

# Project: The Hidden Brain

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## Textbook

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### Project Overview

Firmware is a type of software embedded in hardware—it acts like a "hidden brain" that helps a device function properly. In this group project, you will dive deep into the concept of firmware by researching real-world devices that depend on it. Then, you'll work collaboratively to design and publish an **interactive multimedia webpage** or **digital portfolio** that teaches others about firmware's role, risks, and importance in our everyday digital lives.

### Essential Question

**How does firmware help devices work, and why is it important to understand its role in today's digital world?**

### Project Objectives

By the end of this project, you will be able to:

- Define firmware and explain its role in different types of devices.
- Explore at least three real-world examples of devices that contain firmware (e.g., printers, smart TVs, routers, wearables, game consoles, etc.).
- Create a visually engaging multimedia artifact (webpage or digital portfolio) that educates viewers about firmware.
- Apply project management and collaborative tools to work efficiently in teams.
- Generate proper citations for research sources, images, and media content.
- Use industry-appropriate terminology to describe their findings and presentation.

### Group Roles & Collaboration Tools

Each group (3–4 students) will select or be assigned specific roles:

- **Lead Researcher** – conducts and organizes the research
- **Multimedia Designer** – builds the digital artifact using advanced design tools (e.g., Google Sites, Canva, Adobe Express, Wix, or similar)
- **Citation Specialist** – ensures all sources are properly cited using tools like EasyBib or Zotero
- **Project Manager** – sets deadlines and coordinates team progress using tools like shared Google Calendars, Trello, or Microsoft Teams

Groups will also use **collaborative messaging platforms** (e.g., Google Chat, Microsoft Teams, Slack) to coordinate and share work asynchronously.

## Project Tasks & Timeline

Step	Activity
1	Introduction to firmware with teacher demo; group formation and role assignment
2–3	Research different devices containing firmware; gather images, specs, and diagrams
4	Begin drafting content; define firmware, its functions, and importance in each device
5–6	Create digital artifact (webpage or portfolio); incorporate images, videos, text, and glossaries of technical terms
7	Review work; add citations and polish formatting
8	Peer-review another group's artifact and give feedback
9	Final edits and publication
10	Present project to the class or publish to a shared online gallery

## Required Elements in the Digital Artifact

- A clear **definition of firmware** and why it matters
- Descriptions of **three devices** that use firmware, including labeled diagrams or images
- A **comparison chart** showing how firmware operates in each device
- A **section on firmware updates** and the risks of outdated firmware
- At least one **embedded video** (created by the students or from a reputable source)
- A **glossary** of terms such as BIOS, embedded systems, non-volatile memory, bootloader, etc.
- **Proper citations** for all information and media sources
- A **collaborative reflection** paragraph explaining how the team worked together

## Assessment Criteria

Criteria	Description
<b>Research Depth</b>	Accurate, well-researched examples and clear explanation of firmware
<b>Digital Design</b>	Creative, well-organized multimedia artifact using advanced tools
<b>Collaboration</b>	Effective use of productivity tools and equal contribution from team members

<b>Citations</b>	Complete and properly formatted citations for all text and non-text sources
<b>Terminology Use</b>	Appropriate and accurate use of technical terms
<b>Presentation or Publication</b>	Clear, engaging presentation or successful upload to gallery

## Reflection Prompt (Individual)

At the end of the project, each group member will submit their own short reflection (can be typed or recorded) addressing:

- What did you learn about firmware that surprised you?
- How did your team divide responsibilities and stay organized?
- What tools were most helpful in creating your final product?

## Questions (1)

**1. How many steps are included in this project planning?**

MULTIPLE CHOICE

**Choose the correct answer:**

- A. 3
- B. 5
- C. 7
- D. 10

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## Answer Keys & Solutions

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### Questions

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1. How many steps are included in this project planning?

MULTIPLE CHOICE

Correct Answer:

A. 3

✗ Incorrect

B. 5

✗ Incorrect

C. 7

✗ Incorrect

D. 10

✓ Correct