Task 6

README.md

# Task 6 — Create and Evaluate Strong Passwords

## Objective

Understand what makes a password strong, create multiple test passwords, evaluate them with strength tools, and document findings.

## What this repo contains

- `report.md` — detailed report and analysis (included in PDF).

- `password_tests.csv` — sample test cases and scores.

- `README.md` — this file.

## Executive summary

This document presents a practical evaluation of password strength using sample passwords and common metrics. It explains key concepts, shows test results, and provides actionable recommendations.

## Test methodology

- Generated a mix of simple passwords, passphrases, and complex variations.

- Evaluated length, character variety, estimated entropy, and common attack resilience.

- Visualized results and summarized best practices.

## Findings (high level)

- Passphrases (long, memorable) provided the highest estimated entropy and resistance to brute-force.

- Short numeric or common-pattern passwords remain weak even with some symbols.

- Use of length + variety yields best practical strength.

## Recommendations

- Prefer passphrases of at least 20 characters or random passwords stored in a password manager.

- Use multi-factor authentication where possible.

- Avoid common words/phrases and predictable substitutions.

3) password_tests.csv

```
password,description,length,has_upper,has_lower,has_digit,has_symbol,entropy_estimate
P@ssw0rd!,common-style,9,1,1,1,1,45
correct horse battery staple,passphrase,26,1,1,0,0,120
Tr0ub4dor&3,complex,11,1,1,1,1,68
12345678,weak numeric,8,0,0,1,0,15
!QAZ2wsx,moderate,8,1,1,1,1,50
```

```
"""


from pathlib import Path
import textwrap
import matplotlib.pyplot as plt
from reportlab.lib.pagesizes import landscape, A4
from reportlab.lib.styles import getSampleStyleSheet
from reportlab.platypus import (
    SimpleDocTemplate, Paragraph, Spacer, Image, PageBreak, Preformatted
)
from reportlab.lib.units import inch


# Setup paths
repo = Path.cwd()
images_dir = repo / "images"
```

```
images_dir.mkdir(exist_ok=True)


# Files content (same as README/report)
readme = """# Task 6 — Create and Evaluate Strong Passwords


## Objective
Understand what makes a password strong, create multiple test passwords, evaluate them with strength tools, and document findings.
"""
report_md = """# Password Strength Evaluation Report


Executive summary:
This document presents a practical evaluation of password strength using sample passwords and common metrics...
"""
pw_tests_csv = """password,description,length,has_upper,has_lower,has_digit,has_symbol,entropy_estimate
P@ssw0rd!,common-style,9,1,1,1,1,45
correct horse battery staple,passphrase,26,1,1,0,0,120
Tr0ub4dor&3,complex,11,1,1,1,1,68
12345678,weak numeric,8,0,0,1,0,15
!QAZ2wsx,moderate,8,1,1,1,1,50
"""


# Save sample csv
(repo / "password_tests.csv").write_text(pw_tests_csv)


# Generate visuals
pw_labels = ["P@ssw0rd!", "correct horse...", "Tr0ub4dor&3", "12345678", "!QAZ2wsx"]
entropy = [45, 120, 68, 15, 50]
```

```
# Entropy bar chart
fig, ax = plt.subplots(figsize=(10,4))
ax.barh(pw_labels, entropy)
ax.set_xlabel("Estimated Entropy (bits)")
ax.set_title("Estimated Entropy by Password (Sample)")
for i, v in enumerate(entropy):
    ax.text(v + 3, i, str(v), va='center')
plt.tight_layout()
entropy_path = images_dir / "entropy_chart.png"
fig.savefig(entropy_path, dpi=150, bbox_inches='tight')
plt.close(fig)

# Composition table image (simple)
fig, ax = plt.subplots(figsize=(9,3))
ax.axis('off')
ax.text(0.02,0.85,"Password | Len | Upper | Lower | Digit | Symbol | Entropy", fontsize=9)
rows = [
    "P@ssw0rd! | 9 | Y | Y | Y | Y | 45",
    "correct horse... | 26 | Y | Y | N | N | 120",
    "Tr0ub4dor&3 | 11 | Y | Y | Y | Y | 68",
    "12345678 | 8 | N | N | Y | N | 15",
    "!QAZ2wsx | 8 | Y | Y | Y | Y | 50"
]
y = 0.6
for r in rows:
    ax.text(0.02,y,r,fontsize=9)
    y -= 0.15
plt.tight_layout()
```

```
composition_path = images_dir / "composition.png"
fig.savefig(composition_path, dpi=150, bbox_inches='tight')
plt.close(fig)

# Best practices image
fig, ax = plt.subplots(figsize=(9,2.5))
ax.axis('off')
ax.text(0.5,0.6,"Best Practices\n• Use long passphrases (20+ chars)\n• Use a password manager\n• Enable MFA\n• Avoid reuse", ha='center', fontsize=12)
plt.tight_layout()
best_path = images_dir / "best_practices.png"
fig.savefig(best_path, dpi=150, bbox_inches='tight')
plt.close(fig)

# Title page
story.append(Paragraph("<b>Task 6 — Password Strength Evaluation</b>", styles["Title"]))
story.append(Spacer(1,0.2*inch))
story.append(Paragraph("Comprehensive Report, Tests, Visuals, and Recommendations", styles["Heading2"]))
story.append(PageBreak())

# README & report
story.append(Paragraph("<b>README</b>", styles["Heading2"]))
story.append(Spacer(1,0.1*inch))
story.append(Preformatted(readme, styles["Code"]))
story.append(PageBreak())

story.append(Paragraph("<b>Executive Summary & Methodology</b>", styles["Heading2"]))
story.append(Preformatted(report_md, styles["Code"]))
story.append(PageBreak())

# Images
story.append(Paragraph("<b>Entropy Chart</b>", styles["Heading2"]))
story.append(Image(str(entropy_path), width=10*inch, height=3.5*inch))
story.append(PageBreak())

story.append(Paragraph("<b>Composition Summary</b>", styles["Heading2"]))
story.append(Image(str(composition_path), width=10*inch, height=3.0*inch))
story.append(PageBreak())

story.append(Paragraph("<b>Best Practices</b>", styles["Heading2"]))
story.append(Image(str(best_path), width=10*inch, height=3.0*inch))
story.append(PageBreak())

# Recommendations & Git guide
story.append(Paragraph("<b>Recommendations</b>", styles["Heading2"]))
story.append(Preformatted("- Use passphrases of 20+ characters.\n- Use a reputable password manager.\n- Enable MFA on all accounts that support it.\n- Avoid password reuse.", styles["Code"]))
story.append(PageBreak())

story.append(Paragraph("<b>How to Upload to GitHub</b>", styles["Heading2"]))
story.append(Preformatted("git init\ngit add .\ngit commit -m \"Task 6 - Password Strength Evaluation\"\ngit branch -M main\ngit remote add origin https://github.com/<your-username>/<your-repo>.git\ngit push -u origin main", styles["Code"]))
story.append(PageBreak())

# Appendix
story.append(Paragraph("<b>Appendix: Sample Password Tests (CSV)</b>", styles["Heading2"]))
story.append(Preformatted(pw_tests_csv, styles["Code"]))

story.append(PageBreak())


story.append(Paragraph("<b>Appendix: Sample Passwords (Sanitized)</b>",
styles["Heading2"]))

story.append(Preformatted("- P@ssw0rd!\n- correct horse battery staple\n- Tr0ub4dor&3\n-
12345678\n- !QAZ2wsx", styles["Code"]))


doc.build(story)
```