The Importance of an Engineering Notebook in a Coding Class

Tracking Progress and Encouraging Thoughtful Development

Overview

introduction to Engineering Notebooks

- **Definition:** An Engineering Notebook is a record of design ideas, development processes, and solutions in engineering projects.
- **Purpose:** Helps coders document their thinking, track progress, and stay organized.

Why Use an Engineering Notebook in Coding Classes?

**1** **Reflection of Thought Process:** Coders can log problem-solving strategies, errors, and learning from them.

3 **Encourages Discipline:** Regular documentation fosters careful planning and problem analysis.

2 **Progress Tracking:** Provides a timeline of work and improvements.

4 **Proof of Work:** Validates that students are following proper coding methodologies and approaches.
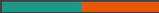
Components of an Engineering Notebook

Date and Time: Timestamp for every entry or session.

Problem Statement: What is the problem you're addressing?

Ideas and Plans: How do you plan to solve it? Pseudocode or flowcharts.

Code Development: Notes about the coding process, challenges, and errors.

Test and Debugging Results: Document testing results and debugging steps.

Reflection: After each session, a brief analysis of what was learned, what challenges arose, and next steps.

How to Structure an Entry

- **Title of the Day/Session:** E.g., *Solving Array Indexing Bug.*
- **Objective:** Clearly define the goal for that session.
- **Approach:** Outline planned steps or pseudocode.
- **Code Observations:** Documenting any insights, blockages, or notes on why changes were made.
- **Challenges:** Record bugs or errors encountered with potential solutions.
- **Results:** State outcomes and reflect on whether goals were met.
- **Next Steps:** Define follow-up tasks for the next session.

Title of the Day/Session:	
Date:	
Objective: Clearly define the goal for that session.	

Approach:
Outline planned steps or pseudocode.
	1.
	   a.
	   b.
	2.
	   a.
	   b.
	3.
	   a.

Code: Document your code	
Code Observations: Documenting any insights, blockages, or notes on why changes were made.	

Challenges: Record bugs or errors encountered with potential solutions.	
Results: State outcomes and reflect on whether goals were met.	

Benefits for Students

- **Skill Development:** Encourages critical thinking, planning, and problem-solving.
- **Improves Learning Retention:** Writing down concepts reinforces memory.
- **Portfolio Development:** The notebook serves as proof of iterative problem-solving,showing instructors the process behind projects.
- **Grades and Assessment:** Instructors can assess not just the final product, but the student's development process.

Real-World Use of Engineering Notebooks

1 **In Industry:** Used by software engineers, data scientists, and project managers to log progress and collaborate on projects.

2 **Legal Documentation:** Engineers use notebooks to protect intellectual property, demonstrating the evolution of an idea.

Digital vs. Paper Notebooks

(1) **Paper Notebooks:**

- Tangible, easy to use without tech tools.
- Harder to organize and search past entries.

(2) **Digital Notebooks:**

- Can include code snippets, images, and links.
- Easier to collaborate with teammates or instructors.
- Tools: Google Docs, Microsoft OneNote, or specialized software like Jupyter Notebooks for coding.
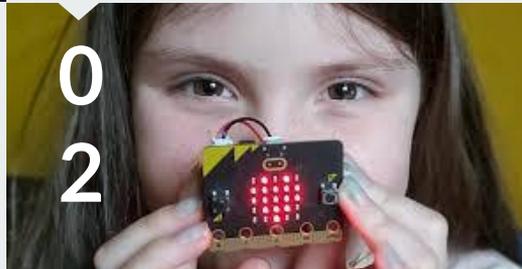
Sample Notebook Entry

01

Link to female Student

Aphrodite's Notebook

03

Link to a male Student

Creed's Notebook

02

This years Notebook

Revised Notebook 2024ZPxMMzPTumLbEBtzWAdqI/edit?usp=sharing

Encouraging Best Practices in Class

- **Daily Entries:** Require students to document each coding session.
- **Self-Reflection:** Encourage students to write about the why, not just the how.
- **Peer Reviews:** Have students review each other's notebooks for collaboration and feedback.
- **Notebook Checks:** Incorporate notebook reviews into grading.

Conclusion

Summarize: An engineering notebook is a powerful tool for documentation, reflection, and proof of work in coding classes.

Call to Action: Encourage students to make regular, detailed entries and use the notebook as a companion in their coding journey.

Reinforces ELA Standards:
- ❖ Writing for Various Purposes
  - ➢ When students document their coding process, they are engaging in **expository writing**, explaining their thinking, challenges, and solutions clearly.
- ❖ Using Evidence to Support Thinking
  - ➢ A student may note, "I chose to use a loop structure instead of recursion because testing showed it was more efficient