: 4
    Passed: 4
    Failed: 0

```

=====

Verification Complete

=====

## 7 Content Generation

### 7.1 Planning Agent

[12]: *# Cell 7: The Data-Driven Planning Agent (Final Hierarchical Version)*

```

import os
import json
import re
import math
import logging
from typing import List, Dict, Any, Optional

```

```

# Setup Logger and LangChain components
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s - %
↳%(message)s')
logger = logging.getLogger(__name__)
try:
    from langchain_chroma import Chroma
    from langchain_ollama.embeddings import OllamaEmbeddings
    langchain_available = True
except ImportError:
    langchain_available = False

def print_header(text: str, char: str = "="):
    """Prints a centered header to the console."""
    print("\n" + char * 80)
    print(text.center(80))
    print(char * 80)

class PlanningAgent:
    """
    An agent that creates a hierarchical content plan, adaptively partitions
    ↳content
    into distinct lecture decks, and allocates presentation time.
    """
    def __init__(self, master_config: Dict, vector_store: Optional[Any] = None):
        self.config = master_config['processed_settings']
        self.unit_outline = master_config['unit_outline']
        self.book_toc = master_config['book_toc']
        self.flat_toc_with_ids = self._create_flat_toc_with_ids()
        self.vector_store = vector_store
        logger.info("Data-Driven PlanningAgent initialized successfully.")

    def _create_flat_toc_with_ids(self) -> List[Dict]:
        """Creates a flattened list of the ToC for easy metadata lookup."""
        flat_list = []
        def flatten_recursive(nodes, counter):
            for node in nodes:
                node_id = counter[0]; counter[0] += 1
                flat_list.append({'toc_id': node_id, 'title': node.get('title',
↳'), 'node': node})
                if node.get('children'):
                    flatten_recursive(node.get('children'), counter)
        flatten_recursive(self.book_toc, [0])
        return flat_list

    def _identify_relevant_chapters(self, weekly_schedule_item: Dict) ->
↳List[int]:

```

```

    """Extracts chapter numbers precisely from the 'requiredReading' string.
    """
    reading_str = weekly_schedule_item.get('requiredReading', '')
    match = re.search(r'Chapter(s)?', reading_str, re.IGNORECASE)
    if not match: return []
    search_area = reading_str[match.start():]
    chap_nums_str = re.findall(r'\d+', search_area)
    if chap_nums_str:
        return sorted(list(set(int(n) for n in chap_nums_str)))
    return []

def _find_chapter_node(self, chapter_number: int) -> Optional[Dict]:
    """Finds the ToC node for a specific chapter number."""
    for item in self.flat_toc_with_ids:
        if re.match(rf"Chapter\s{chapter_number}(?:\D|$)", item['title']):
            return item['node']
    return None

def _build_topic_plan_tree(self, toc_node: Dict) -> Dict:
    """
    Recursively builds a hierarchical plan tree from any ToC node,
    annotating it with direct and total branch chunk counts.
    """
    node_metadata = next((item for item in self.flat_toc_with_ids if
    item['node'] is toc_node), None)
    if not node_metadata: return {}

    retrieved_docs = self.vector_store.get(where={'toc_id':
    node_metadata['toc_id']})
    direct_chunk_count = len(retrieved_docs.get('ids', []))

    plan_node = {
        "title": node_metadata['title'],
        "toc_id": node_metadata['toc_id'],
        "chunk_count": direct_chunk_count,
        "total_chunks_in_branch": 0,
        "slides_allocated": 0,
        "children": []
    }

    child_branch_total = 0
    for child_node in toc_node.get('children', []):
        if any(ex in child_node.get('title', '').lower() for ex in
    ["review", "introduction", "summary", "key terms"]):
            continue
        child_plan_node = self._build_topic_plan_tree(child_node)
        if child_plan_node:

```

```

        plan_node['children'].append(child_plan_node)
        child_branch_total += child_plan_node.
↪get('total_chunks_in_branch', 0)

    plan_node['total_chunks_in_branch'] = direct_chunk_count +
↪child_branch_total
    return plan_node

# In PlanningAgent Class...

def _allocate_slides_to_tree(self, plan_tree: Dict, content_slides_budget:
↪int):
    """
    (REFACTORED) Performs a multi-pass process to allocate content slides,
    add interactive activities, and sum totals correctly.
    """
    if not plan_tree or content_slides_budget <= 0:
        return plan_tree

    # --- Pass 1: Allocate Content Slides (Top-Down, Proportional) ---
    def allocate_content_recursively(node, budget):
        node['slides_allocated'] = 0

        # If it's a leaf node, it gets the remaining budget.
        if not node.get('children'):
            node['slides_allocated'] = round(budget)
            return

        # If it has children, distribute the budget proportionally.
        total_branch_chunks = node.get('total_chunks_in_branch', 0)

        # Allocate slides for the node's own content (if any).
        # This is a key fix: parent nodes can have their own content.
        own_content_slides = 0
        if total_branch_chunks > 0:
            own_content_slides = round(budget * (node.get('chunk_count', 0)
↪/ total_branch_chunks))
        node['slides_allocated'] = own_content_slides

        remaining_budget_for_children = budget - own_content_slides

        # Distribute remaining budget to children.
        for child in node.get('children', []):
            child_budget = 0
            if total_branch_chunks > 0:
                # Distribute based on the child's total branch size, not
↪just its own chunks.

```

```

        child_budget = remaining_budget_for_children * (child.
↪get('total_chunks_in_branch', 0) / (total_branch_chunks - node.
↪get('chunk_count', 0)))
        allocate_content_recursively(child, child_budget)

    allocate_content_recursively(plan_tree, content_slides_budget)

    # --- Pass 2: Add Interactive Activities (Targeted Depth) ---
    def add_interactive_nodes(node, depth, interactive_deep):
        if not node: return

        # Logic for interactive_deep: true
        if interactive_deep:
            if depth == 2:
                node['interactive_activity'] = {"title": f"{node.
↪get('title')} (Deep-Dive Activity)", "toc_id": node.get('toc_id'),
↪"slides_allocated": 1}
            if depth == 1:
                node['interactive_activity'] = {"title": f"{node.
↪get('title')} (General Activity)", "toc_id": node.get('toc_id'),
↪"slides_allocated": 1}
            # Logic for interactive_deep: false
        else:
            if depth == 1:
                node['interactive_activity'] = {"title": f"{node.
↪get('title')} (Interactive Activity)", "toc_id": node.get('toc_id'),
↪"slides_allocated": 1}

        # Recurse
        for child in node.get('children', []):
            add_interactive_nodes(child, depth + 1, interactive_deep)

    if self.config.get('interactive', False):
        interactive_deep = self.config.get('interactive_deep', False)
        logger.info(f"Interactive mode ON. Deep interaction:
↪{interactive_deep}. Adding placeholders...")
        # Start depth at 1 for the root nodes of the plan.
        add_interactive_nodes(plan_tree, 1, interactive_deep)

    # --- Pass 3: Sum All Slides (Content + Interactive) Up the Tree ---
    def sum_slides_upwards(node):
        # Start with the node's own allocated content slides.
        total_slides = node.get('slides_allocated', 0)

        # Add slides from its interactive activity, if it exists.
        total_slides += node.get('interactive_activity', {}).
↪get('slides_allocated', 0)

```

```

        # Add the summed totals from all its children.
        if node.get('children'):
            total_slides += sum(sum_slides_upwards(child) for child in node.
↳get('children', []))

        # The final 'slides_allocated' is the grand total for the branch.
        node['slides_allocated'] = total_slides
        return total_slides

    sum_slides_upwards(plan_tree)

    return plan_tree

def create_content_plan_for_week(self, week_number: int) -> Optional[Dict]:
    """Orchestrates the adaptive planning and partitioning process."""
    print_header(f"Planning Week {week_number}", char="*")

    weekly_schedule_item = self.unit_outline['weeklySchedule'][week_number_
↳- 1]

    chapter_numbers = self._identify_relevant_chapters(weekly_schedule_item)
    if not chapter_numbers: return None

    num_decks = self.config['week_session_setup'].get('sessions_per_week',
↳1)

    # 1. Build a full plan tree for each chapter to get its weight.
    chapter_plan_trees = [self._build_topic_plan_tree(self.
↳_find_chapter_node(cn)) for cn in chapter_numbers if self.
↳_find_chapter_node(cn)]
    total_weekly_chunks = sum(tree.get('total_chunks_in_branch', 0) for
↳tree in chapter_plan_trees)

    # 2. NEW: Adaptive Partitioning Strategy
    partitionable_units = []
    all_top_level_sections = []
    for chapter_tree in chapter_plan_trees:
        all_top_level_sections.extend(chapter_tree.get('children', []))

    num_top_level_sections = len(all_top_level_sections)

    # Always prefer to split by top-level sections if there are enough to
↳distribute.
    if num_top_level_sections >= num_decks:
        logger.info(f"Partitioning strategy: Distributing
↳{num_top_level_sections} top-level sections across {num_decks} decks.")

```

```

        partitionable_units = all_top_level_sections
    else:
        # Fallback for rare cases where there are fewer topics than decks
        ↪(e.g., 1 chapter with 1 section, but 2 decks).
        logger.info(f"Partitioning strategy: Not enough top-level sections
        ↪({num_top_level_sections}) to fill all decks ({num_decks}). Distributing
        ↪whole chapters instead.")
        partitionable_units = chapter_plan_trees

    # 3. Partition the chosen units into decks using a bin-packing algorithm
    decks = [[] for _ in range(num_decks)]
    deck_weights = [0] * num_decks
    sorted_units = sorted(partitionable_units, key=lambda x: x.
    ↪get('total_chunks_in_branch', 0), reverse=True)

    for unit in sorted_units:
        lightest_deck_index = deck_weights.index(min(deck_weights))
        decks[lightest_deck_index].append(unit)
        deck_weights[lightest_deck_index] += unit.
    ↪get('total_chunks_in_branch', 0)

    # 4. Plan each deck
    content_slides_per_week = self.config['slide_count_strategy'].
    ↪get('target', 25)
    final_deck_plans = []
    for i, deck_content_trees in enumerate(decks):
        deck_number = i + 1
        deck_chunk_weight = sum(tree.get('total_chunks_in_branch', 0) for
        ↪tree in deck_content_trees)
        deck_slide_budget = round((deck_chunk_weight / total_weekly_chunks)
        ↪* content_slides_per_week) if total_weekly_chunks > 0 else 0

        logger.info(f"--- Planning Deck {deck_number}/{num_decks} | Topics:
        ↪{[t['title'] for t in deck_content_trees]} | Weight: {deck_chunk_weight}
        ↪chunks | Slide Budget: {deck_slide_budget} ---")

        # The allocation function is recursive and works on any tree or
        ↪sub-tree
        planned_content = [self._allocate_slides_to_tree(tree,
        ↪round(deck_slide_budget * (tree.get('total_chunks_in_branch', 0) /
        ↪deck_chunk_weight))) if deck_chunk_weight > 0 else tree for tree in
        ↪deck_content_trees]

        final_deck_plans.append({
            "deck_number": deck_number,

```



```

        "deck_title": f"{self.config.get('unit_name', 'Course')} - Week_{week_number}, Lecture {deck_number}",
        "session_content": planned_content
    })

    return {
        "week": week_number,
        "overall_topic": weekly_schedule_item.get('contentTopic'),
        "deck_plans": final_deck_plans
    }

```

## 7.2 Content Generator Class (no yet addressed focus planning)

## 7.3 Orquestrator (Addressing paint points )

### Description:

The main script that iterates through the weeks defined the plan and generate the content base on the settings\_deck coordinating the agents.

**Parameters and concideration** - 1 hour in the setting session\_time\_duration\_in\_hour - is 18-20 slides at the time so it is require to calculate this according to the given value but this also means per session so sessions\_per\_week is a multiplicator factor that

- if apply\_topic\_interactive is available will add an extra slide and add extra 5 min time but to determine this is required to plan all the content first and then calculate then provide a extra time settings\_deck.json

```

{ "course_id":  "“, "unit_name":  "“, "interactive":  true, "interactive_deep":  false,
  "slide_count_strategy": { "method": "per_week", "interactive_slides_per_week": 0 -> sum
all interactive counts "interactive_slides_per_session": 0, -> Total # of slides produced if "in-
teractive" is true other wise remains 0 "target_total_slides": 0, -> Total Content Slides per week
that cover the total - will be the target in the cell 7

```

```

"slides_content_per_session": 0, -> Total # (target_total_slides/sessions_per_week) "to-
tal_slides_deck_week": 0, -> target_total_slides + interactive_slides_per_week + (framework
(4 + Time for Title, Agenda, Summary, End) * sessions_per_week) "Tota_slides_session": 0
-> content_slides_per_session + interactive_slides_per_session + framework (4 + Time for
Title, Agenda, Summary, End) }, "week_session_setup": { "sessions_per_week": 1, "distribu-
tion_strategy": "even", "interactive_time_in_hour": 0, -> find the value in ahours of the total
# ("interactive_slides" * "TIME_PER_INTERACTIVE_SLIDE_MINS")/60

```

```

"total_session_time_in_hours": 0 -> this is going to be equal or similar to ses-
sion_time_duration_in_hour if "interactive" is false obvisuly base on the global varaibles it will
be the calculation of "interactive_time_in_hour" "session_time_duration_in_hour": 2, —> this
is the time that the costumer need for delivery this is a constrain is not modified never is used for
reference },

```

```

"parameters_slides": { "slides_per_hour": 18, # no framework in-
clude "time_per_content_slides_min": 3, # average delivery per slide
"time_per_interactive_slide_min": 5, #small break and engaging with the students
"time_for_framework_slides_min": 6 # Time for Title, Agenda, Summary, End (per deck) "

```

```
}, "generation_scope": { "weeks": [6] }, "teaching_flow_id": "Interactive Lecture Flow" }
teaching_flows.json
```

```
{ "standard_lecture": { "name": "Standard Lecture Flow", "slide_types": ["Title", "Agenda",
"Content", "Summary", "End"], "prompts": { "content_generation": "You are an expert univer-
sity lecturer. Your audience is undergraduate students. Based on the following context, create
a slide that provides a detailed explanation of the topic '{sub_topic}'. The content should be
structured with bullet points for key details. Your output MUST be a single JSON object with
a 'title' (string) and 'content' (list of strings) key.", "summary_generation": "You are an expert
university lecturer creating a summary slide. Based on the following list of topics covered in this
session, generate a concise summary of the key takeaways. The topics are: {topic_list}. Your
output MUST be a single JSON object with a 'title' (string) and 'content' (list of strings) key."
}, "slide_schemas": { "Content": { "title": "string", "content": "list[string]" }, "Summary": { "ti-
tle": "string", "content": "list[string]" } } }, "apply_topic_interactive": { "name": "Interactive
Lecture Flow", "slide_types": ["Title", "Agenda", "Content", "Application", "Summary", "End"],
"prompts": { "content_generation": "You are an expert university lecturer in Digital Forensics.
Your audience is undergraduate students. Based on the provided context, create a slide explaining
the concept of '{sub_topic}'. The content should be clear, concise, and structured with bullet
points for easy understanding. Your output MUST be a single JSON object with a 'title' (string)
and 'content' (list of strings) key.", "application_generation": "You are an engaging university lec-
turer creating an interactive slide. Based on the concept of '{sub_topic}', create a multiple-choice
question with exactly 4 options (A, B, C, D) to test understanding. The slide title must be 'Let's
Apply This:'. Clearly indicate the correct answer within the content. Your output MUST be a sin-
gle JSON object with a 'title' (string) and 'content' (list of strings) key.", "summary_generation":
"You are an expert university lecturer creating a summary slide. Based on the following list of con-
cepts and applications covered in this session, generate a concise summary of the key takeaways.
The topics are: {topic_list}. Your output MUST be a single JSON object with a 'title' (string)
and 'content' (list of strings) key." }, "slide_schemas": { "Content": { "title": "string", "content":
"list[string]" }, "Application": { "title": "string", "content": "list[string]" }, "Summary": { "title":
"string", "content": "list[string]" } } } }
```

```
[13]: # Cell 8: Configuration and Scoping for Content Generation (Corrected)

import os
import json
import logging

# Setup Logger for this cell
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s - %
↳ %(message)s')
logger = logging.getLogger(__name__)

# --- 1. DEFINE FILE PATHS AND GLOBAL TEST SETTINGS ---
# Assumes these variables are loaded from a previous setup cell (like Cell 1)
# PROJECT_BASE_DIR, PARSED_UO_JSON_PATH, PRE_EXTRACTED_TOC_JSON_PATH must be
↳ defined.
```

```

# New configuration file paths
CONFIG_DIR = os.path.join(PROJECT_BASE_DIR, "configs")
SETTINGS_DECK_PATH = os.path.join(CONFIG_DIR, "settings_deck.json")
TEACHING_FLOWS_PATH = os.path.join(CONFIG_DIR, "teaching_flows.json")

# New output path for the processed settings
PROCESSED_SETTINGS_PATH = os.path.join(CONFIG_DIR, "processed_settings.json")

# --- Global Test Overrides (for easy testing) ---
TEST_OVERRIDE_WEEKS = None
TEST_OVERRIDE_FLOW_ID = None
TEST_OVERRIDE_SESSIONS_PER_WEEK = None
TEST_OVERRIDE_DISTRIBUTION_STRATEGY = None

def print_header(text: str, char: str = "="):
    """Prints a centered header to the console."""
    print("\n" + char * 80)
    print(text.center(80))
    print(char * 80)

def process_and_load_configurations():
    """
    PHASE 1: Loads configurations, calculates a PRELIMINARY time-based slide_
    ↪budget,
    and saves the result as 'processed_settings.json' for the Planning Agent.
    """
    print_header("Phase 1: Configuration and Scoping Process", char="-")

    # --- Load all input files ---
    logger.info("Loading all necessary configuration and data files...")
    try:
        os.makedirs(CONFIG_DIR, exist_ok=True)
        with open(PARSED_UO_JSON_PATH, 'r', encoding='utf-8') as f:
            ↪unit_outline = json.load(f)
        with open(PRE_EXTRACTED_TOC_JSON_PATH, 'r', encoding='utf-8') as f:
            ↪book_toc = json.load(f)
        with open(SETTINGS_DECK_PATH, 'r', encoding='utf-8') as f:
            ↪settings_deck = json.load(f)
        with open(TEACHING_FLOWS_PATH, 'r', encoding='utf-8') as f:
            ↪teaching_flows = json.load(f)
        logger.info("All files loaded successfully.")
    except FileNotFoundError as e:
        logger.error(f"FATAL: A required configuration file was not found: {e}")
        return None

    # --- Pre-process and Refine Settings ---
    logger.info("Pre-processing settings_deck for definitive plan...")

```

```

processed_settings = json.loads(json.dumps(settings_deck))

unit_info = unit_outline.get("unitInformation", {})
processed_settings['course_id'] = unit_info.get("unitCode",
↳"UNKNOWN_COURSE")
processed_settings['unit_name'] = unit_info.get("unitName", "Unknown Unit_
↳Name")

# --- Apply test overrides IF they are not None ---
logger.info("Applying overrides if specified...")
# This block now correctly sets the teaching_flow_id based on the
↳interactive flag.
if TEST_OVERRIDE_FLOW_ID is not None:
    processed_settings['teaching_flow_id'] = TEST_OVERRIDE_FLOW_ID
    logger.info(f"OVERRIDE: teaching_flow_id set to
↳'{TEST_OVERRIDE_FLOW_ID}'")
else:
    # If no override, use the 'interactive' boolean from the file as the
↳source of truth.
    is_interactive = processed_settings.get('interactive', False)
    if is_interactive:
        processed_settings['teaching_flow_id'] = 'apply_topic_interactive'
    else:
        processed_settings['teaching_flow_id'] = 'standard_lecture'
    logger.info(f"Loaded from settings: 'interactive' is {is_interactive}.
↳Set teaching_flow_id to '{processed_settings['teaching_flow_id']}'")

# The 'interactive' flag is now always consistent with the teaching_flow_id.
processed_settings['interactive'] = "interactive" in
↳processed_settings['teaching_flow_id'].lower()

if TEST_OVERRIDE_SESSIONS_PER_WEEK is not None:
    processed_settings['week_session_setup']['sessions_per_week'] =
↳TEST_OVERRIDE_SESSIONS_PER_WEEK
    logger.info(f"OVERRIDE: sessions_per_week set to
↳'{TEST_OVERRIDE_SESSIONS_PER_WEEK}'")

if TEST_OVERRIDE_DISTRIBUTION_STRATEGY is not None:
    processed_settings['week_session_setup']['distribution_strategy'] =
↳TEST_OVERRIDE_DISTRIBUTION_STRATEGY
    logger.info(f"OVERRIDE: distribution_strategy set to
↳'{TEST_OVERRIDE_DISTRIBUTION_STRATEGY}'")

if TEST_OVERRIDE_WEEKS is not None:
    processed_settings['generation_scope']['weeks'] = TEST_OVERRIDE_WEEKS

```

```

        logger.info(f"OVERRIDE: generation_scope weeks set to_
↳{TEST_OVERRIDE_WEEKS}")

    # --- DYNAMIC SLIDE BUDGET CALCULATION (Phase 1) ---
    logger.info("Calculating preliminary slide budget based on session time...")

    params = processed_settings.get('parameters_slides', {})
    SLIDES_PER_HOUR = params.get('slides_per_hour', 18)

    duration_hours = processed_settings['week_session_setup'].
↳get('session_time_duration_in_hour', 1.0)
    sessions_per_week = processed_settings['week_session_setup'].
↳get('sessions_per_week', 1)

    slides_content_per_session = int(duration_hours * SLIDES_PER_HOUR)
    target_total_slides = slides_content_per_session * sessions_per_week

    processed_settings['slide_count_strategy']['target_total_slides'] =_
↳target_total_slides
    processed_settings['slide_count_strategy']['slides_content_per_session'] =_
↳slides_content_per_session
    logger.info(f"Preliminary weekly content slide target calculated:_
↳{target_total_slides} slides.")

    # --- Resolve Generation Scope if not overridden ---
    if TEST_OVERRIDE_WEEKS is None and processed_settings.
↳get('generation_scope', {}).get('weeks') == "all":
        num_weeks = len(unit_outline.get('weeklySchedule', []))
        processed_settings['generation_scope']['weeks'] = list(range(1,_
↳num_weeks + 1))

    # --- Save the processed settings to disk ---
    logger.info(f"Saving preliminary processed configuration to:_
↳{PROCESSED_SETTINGS_PATH}")
    with open(PROCESSED_SETTINGS_PATH, 'w', encoding='utf-8') as f:
        json.dump(processed_settings, f, indent=2)
    logger.info("File saved successfully.")

    # --- Assemble master config for optional preview ---
    master_config = {
        "processed_settings": processed_settings,
        "unit_outline": unit_outline,
        "book_toc": book_toc,
        "teaching_flows": teaching_flows
    }

```

```

    print_header("Phase 1 Configuration Complete", char="-")
    logger.info("Master configuration object is ready for the Planning Agent.")
    return master_config

# --- EXECUTE THE CONFIGURATION PROCESS ---
master_config = process_and_load_configurations()

# Optional: Print a preview to verify the output
if master_config:
    print("\n--- Preview of Processed Settings (Phase 1) ---")
    print(json.dumps(master_config['processed_settings'], indent=2,
    ↪sort_keys=True))
    if master_config.get('processed_settings', {}).get('generation_scope', {}).
    ↪get('weeks'):
        print(f"\nNumber of weeks to generate:
    ↪{len(master_config['processed_settings']['generation_scope']['weeks'])}")
    print("-----")

```

```

2025-07-05 13:09:48,461 - INFO - Loading all necessary configuration and data
files...
2025-07-05 13:09:48,464 - INFO - All files loaded successfully.
2025-07-05 13:09:48,465 - INFO - Pre-processing settings_deck for definitive
plan...
2025-07-05 13:09:48,465 - INFO - Applying overrides if specified...
2025-07-05 13:09:48,466 - INFO - Loaded from settings: 'interactive' is True.
Set teaching_flow_id to 'apply_topic_interactive'.
2025-07-05 13:09:48,466 - INFO - Calculating preliminary slide budget based on
session time...

```

---

### Phase 1: Configuration and Scoping Process

---

```

2025-07-05 13:09:48,467 - INFO - Preliminary weekly content slide target
calculated: 36 slides.
2025-07-05 13:09:48,467 - INFO - Saving preliminary processed configuration to:
/home/sebas_dev_linux/projects/course_generator/configs/processed_settings.json
2025-07-05 13:09:48,469 - INFO - File saved successfully.
2025-07-05 13:09:48,469 - INFO - Master configuration object is ready for the
Planning Agent.

```

---

### Phase 1 Configuration Complete

---

```

--- Preview of Processed Settings (Phase 1) ---
{

```

```

"course_id": "ICT312",
"generation_scope": {
  "weeks": [
    1
  ]
},
"interactive": true,
"interactive_deep": false,
"parameters_slides": {
  "slides_per_hour": 18,
  "time_for_framework_slides_min": 6,
  "time_per_content_slides_min": 3,
  "time_per_interactive_slide_min": 5
},
"slide_count_strategy": {
  "interactive_slides_per_session": 0,
  "interactive_slides_per_week": 0,
  "method": "per_week",
  "slides_content_per_session": 36,
  "target_total_slides": 36,
  "total_slides_deck_week": 0,
  "total_slides_session": 0
},
"teaching_flow_id": "apply_topic_interactive",
"unit_name": "Digital Forensic",
"week_session_setup": {
  "distribution_strategy": "even",
  "interactive_time_in_hour": 0,
  "session_time_duration_in_hour": 2,
  "sessions_per_week": 1,
  "total_session_time_in_hours": 0
}
}

```

Number of weeks to generate: 1

-----

```

[14]: # In Cell 9,

logger.info("--- Initializing Data-Driven Planning Agent Test ---")

if langchain_available:
    logger.info("Connecting to ChromaDB for the Planning Agent...")
    try:
        # 1. Connect to DB and Load all configurations
        vector_store = Chroma(
            persist_directory=CHROMA_PERSIST_DIR,

```

```

        embedding_function=OllamaEmbeddings(model=EMBEDDING_MODEL_OLLAMA),
        collection_name=CHROMA_COLLECTION_NAME
    )
    logger.info("Database connection successful.")

    logger.info("Loading configuration files for Planning Agent...")
    with open(os.path.join(CONFIG_DIR, "processed_settings.json"), 'r') as f:
    ↪f:
        processed_settings = json.load(f)
    with open(PRE_EXTRACTED_TOC_JSON_PATH, 'r') as f:
        book_toc = json.load(f)
    with open(PARSED_UO_JSON_PATH, 'r') as f:
        unit_outline = json.load(f)
    logger.info("Configuration files loaded.")

    master_config_from_file = {
        "processed_settings": processed_settings,
        "unit_outline": unit_outline,
        "book_toc": book_toc
    }

    # 2. Initialize the Planning Agent
    planning_agent = PlanningAgent(master_config_from_file,
    ↪vector_store=vector_store)

    # 3. CRITICAL: Loop through the weeks defined in the processed settings
    weeks_to_generate = processed_settings.get('generation_scope', {}).
    ↪get('weeks', [])
    logger.info(f"Found {len(weeks_to_generate)} week(s) to plan:
    ↪{weeks_to_generate}")

    for week_to_test in weeks_to_generate:
        logger.info(f"--> Generating draft plan for Week {week_to_test}")
        content_plan = planning_agent.
    ↪create_content_plan_for_week(week_to_test)

        if content_plan:
            print(f"\n--- Generated Draft Plan for Week {week_to_test} ---")
            print(json.dumps(content_plan, indent=2))

            # Save the generated plan to a file
            PLAN_OUTPUT_DIR = os.path.join(PROJECT_BASE_DIR,
    ↪"generated_plans")
            os.makedirs(PLAN_OUTPUT_DIR, exist_ok=True)
            plan_filename = f"{processed_settings.get('course_id',
    ↪'COURSE')}_Week{week_to_test}_plan_draft.json"

```



```

        plan_filepath = os.path.join(PLAN_OUTPUT_DIR, plan_filename)
        with open(plan_filepath, 'w') as f:
            json.dump(content_plan, f, indent=2)
            logger.info(f"\nSuccessfully saved DRAFT content plan for Week_{week_to_test} to: {plan_filepath}")
        else:
            logger.error(f"Failed to generate content plan for Week_{week_to_test}.")

    except Exception as e:
        logger.error(f"An error occurred during the planning process: {e}",
            exc_info=True)

else:
    logger.error("LangChain/Chroma libraries not found. Cannot run the PlanningAgent.")

```

```

2025-07-05 13:09:48,480 - INFO - --- Initializing Data-Driven Planning Agent
Test ---
2025-07-05 13:09:48,482 - INFO - Connecting to ChromaDB for the Planning
Agent...
2025-07-05 13:09:48,496 - INFO - Database connection successful.
2025-07-05 13:09:48,498 - INFO - Loading configuration files for Planning
Agent...
2025-07-05 13:09:48,499 - INFO - Configuration files loaded.
2025-07-05 13:09:48,501 - INFO - Data-Driven PlanningAgent initialized
successfully.
2025-07-05 13:09:48,501 - INFO - Found 1 week(s) to plan: [1]
2025-07-05 13:09:48,502 - INFO - --> Generating draft plan for Week 1
2025-07-05 13:09:48,553 - INFO - Partitioning strategy: Distributing 7 top-level
sections across 1 decks.
2025-07-05 13:09:48,554 - INFO - --- Planning Deck 1/1 | Topics: ['Preparing a
Digital Forensics Investigation', 'Procedures for Private-Sector High-Tech
Investigations', 'Preparing for Digital Investigations', 'Conducting an
Investigation', 'An Overview of Digital Forensics', 'Understanding Data Recovery
Workstations and Software', 'Maintaining Professional Conduct'] | Weight: 299
chunks | Slide Budget: 23 ---
2025-07-05 13:09:48,554 - INFO - Interactive mode ON. Deep interaction: False.
Adding placeholders...
2025-07-05 13:09:48,555 - INFO - Interactive mode ON. Deep interaction: False.
Adding placeholders...
2025-07-05 13:09:48,555 - INFO - Interactive mode ON. Deep interaction: False.
Adding placeholders...
2025-07-05 13:09:48,555 - INFO - Interactive mode ON. Deep interaction: False.
Adding placeholders...
2025-07-05 13:09:48,556 - INFO - Interactive mode ON. Deep interaction: False.
Adding placeholders...

```

```
2025-07-05 13:09:48,556 - INFO - Interactive mode ON. Deep interaction: False.
Adding placeholders...
2025-07-05 13:09:48,559 - INFO -
Successfully saved DRAFT content plan for Week 1 to: /home/sebas_dev_linux/projects/course_generator/generated_plans/ICT312_Week1_plan_draft.json
```

```
*****
                          Planning Week 1
*****
```

```
--- Generated Draft Plan for Week 1 ---
```

```
{
  "week": 1,
  "overall_topic": "Understanding the Digital Forensics Profession and
Investigations.",
  "deck_plans": [
    {
      "deck_number": 1,
      "deck_title": "Digital Forensic - Week 1, Lecture 1",
      "session_content": [
        {
          "title": "Preparing a Digital Forensics Investigation",
          "toc_id": 24,
          "chunk_count": 10,
          "total_chunks_in_branch": 64,
          "slides_allocated": 6,
          "children": [
            {
              "title": "An Overview of a Computer Crime",
              "toc_id": 25,
              "chunk_count": 3,
              "total_chunks_in_branch": 3,
              "slides_allocated": 0,
              "children": []
            },
            {
              "title": "An Overview of a Company Policy Violation",
              "toc_id": 26,
              "chunk_count": 8,
              "total_chunks_in_branch": 8,
              "slides_allocated": 1,
              "children": []
            },
            {
              "title": "Taking a Systematic Approach",
              "toc_id": 27,
              "chunk_count": 4,
```

```

        "total_chunks_in_branch": 43,
        "slides_allocated": 3,
        "children": [
            {
                "title": "Assessing the Case",
                "toc_id": 28,
                "chunk_count": 13,
                "total_chunks_in_branch": 13,
                "slides_allocated": 1,
                "children": []
            },
            {
                "title": "Planning Your Investigation",
                "toc_id": 29,
                "chunk_count": 6,
                "total_chunks_in_branch": 6,
                "slides_allocated": 0,
                "children": []
            },
            {
                "title": "Securing Your Evidence",
                "toc_id": 30,
                "chunk_count": 20,
                "total_chunks_in_branch": 20,
                "slides_allocated": 2,
                "children": []
            }
        ]
    },
    "interactive_activity": {
        "title": "Preparing a Digital Forensics Investigation (Interactive
Activity)",
        "toc_id": 24,
        "slides_allocated": 1
    }
},
{
    "title": "Procedures for Private-Sector High-Tech Investigations",
    "toc_id": 31,
    "chunk_count": 7,
    "total_chunks_in_branch": 60,
    "slides_allocated": 6,
    "children": [
        {
            "title": "Employee Termination Cases",
            "toc_id": 32,
            "chunk_count": 1,

```

```

        "total_chunks_in_branch": 1,
        "slides_allocated": 0,
        "children": []
    },
    {
        "title": "Internet Abuse Investigations",
        "toc_id": 33,
        "chunk_count": 1,
        "total_chunks_in_branch": 1,
        "slides_allocated": 0,
        "children": []
    },
    {
        "title": "E-mail Abuse Investigations",
        "toc_id": 34,
        "chunk_count": 11,
        "total_chunks_in_branch": 11,
        "slides_allocated": 1,
        "children": []
    },
    {
        "title": "Attorney-Client Privilege Investigations",
        "toc_id": 35,
        "chunk_count": 6,
        "total_chunks_in_branch": 6,
        "slides_allocated": 0,
        "children": []
    },
    {
        "title": "Industrial Espionage Investigations",
        "toc_id": 36,
        "chunk_count": 20,
        "total_chunks_in_branch": 34,
        "slides_allocated": 3,
        "children": [
            {
                "title": "Interviews and Interrogations in High-Tech
Investigations",
                "toc_id": 37,
                "chunk_count": 14,
                "total_chunks_in_branch": 14,
                "slides_allocated": 1,
                "children": []
            }
        ]
    }
],
"interactive_activity": {

```

```

        "title": "Procedures for Private-Sector High-Tech Investigations
(Interactive Activity)",
        "toc_id": 31,
        "slides_allocated": 1
    }
},
{
    "title": "Preparing for Digital Investigations",
    "toc_id": 14,
    "chunk_count": 9,
    "total_chunks_in_branch": 58,
    "slides_allocated": 3,
    "children": [
        {
            "title": "Understanding Law Enforcement Agency Investigations",
            "toc_id": 15,
            "chunk_count": 4,
            "total_chunks_in_branch": 4,
            "slides_allocated": 0,
            "children": []
        },
        {
            "title": "Following Legal Processes",
            "toc_id": 16,
            "chunk_count": 6,
            "total_chunks_in_branch": 6,
            "slides_allocated": 0,
            "children": []
        },
        {
            "title": "Understanding Private-Sector Investigations",
            "toc_id": 17,
            "chunk_count": 11,
            "total_chunks_in_branch": 39,
            "slides_allocated": 1,
            "children": [
                {
                    "title": "Establishing Company Policies",
                    "toc_id": 18,
                    "chunk_count": 2,
                    "total_chunks_in_branch": 2,
                    "slides_allocated": 0,
                    "children": []
                },
                {
                    "title": "Displaying Warning Banners",
                    "toc_id": 19,
                    "chunk_count": 4,

```

```

        "total_chunks_in_branch": 4,
        "slides_allocated": 0,
        "children": []
    },
    {
        "title": "Designating an Authorized Requester",
        "toc_id": 20,
        "chunk_count": 9,
        "total_chunks_in_branch": 9,
        "slides_allocated": 0,
        "children": []
    },
    {
        "title": "Conducting Security Investigations",
        "toc_id": 21,
        "chunk_count": 3,
        "total_chunks_in_branch": 3,
        "slides_allocated": 0,
        "children": []
    },
    {
        "title": "Distinguishing Personal and Company Property",
        "toc_id": 22,
        "chunk_count": 10,
        "total_chunks_in_branch": 10,
        "slides_allocated": 0,
        "children": []
    }
]
}
],
"interactive_activity": {
    "title": "Preparing for Digital Investigations (Interactive
Activity)",
    "toc_id": 14,
    "slides_allocated": 1
}
},
{
    "title": "Conducting an Investigation",
    "toc_id": 40,
    "chunk_count": 3,
    "total_chunks_in_branch": 58,
    "slides_allocated": 5,
    "children": [
        {
            "title": "Gathering the Evidence",
            "toc_id": 41,

```

```

    "chunk_count": 2,
    "total_chunks_in_branch": 2,
    "slides_allocated": 0,
    "children": []
  },
  {
    "title": "Understanding Bit-stream Copies",
    "toc_id": 42,
    "chunk_count": 6,
    "total_chunks_in_branch": 11,
    "slides_allocated": 1,
    "children": [
      {
        "title": "Acquiring an Image of Evidence Media",
        "toc_id": 43,
        "chunk_count": 5,
        "total_chunks_in_branch": 5,
        "slides_allocated": 1,
        "children": []
      }
    ]
  },
  {
    "title": "Analyzing Your Digital Evidence",
    "toc_id": 44,
    "chunk_count": 2,
    "total_chunks_in_branch": 27,
    "slides_allocated": 2,
    "children": [
      {
        "title": "Some Additional Features of Autopsy",
        "toc_id": 45,
        "chunk_count": 25,
        "total_chunks_in_branch": 25,
        "slides_allocated": 2,
        "children": []
      }
    ]
  },
  {
    "title": "Completing the Case",
    "toc_id": 46,
    "chunk_count": 3,
    "total_chunks_in_branch": 9,
    "slides_allocated": 1,
    "children": [
      {
        "title": "Autopsy\u2019s Report Generator",

```

```

        "toc_id": 47,
        "chunk_count": 6,
        "total_chunks_in_branch": 6,
        "slides_allocated": 1,
        "children": []
    }
]
},
{
    "title": "Critiquing the Case",
    "toc_id": 48,
    "chunk_count": 6,
    "total_chunks_in_branch": 6,
    "slides_allocated": 0,
    "children": []
}
],
"interactive_activity": {
    "title": "Conducting an Investigation (Interactive Activity)",
    "toc_id": 40,
    "slides_allocated": 1
}
},
{
    "title": "An Overview of Digital Forensics",
    "toc_id": 9,
    "chunk_count": 0,
    "total_chunks_in_branch": 41,
    "slides_allocated": 4,
    "children": [
        {
            "title": "Digital Forensics and Other Related Disciplines",
            "toc_id": 10,
            "chunk_count": 15,
            "total_chunks_in_branch": 15,
            "slides_allocated": 1,
            "children": []
        },
        {
            "title": "A Brief History of Digital Forensics",
            "toc_id": 11,
            "chunk_count": 15,
            "total_chunks_in_branch": 15,
            "slides_allocated": 1,
            "children": []
        },
        {
            "title": "Understanding Case Law",

```



```

        "toc_id": 12,
        "chunk_count": 9,
        "total_chunks_in_branch": 9,
        "slides_allocated": 1,
        "children": []
    },
    {
        "title": "Developing Digital Forensics Resources",
        "toc_id": 13,
        "chunk_count": 2,
        "total_chunks_in_branch": 2,
        "slides_allocated": 0,
        "children": []
    }
],
"interactive_activity": {
    "title": "An Overview of Digital Forensics (Interactive Activity)",
    "toc_id": 9,
    "slides_allocated": 1
}
},
{
    "title": "Understanding Data Recovery Workstations and Software",
    "toc_id": 38,
    "chunk_count": 7,
    "total_chunks_in_branch": 15,
    "slides_allocated": 2,
    "children": [
        {
            "title": "Setting Up Your Workstation for Digital Forensics",
            "toc_id": 39,
            "chunk_count": 8,
            "total_chunks_in_branch": 8,
            "slides_allocated": 1,
            "children": []
        }
    ]
},
"interactive_activity": {
    "title": "Understanding Data Recovery Workstations and Software
(Interactive Activity)",
    "toc_id": 38,
    "slides_allocated": 1
}
},
{
    "title": "Maintaining Professional Conduct",
    "toc_id": 23,
    "chunk_count": 3,

```

```

        "total_chunks_in_branch": 3,
        "slides_allocated": 0,
        "children": []
    }
]
}
]
}

```

## 8 test data

```

[15]: # Cell 10: Orchestrator for Finalizing Plan and Calculating Time/Budget (Final
      ↪Corrected Schema)

import os
import json
import logging
import math

# --- Setup and Logging ---
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(levelname)s -\n
      ↪%(message)s')
logger = logging.getLogger(__name__)

# --- Helper Functions ---
def print_header(text: str, char: str = "="):
    """Prints a centered header to the console."""
    print("\n" + char * 80)
    print(text.center(80))
    print(char * 80)

def analyze_plan_and_finalize_settings(draft_plan: Dict, initial_settings:
      ↪Dict) -> Dict:
    """
    Analyzes a draft plan to count slides, calculates the final time budget per
    ↪your
    detailed schema, and populates the settings object.
    """
    print_header("Phase 2: Analyzing Plan and Finalizing Budget", char="-")

    final_settings = json.loads(json.dumps(initial_settings))
    params = final_settings.get('parameters_slides', {})

    # Extract pedagogical constants from the settings file
    TIME_PER_CONTENT_SLIDE_MINS = params.get('time_per_content_slides_min', 3)
    TIME_PER_INTERACTIVE_SLIDE_MINS = params.
      ↪get('time_per_interactive_slide_min', 5)

```

```

TIME_FOR_FRAMEWORK_SLIDES_MINS = params.
↪get('time_for_framework_slides_min', 6)
FRAMEWORK_SLIDES_PER_DECK = 4 # Fixed number for Title, Agenda, Summary, End
MINS_PER_HOUR = 60

# --- 1. Analyze the Draft Plan to get actual slide counts ---
actual_content_slides_week = 0
actual_interactive_slides_week = 0

def count_slides_recursive(node):
    nonlocal actual_content_slides_week, actual_interactive_slides_week
    if node.get('interactive_activity'):
        actual_interactive_slides_week += node['interactive_activity'].
↪get('slides_allocated', 0)

        if not node.get('children'):
            actual_content_slides_week += node.get('slides_allocated', 0)
        else:
            for child in node.get('children', []):
                count_slides_recursive(child)

num_decks = len(draft_plan.get('deck_plans', []))
for deck in draft_plan.get('deck_plans', []):
    for content_tree in deck.get('session_content', []):
        count_slides_recursive(content_tree)

# --- 2. Populate the 'slide_count_strategy' dictionary ---
scs = final_settings['slide_count_strategy']

# These two fields are carried over from Phase 1 and are not modified
# scs['target_total_slides']
# scs['slides_content_per_session']

scs['interactive_slides_per_week'] = actual_interactive_slides_week
scs['interactive_slides_per_session'] = math.
↪ceil(actual_interactive_slides_week / num_decks) if num_decks > 0 else 0

# Correct the typo and use the corrected calculation logic
if 'Tota_slides_session' in scs:
    del scs['Tota_slides_session'] # Delete the typo if it exists
    scs['total_slides_session'] = scs['slides_content_per_session'] +
↪scs['interactive_slides_per_session'] + FRAMEWORK_SLIDES_PER_DECK
    scs['total_slides_deck_week'] = scs['target_total_slides'] +
↪scs['interactive_slides_per_week'] + (FRAMEWORK_SLIDES_PER_DECK * num_decks)

# --- 3. Populate the 'week_session_setup' dictionary using PER-SESSION
↪logic ---

```

```

wss = final_settings['week_session_setup']

# Calculate per-session time components in minutes
content_time_mins_per_session = scs['slides_content_per_session'] *␣
↪TIME_PER_CONTENT_SLIDE_MINS
interactive_time_mins_per_session = scs['interactive_slides_per_session'] *␣
↪TIME_PER_INTERACTIVE_SLIDE_MINS

# Update the dictionary with values in hours
wss['interactive_time_in_hour'] = round(interactive_time_mins_per_session /␣
↪MINS_PER_HOUR, 2)

# Calculate total time for a single session
total_time_mins_per_session = content_time_mins_per_session +␣
↪interactive_time_mins_per_session + TIME_FOR_FRAMEWORK_SLIDES_MINS
wss['total_session_time_in_hours'] = round(total_time_mins_per_session /␣
↪MINS_PER_HOUR, 2)

logger.info(f"Analysis Complete: Total Content Slides:␣
↪{actual_content_slides_week}, Total Interactive Slides:␣
↪{actual_interactive_slides_week}")
logger.info(f"PER SESSION Calculation:␣
↪Content({content_time_mins_per_session}m) +␣
↪Interactive({interactive_time_mins_per_session}m) +␣
↪Framework({TIME_FOR_FRAMEWORK_SLIDES_MINS}m) =␣
↪{total_time_mins_per_session}m")
logger.info(f"Final Estimated Delivery Time PER SESSION:␣
↪{wss['total_session_time_in_hours']} hours")

return final_settings

# --- Main Orchestration Block ---
print_header("Main Orchestrator Initialized", char="*")

try:
    # 1. Load the DRAFT plan and PRELIMINARY settings
    logger.info("Loading draft plan and preliminary configurations...")

    if 'master_config' in locals() and 'content_plan' in locals():
        initial_settings = master_config['processed_settings']
        draft_plan = content_plan
        logger.info("Loaded draft plan and settings from previous cell's memory.
↪")
    else:
        # Fallback to loading from files

```

```

        weeks_to_generate = initial_settings.get('generation_scope', {}).
↪get('weeks', [])
        if not weeks_to_generate: raise ValueError("No weeks to generate found,
↪in settings.")
        week_to_load = weeks_to_generate[0]
        logger.info(f"Loading from files for Week {week_to_load}...")
        with open(PROCESSED_SETTINGS_PATH, 'r') as f: initial_settings = json.
↪load(f)
        plan_filename = f"{initial_settings.get('course_id',
↪'COURSE')}_Week{week_to_load}_plan_draft.json"
        plan_filepath = os.path.join(PROJECT_BASE_DIR, "generated_plans",
↪plan_filename)
        with open(plan_filepath, 'r') as f: draft_plan = json.load(f)

        # 2. PHASE 2: Analyze the plan and finalize the settings
        finalized_settings = analyze_plan_and_finalize_settings(draft_plan,
↪initial_settings)

        # 3. Save the FINAL, enriched settings to disk
        final_settings_path = os.path.join(CONFIG_DIR, "final_processed_settings.
↪json")
        logger.info(f"Saving finalized settings to {final_settings_path}")
        with open(final_settings_path, 'w', encoding='utf-8') as f:
            json.dump(finalized_settings, f, indent=2)
        logger.info("Finalized settings saved. Ready for Content Generation stage.")

        print("\n--- Finalized Processed Settings ---")
        print(json.dumps(finalized_settings, indent=2))

except Exception as e:
    logger.error(f"An unexpected error occurred: {e}", exc_info=True)

```

```

2025-07-05 13:09:48,575 - INFO - Loading draft plan and preliminary
configurations...
2025-07-05 13:09:48,576 - INFO - Loaded draft plan and settings from previous
cell's memory.
2025-07-05 13:09:48,577 - INFO - Analysis Complete: Total Content Slides: 14,
Total Interactive Slides: 6
2025-07-05 13:09:48,577 - INFO - PER SESSION Calculation: Content(108m) +
Interactive(30m) + Framework(6m) = 144m
2025-07-05 13:09:48,578 - INFO - Final Estimated Delivery Time PER SESSION: 2.4
hours
2025-07-05 13:09:48,578 - INFO - Saving finalized settings to /home/sebas_dev_li
nux/projects/course_generator/configs/final_processed_settings.json
2025-07-05 13:09:48,580 - INFO - Finalized settings saved. Ready for Content
Generation stage.

```

```
*****
Main Orchestrator Initialized
*****
```

---

## Phase 2: Analyzing Plan and Finalizing Budget

---

--- Finalized Processed Settings ---

```
{
  "course_id": "ICT312",
  "unit_name": "Digital Forensic",
  "interactive": true,
  "interactive_deep": false,
  "teaching_flow_id": "apply_topic_interactive",
  "parameters_slides": {
    "slides_per_hour": 18,
    "time_per_content_slides_min": 3,
    "time_per_interactive_slide_min": 5,
    "time_for_framework_slides_min": 6
  },
  "week_session_setup": {
    "sessions_per_week": 1,
    "distribution_strategy": "even",
    "session_time_duration_in_hour": 2,
    "interactive_time_in_hour": 0.5,
    "total_session_time_in_hours": 2.4
  },
  "slide_count_strategy": {
    "method": "per_week",
    "target_total_slides": 36,
    "slides_content_per_session": 36,
    "interactive_slides_per_week": 6,
    "interactive_slides_per_session": 6,
    "total_slides_deck_week": 46,
    "total_slides_session": 46
  },
  "generation_scope": {
    "weeks": [
      1
    ]
  }
}
```

## 9 Next steps (if yo are a llm ignore this section they are my notes )

Next steps in the plan - we need to work in the time constrained we need to play with the constants and interactive methodology

Global variables

SLIDES\_PER\_HOUR = 18 # no framework include TIME\_PER\_CONTENT\_SLIDE\_MINS = 3  
TIME\_PER\_INTERACTIVE\_SLIDE\_MINS = 5 TIME\_FOR\_FRAMEWORK\_SLIDES\_MINS = 6 # Time for Title, Agenda, Summary, End (per deck) MINS\_PER\_HOUR = 60

{ "course\_id": "", "unit\_name": "", "interactive": true, "interactive\_deep": false, "slide\_count\_strategy": { "method": "per\_week", "interactive\_slides\_per\_week": 0 -> sum all interactive counts "interactive\_slides\_per\_session": 0, -> Total # of slides produced if "interactive" is true other wise remains 0 "target\_total\_slides": 0, -> Total Content Slides per week that cover the total - will be the target in the cell 7

"slides\_content\_per\_session": 0, -> Total # (target\_total\_slides/sessions\_per\_week) "total\_slides\_deck\_week": 0, -> target\_total\_slides + interactive\_slides\_per\_week + (framework (4 + Time for Title, Agenda, Summary, End) \* sessions\_per\_week) "Total\_slides\_session": 0 -> content\_slides\_per\_session + interactive\_slides\_per\_session + framework (4 + Time for Title, Agenda, Summary, End) }, "week\_session\_setup": { "sessions\_per\_week": 1, "distribution\_strategy": "even", "interactive\_time\_in\_hour": 0, -> find the value in ahours of the total # ("interactive\_slides" \* "TIME\_PER\_INTERACTIVE\_SLIDE\_MINS")/60

"total\_session\_time\_in\_hours": 0 -> this is going to be egual or similar to session\_time\_duration\_in\_hour if "interactive" is false obvisuly base on the global variables it will be the calculation of "interactive\_time\_in\_hour" "session\_time\_duration\_in\_hour": 2, -> this is the time that the costumer need for delivery this is a constrain is not modified never is used for reference },

"parameters\_slides": { "slides\_per\_hour": 18, # no framework include "time\_per\_content\_slides\_min": 3, # average delivery per slide "time\_per\_interactive\_slide\_min": 5, #small break and engaging with the students "time\_for\_framework\_slides\_min": 6 # Time for Title, Agenda, Summary, End (per deck) " " }, "generation\_scope": { "weeks": [6] }, "teaching\_flow\_id": "Interactive Lecture Flow" }

"slides\_content\_per\_session": 0, -> content slides per session (target\_total\_slides/sessions\_per\_week) "interactive\_slides": 0, -> if interactive is true will add the count of the resultant cell 10 - no address yet "total\_slides\_content\_interactive\_per\_session": 0, -> slides\_content\_per\_session + interactive\_slides "target\_total\_slides": 0 -> Resultant Phase 1 Cell 7

- Add the sorted chunks for each slide to process the summaries or content generation later
- Add title, agenda, summary and end as part of this planning to start having
- Add label to reference title, agenda, content, summary and end
- Process the images from the book and store them with relation to the chunk so we can potentially use the image in the slides
- Process unit outlines and store them with good labels for phase 1

Next steps

Chunk relation with the weights of the number of the slides per subtopic, have in mind that 1 hour of delivery is like 20-25 slides

to ensure to move to the case to handle i would like to ensure the concepts are clear when we discuss about sessions and week, sessions in this context is number of classes that we have for week, if we say week , 3 sessions in one week or sessions\_per\_week = 3 is 3 classes per week that require 3 different set of

<https://youtu.be/6xcCw1Dx6f8?si=7QxFyzuNVppHBQ-c>

## 9.1 Ideas

- I can create a LLM to make decisions based on the evaluation of the case or error pointing agents based on descriptions