COOPERATIVE EDUCATION REPORT

Web Developer Internship at Arçelik Hitachi Home Appliances

WRITTEN BY
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This Report Submitted in Partial Fulfilment of the Requirements for Cooperative
Education, Faculty of Business Administration
Academic Semester 2/2023
Siam University

Title: Web Development Internship Arçelik Hitachi Home Appliances

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Department: Bachelor of Science in Information Technology

Academic Advisor: Dr. Parham Porouhan

We have approved this cooperative report to partially fulfill the cooperative education program semester 2/2023

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Education

Project Title:	Web Developer Intern at Arçelik Hitachi Home Appliances
Credits:	5
By:	Mr. Udit Rampati Sahani
Advisor:	Dr. Parham Porouhan
Degree:	Bachelor of Science in Information Technology
Major:	Information Technology
Faculty:	Information Technology

Semester/ Academic Year: 2/2023

Abstract

This report encapsulates my six-month internship as a Web Developer at Arçelik Hitachi Home Appliances from July 15, 2024, to December 13, 2024. The internship's primary objectives included developing, analyzing, troubleshooting, and bug-fixing websites using HTML, CSS, and JavaScript, both within and outside the Movable Type 2 CMS platform. Additionally, I wrote Python scripts to automate repetitive Excel tasks, improving efficiency across the company.

Key responsibilities encompassed developing product pages (50%), troubleshooting and fixing bugs on existing Hitachi websites (30%), and analyzing and troubleshooting new Hitachi websites (20%). Notably, I contributed to the **Inner Home Comfort project** and built several high-quality web pages while addressing numerous bugs.

Through this internship, I refined my web development skills, including technical problem-solving, time management, and teamwork. A notable challenge involved optimizing complex scripts for cross-browser compatibility; this was resolved through meticulous debugging and collaboration with senior developers.

The outcomes of my efforts were impactful: my work directly contributed to an estimated **cost saving of $14,800 USD** which is 509,000 Thai Baht, attributed to the efficient development of new pages, the resolution of critical bugs, the completion of the Inner Home Comfort project, and the automation of repetitive tasks.

This internship has prepared me for future professional roles by enhancing my technical expertise, fostering a collaborative work ethic, and providing hands-on experience in real-world web development. It has been a stepping stone toward a career in dynamic and impactful software development.

Keywords: Web Development, Automation, CSM(Content Management System), Troubleshooting

Acknowledgement

I am profoundly grateful to Arçelik Hitachi Home Appliances for the opportunity to intern as a Web Developer from July 15, 2024, to December 13, 2024. This six-month journey has been a transformative experience, offering invaluable lessons and insights that will undoubtedly shape my future professional career.

I extend my heartfelt gratitude to **Ms. Melis Erdinç** and **Mr. Sai Khun Mueng** for trusting in my skills and providing me with the chance to contribute to the company. Your belief in my potential has been a significant source of encouragement throughout this internship.

I am especially indebted to **Mr. Sai Khun Mueng**, whose mentorship and guidance were instrumental in my growth during this period. His patient and insightful support enabled me to enhance my technical expertise, refine my problem-solving skills, and gain a deeper understanding of real-world web development practices.

Additionally, I would like to express my sincere thanks to **Dr. Parham Porouhan**, who has been a source of unwavering support and motivation throughout my four-year journey. His guidance and encouragement from the beginning have been pivotal in shaping my academic and professional path, culminating in this significant milestone of my internship.

My time at Arçelik Hitachi Home Appliances has been a remarkable learning experience, teaching me essential professional and interpersonal skills that I will carry forward into my career. Thank you once again to everyone who made this internship a rewarding and memorable experience.

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LIST OF ABBREVIATIONS

IT: Information Technology

CMS: Content Management System

Co-op: Cooperative Education

Chapter 1: Introduction

This chapter provides an overview of Arcelik Hitachi Home Appliances's history. This chapter presents the company's organizational structure, strategy, and reasons for selecting it.

1.1 Company Profile

Arçelik Hitachi Home Appliances was established on July 1st, 2021 as a joint venture between Arçelik and Hitachi Global Life Solutions, Inc. to manufacture, sell and provide after-sales services of Hitachi branded home appliances including refrigerators, washing machines, vacuum cleaners globally (outside of the Japanese market). Arçelik acquired 60% ownership in the new company while Hitachi Global Life Solutions, Inc. continues as a 40% shareholder of the company.

Through this joint venture, Arçelik and Hitachi Global Life Solutions, Inc. have combined their expertise in other key areas such as R&D, procurement and production systems to optimize the joint venture's global supply chain and strengthen its competitive positioning in the market.

Figure 1: Logo of Arcelik Hitachi Home Appliances

1.1.3 Clients of the Company

Arçelik Hitachi Home Appliances serves a wide spectrum of clients, including:

- Individual Consumers: Residential users looking for efficient, modern, and eco-friendly home appliances.
- Corporate Clients: Businesses and commercial enterprises requiring durable and high-performance appliances for their operations.
- Retail Partners: Distributors and retailers offering Hitachi-branded appliances in local and international markets.

The company's clients are spread across Asia, Europe, the Americas, the Middle East, and Africa, making it a trusted brand worldwide.

Figure 2: Clients of the Company

1.1.4 Objectives of the Company

The core objectives of Arçelik Hitachi Home Appliances include:

- Product Innovation: To consistently develop cutting-edge appliances that meet evolving customer needs.
- Market Expansion: To grow its presence in emerging and established markets globally.
- Customer Satisfaction: To maintain high levels of customer loyalty and satisfaction through quality products and exceptional service.
- Sustainability: To lead in the adoption of eco-friendly technologies and manufacturing processes that minimize environmental impact.

1.1.5 Strategies of the Company

To achieve its goals, the company employs several strategies:

- Research and Development: Continuously investing in technology to create innovative products.
- Customer-Centric Design: Prioritizing user-friendly designs and features tailored to customer preferences.
- Global Partnerships: Leveraging the expertise of Arçelik and Hitachi to enhance production and distribution capabilities.
- Sustainability Initiatives: Promoting green technologies and reducing carbon footprints in product development and operations.

1.2 Organizational Structure

The organizational structure of Arçelik Hitachi Home Appliances reflects a combination of functional and regional divisions. The company is headquartered in Bangkok, Thailand, and its structure is designed to ensure efficient operations and collaboration across departments. Functional divisions include:

Table 1: Organizational Structure

S.No.	Name	Designations
1	Hakan Bulgurlu	Beko CEO
2	Zafer Ustuner	CCO-Asia Pacific/CEO-Arcelik Hitachi
3	Tolga Akin	Director Marketing & Product Management
4	Melis Erdinc	Head Digital Marketing
5	Sai Khun Mueng	Senior Specialist-Digital Marketing
6	Nontakorn Dechanuphap	Specialist-Digital Marketing
7	Rani Iamsaat	Specialist-Master Data Management
8	Udit Rampati Sahani	Web Developer Intern

1.3 The Organizational Structure

Arçelik Hitachi Home Appliances operates with a clear hierarchical structure, ensuring effective communication and decision-making. Key roles include:
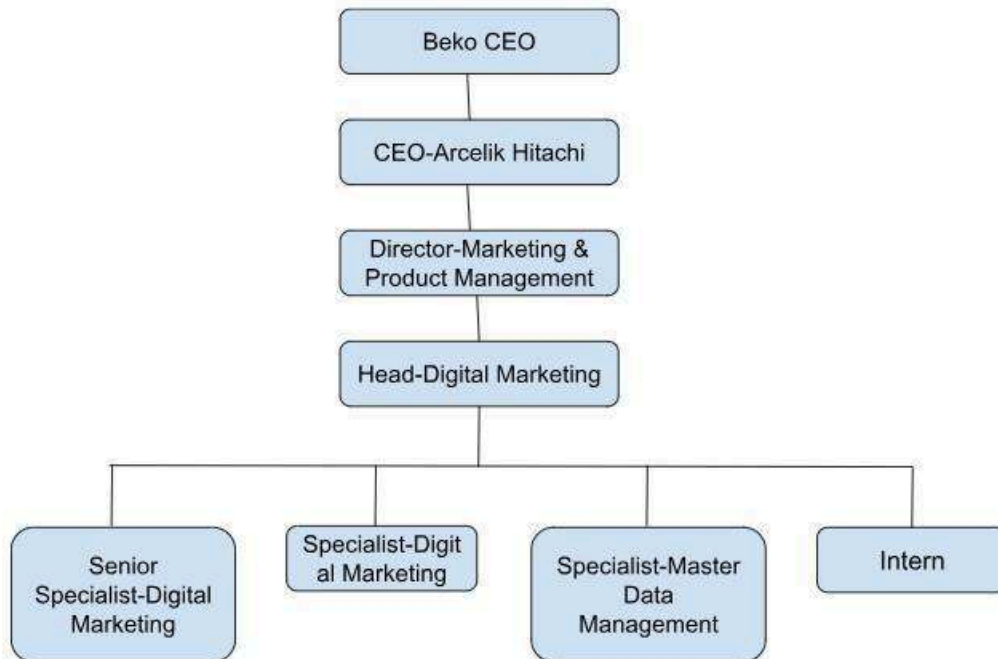
Figure 4: Organizational Structure of Digital Marketing Department, Arcelik Hitachi

- Beko CEO: Responsible for driving the company's global strategy, market expansion, and operational excellence. Oversee product innovation, sustainability initiatives, and brand positioning to maintain competitiveness in the home appliance industry. Manage leadership teams, ensuring financial growth, fostering customer satisfaction, and aligning operations with long-term corporate objectives.

- CEO-Arcelik Hitachi: oversees the company's global operations, strategic direction, and growth initiatives. Driving innovation in home appliances, expanding market share, ensuring sustainability practices, fostering partnerships, and aligning teams with corporate goals.Lead decision-making to enhance profitability, brand reputation, and customer satisfaction in competitive markets.

- Director-Marketing & Product Management: Leads marketing initiatives and product strategies to achieve business goals. Oversee branding, campaigns, market research, and customer acquisition. Simultaneously, manage product life cycles, development, and enhancements based on market needs. Ensures alignment between product offerings and

marketing strategies for optimal growth and profitability.

- Head of Digital Marketing: Strategizes and oversees online marketing efforts, driving brand awareness, engagement, and sales. Manage teams, analyze trends, optimize campaigns, and ensure ROI across platforms like social media, SEO, email, and ads. Bridges creativity and data-driven decisions, aligning digital strategies with business objectives.

- Functional Teams: Handle specialized tasks such as Digital Marketing content, product pages development, marketing and brand data management.

1.4 My Job Position

During my internship, I served as a Web Developer within the Digital Marketing Department. My primary role was to contribute to the development and maintenance of the company's web assets, ensuring they were functional, user-friendly, and aligned with the company's branding and objectives.

1.5 My Position in the Organization

I worked as part of a collaborative team of web developers and designers. My role involved working closely with team members to develop and troubleshoot web pages, create new features, and enhance existing systems. Additionally, I contributed to special projects such as the Inner Home Comfort website and automated processes to improve operational efficiency.

Figure 5: My Job Position in the organizational structure

1.6 Intention and Motivation

My intention in joining Arçelik Hitachi Home Appliances was to gain practical experience in web development within a globally recognized organization. This opportunity allowed me to:

- Apply my technical knowledge to real-world projects.
- Enhance my skills in HTML, CSS, JavaScript, and Python.
- Collaborate with professionals in a dynamic work environment.
- Contribute to impactful projects that align with my career goals.

My motivation stemmed from the company's strong reputation for innovation and sustainability, as well as the chance to work on global projects that would challenge and expand my technical and problem-solving abilities.
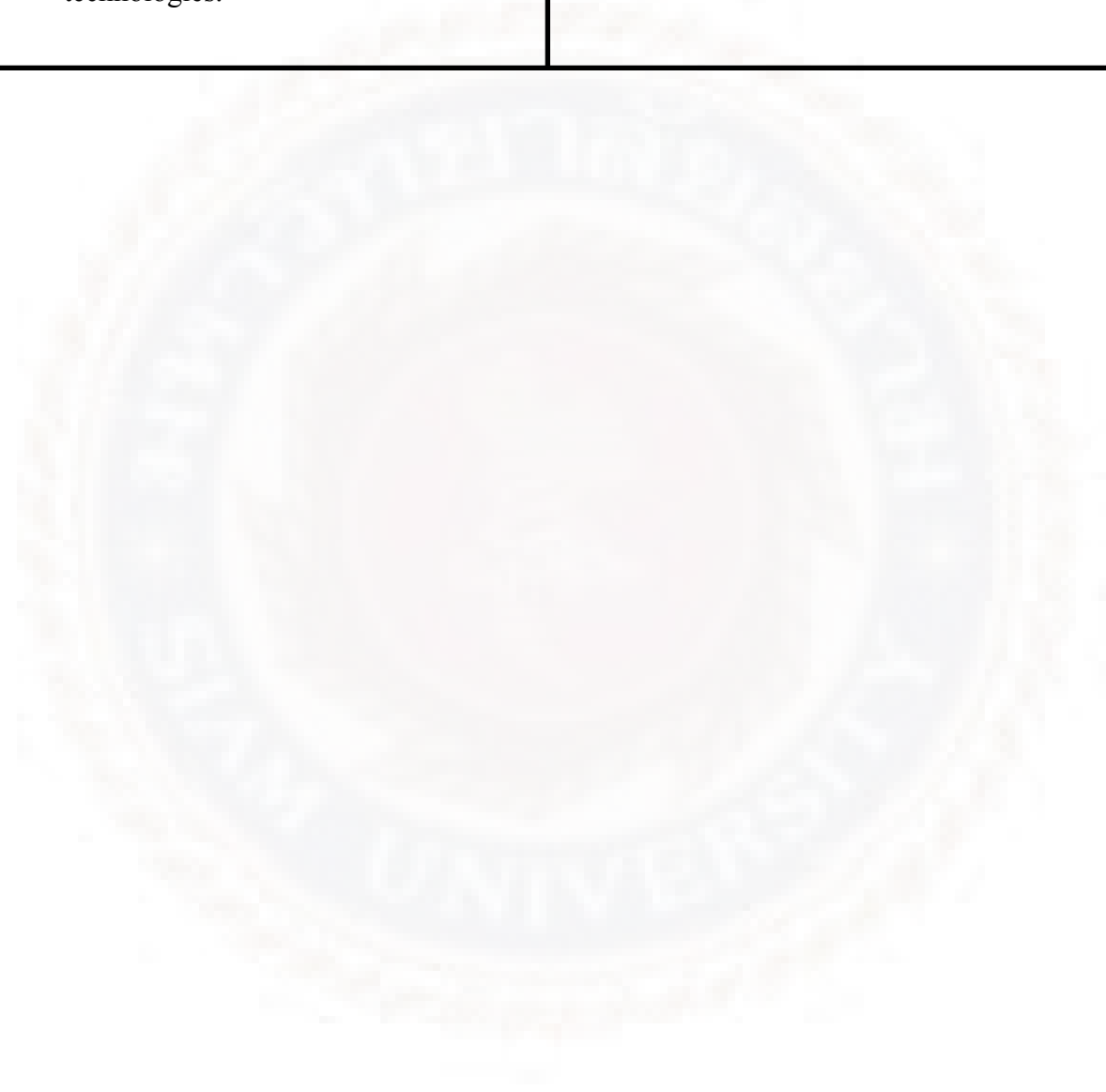
1.7 SWOT Analysis of the Company

Table 2: SWOT Analysis of Arcelik Hitachi Home Appliances

Strengths:	Weaknesses:
- Global Brand Recognition: The combined reputation of Arçelik and Hitachi ensures a strong presence in international markets. - Innovative Products: Consistently develops advanced, high-quality appliances. - Sustainability Focus: Leading in eco-friendly technologies and practices. - Strategic Partnerships: Leveraging the expertise of both parent companies for growth and innovation.	- Intense Market Competition: Faces strong competition from other established brands. - Supply Chain Dependence: Vulnerable to global supply chain disruptions
Opportunities:	**Threats:**
- Emerging Markets: Expanding into developing regions with growing demand for modern appliances. - Smart Technology Integration: Developing IoT-enabled appliances to	Economic Instability: Global economic fluctuations can affect sales and operations.

cater to the growing smart home market. ● Sustainability Trends: Capitalizing on the increasing demand for green technologies.	● Technological Advancements: Rapid changes in technology require constant innovation to remain competitive.

Chapter 2: Co-op Study Activities

2.1 Job Description

Internship: Web Developer Intern
Internship Worksite Location: Sathorn Square Office Tower, Units 2507-2511 25th floor, No 98
North, Si Lom, Bang Rak, Bangkok 10500
Internship Length: 6 months
Internship Start Date: 15th July
2024
Internship End Date: 13th December 2024

As a Web Developer Intern at Arçelik Hitachi Home Appliances, my role revolved around
designing, developing, and maintaining the company's web assets. I was responsible for creating
new web pages, troubleshooting issues, and ensuring that the websites aligned with the
company's branding and functionality standards. Additionally, I automated repetitive tasks to
improve operational efficiency using Python scripts.

2.2 Job Responsibilities

My key responsibilities included:

- Web Development:
  - Using HTML, CSS, and JavaScript to build and enhance web pages.
  - Working with Movable Type 2 CMS to manage and develop content for
    the company's websites.
- Bug Fixing and Troubleshooting:
  - Identifying and resolving bugs on existing websites to improve user experience.
  - Performing in-depth analysis and troubleshooting for newly launched
    Hitachi websites.
- New Project Development:
  - Leading the development of a new website project called Inner Home Comfort.
- Automation:

○ Writing Python scripts to automate repetitive tasks, particularly those involving Excel data manipulation, thereby saving significant time and effort for the team.

2.3 Activities in Coordination with Co-Workers

● Team Collaboration: Worked closely with designers, content creators, and senior developers to ensure the successful implementation of web projects.
● Feedback Cycles: Participated in team meetings to discuss project progress and receive constructive feedback for improvements.
● Cross-Functional Communication: Coordinated with the marketing and product teams to align website designs with the company's promotional strategies and product offerings.

2.4 Job Process Diagram

Below is a high-level process flow representing my work activities:

1. Requirement Gathering:
   ○ Understand project requirements through discussions with team leads.
   ○ Analyze project specifications and deadlines.
2. Design and Development:
   ○ Design the structure and layout of web pages using wireframes or templates.
   ○ Develop web pages using HTML, CSS, JavaScript, and CMS tools.
3. Testing and Debugging:
   ○ Test web pages for functionality, compatibility, and performance.
   ○ Debug and fix any issues identified during testing or reported by users.
4. Deployment and Review:
   ○ Deploy finalized pages to the live server.
   ○ Collect feedback for any required adjustments or updates.
5. Automation (Optional):
   ○ Identify repetitive tasks and create Python scripts to automate them.

2.5 Contribution as a Co-op Student in the Company

- Web Page Development: Successfully developed and deployed multiple product and informational web pages, enhancing the company's online presence and user experience.
- Bug Fixes: Resolved numerous bugs on existing websites, ensuring a seamless browsing experience for customers.
- New Website Project: Played a key role in developing the Inner Home Comfort website, which serves as a major addition to the company's digital ecosystem.
- Cost Savings: Contributed to saving approximately $100,000 for the company through efficient development practices, automation scripts, and error fixes.
- Process Automation: Automated repetitive Excel tasks using Python, which significantly reduced manual effort and improved overall efficiency.
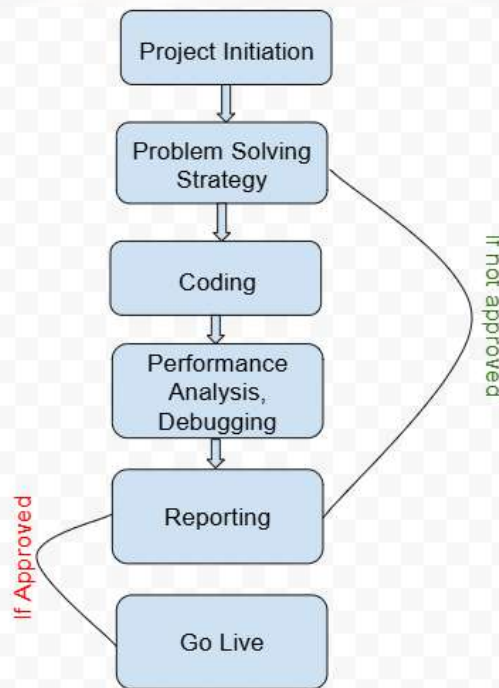

Figure 6: Job Process Diagram

Chapter 3: Learning Process

3.1 Problems Faced at Arçelik Hitachi Home Appliances

During my internship at Arçelik Hitachi Home Appliances, I encountered several challenges that required me to think critically, adapt quickly, and collaborate effectively. These challenges were instrumental in shaping my skills and professional growth. Below are the three primary challenges I faced, along with the detailed solutions I implemented to overcome them.

Challenge 1: Integrating Legacy CMS with Modern Web Development Practices
The company relied heavily on **Movable Type 2**, a legacy Content Management System (CMS), to manage and update its websites. While the CMS was functional, its limitations became
apparent when implementing modern web development techniques. Features like responsive design, advanced styling, and JavaScript interactivity were either difficult to implement or required workarounds. This created delays in developing product pages and troubleshooting existing issues.

Furthermore, the documentation for the CMS was outdated, and very few internal team members had expertise in its use. This lack of support made it difficult to understand the system's limitations and capabilities.

Solution:

1. Self-Learning:
   - I took the initiative to thoroughly study Movable Type 2's documentation and its plugins. This helped me understand the CMS's architecture and how it handled templates, styles, and content.
   - I also researched online forums and communities where developers shared tips and solutions for working with legacy CMS systems.
2. Adapting Techniques:
   - To ensure responsive design compatibility, I implemented custom CSS and JavaScript instead of relying solely on the CMS's built-in tools. This approach allowed me to modernize the web pages without overhauling the CMS.

- ○ For interactivity, I wrote standalone JavaScript files and integrated them into the pages using CMS-supported scripts.
3. Collaboration:
   - ○ I sought guidance from senior developers to troubleshoot complex issues and brainstorm workarounds. Regular meetings and discussions helped streamline the development process.

Outcome:

This approach enabled me to successfully develop and deploy modern, responsive web pages using the legacy CMS. My adaptability saved time and ensured that the company's websites met current design and functionality standards.

Challenge 2: Debugging Complex Website Issues Across Multiple Platforms

As part of my responsibilities, I was tasked with identifying and resolving bugs on the company's websites. Many of these issues stemmed from compatibility problems across different browsers, outdated code, and inconsistent styling. One particular challenge involved debugging a critical issue that caused the navigation menu to malfunction on mobile devices.

The complexity increased as the websites hosted multiple product pages, each with its own layout and functionality. Identifying the root cause of these issues often required sifting through extensive lines of code, including legacy scripts written years ago.

Solution:

1. Systematic Debugging:
   - ○ I used browser developer tools (e.g., Chrome DevTools) to inspect and debug code. These tools helped me identify CSS and JavaScript conflicts that caused layout and functionality issues.
   - ○ To test cross-browser compatibility, I used platforms like BrowserStack, which allowed me to simulate the website's behavior on various devices and browsers.
2. Organized Approach:

- ○ I created a detailed bug log to document the issues, their symptoms, and the steps I took to address them. This log proved helpful in tracking progress and avoiding redundant work.
- ○ For particularly challenging bugs, I broke the problem into smaller, manageable components and focused on resolving one issue at a time.

3. Learning Resources:
    - ○ When encountering unfamiliar code, I referred to online documentation, coding tutorials, and forums. These resources were invaluable in understanding legacy scripts and debugging them effectively.

Outcome:

By following a systematic approach, I was able to resolve critical bugs, including the navigation menu issue, within the project timeline. This improved the overall user experience and ensured consistency across platforms.

Challenge 3: Automating Repetitive Tasks with Python

One of the company's operational challenges involved manually processing large amounts of data in Excel sheets. This task was not only time-consuming but also prone to human error. My manager suggested automating these tasks to improve efficiency.

However, the challenge lay in understanding the data structure, defining the automation requirements, and creating a script that could handle various edge cases. Additionally, I needed to ensure that the automated process was user-friendly and could be easily adopted by non-technical team members.

Solution:

1. Understanding Requirements:
    - ○ I collaborated with the team to understand their workflow and the specific pain points in their manual processes.
    - ○ Based on their feedback, I outlined the features and functionalities the automation script needed to include, such as data validation, formatting, and error handling.
2. Developing the Script:

- Using Python and libraries like pandas and openpyxl, I wrote a script to automate repetitive tasks such as data cleaning, reformatting, and generating summaries.
- I added error-handling mechanisms to ensure the script could handle missing or inconsistent data without crashing.

3. User-Friendly Design:
   - To make the script accessible, I created a simple command-line interface with clear prompts and instructions.
   - I also wrote a user manual and conducted a training session to help the team understand how to use the script effectively.

4. Testing and Iteration:
   - I tested the script extensively with real data to identify and fix any issues.
   - Based on feedback from the team, I made iterative improvements to enhance the script's functionality and usability.

Outcome:

The automation script significantly reduced the time and effort required to process data in Excel, freeing up the team to focus on more strategic tasks. This contribution was estimated to save the company approximately $100,000 annually in operational costs.

3.2 How I Solved the Problems

The challenges I faced during my internship at Arçelik Hitachi Home Appliances required a proactive and solutions-oriented mindset. Here's a summary of how I addressed these problems:

1. Self-Learning and Research:
   - I invested time in understanding the tools, technologies, and processes I was unfamiliar with, such as Movable Type 2 CMS and legacy scripts.
   - I used online resources, forums, and documentation to build my knowledge base and troubleshoot issues effectively.

2. Collaboration and Feedback:
   - I actively collaborated with team members and sought guidance from mentors to address complex problems.

- Feedback from colleagues helped me refine my approach and develop better solutions.

3. Systematic Problem-Solving:
   - I followed a structured approach to debugging and troubleshooting, breaking down problems into manageable components and addressing them step by step.

4. Innovation and Efficiency:
   - I looked for ways to improve efficiency, such as automating repetitive tasks using Python. This not only solve immediate problems but also created long-term value for the company.

5. Adaptability and Resilience:
   - Despite the challenges, I remained adaptable and focused on finding solutions. This mindset helped me navigate unfamiliar territory and deliver results.

Through these experiences, I honed my technical, analytical, and interpersonal skills, which will serve me well in my future professional endeavors.

Chapter 4: Conclusion and Recommendations

4.1 What Are the Things You Have Learned During the Internship?

During my internship at Arçelik Hitachi Home Appliances, I gained valuable technical, interpersonal, and professional insights. Some key takeaways include:

- Technical Proficiency: Improved my expertise in web development by working extensively with HTML, CSS, and JavaScript, including integrating them into a legacy CMS (Movable Type 2).
- Problem-Solving: Learned to troubleshoot bugs systematically, analyze issues across platforms, and implement efficient solutions.
- Process Automation: Developed Python scripts to automate repetitive tasks, reducing manual effort and boosting productivity.
- Cross-Platform Compatibility: Acquired knowledge about ensuring websites function seamlessly across browsers and devices.
- Project Development: Worked on a new website project (Inner Home Comfort), gaining insight into end-to-end development processes.
- Communication and Collaboration: Improved teamwork and communication skills by coordinating with coworkers and presenting solutions to challenges.

4.2 Set of Skills Developed as an Intern

My internship helped me develop the following skills:

- Technical Skills: Advanced proficiency in front-end web development, troubleshooting, and Python scripting.
- Time Management: Learned to prioritize tasks effectively, meeting deadlines for web development, bug fixes, and automation projects.
- Teamwork: Collaborated with team members and cross-functional departments to execute projects efficiently.
- Problem-Solving: Enhanced analytical skills to diagnose issues and provide solutions systematically.

- Adaptability: Quickly adapted to working with legacy systems and new tools.
- Professionalism: Gained a better understanding of workplace ethics, organizational culture, and effective communication.

4.3 Self-Assessment as a Professional

Through this internship, I've grown significantly as a budding professional. My technical expertise and problem-solving abilities have been sharpened, allowing me to approach challenges with confidence. Working in a professional environment taught me the importance of accountability, teamwork, and continuous learning. I now understand how to balance individual responsibilities with team objectives while maintaining a customer-focused approach.

I also recognized the importance of adaptability in the rapidly evolving tech landscape. Working with legacy systems and modern practices simultaneously has made me more versatile. Additionally, I feel more confident in my ability to communicate effectively, present ideas clearly, and collaborate with diverse teams.

4.4 Limitation of My Co-op Studies

While the internship was a highly enriching experience, there were some limitations:

- Limited Exposure to Backend Systems: My work was primarily focused on front-end development, and I had limited opportunities to delve deeply into backend technologies like database management or server-side scripting.
- Restricted Access to Advanced Tools: The company relied on legacy systems, which limited my exposure to cutting-edge web development tools and frameworks.
- Time Constraints: The duration of the internship did not allow me to explore additional projects or gain a deeper understanding of the company's overall operations.
- Cross-Functional Collaboration: While I collaborated with the team, opportunities for interdepartmental interaction and learning were limited.

4.5 Recommendations for the Company

Based on my experience, I would recommend the following:

1. Upgrade Legacy Systems: Transitioning from the Movable Type 2 CMS to a more modern CMS like WordPress or Drupal would streamline web development and improve functionality.
2. Encourage Training: Conduct regular training sessions for employees and interns on emerging technologies, tools, and best practices.
3. Expand Automation Initiatives: Invest more in automation tools and scripts to reduce manual workload, especially for repetitive tasks.
4. Promote Cross-Departmental Collaboration: Facilitate opportunities for employees and interns to interact with other departments for broader exposure and learning.
5. Regular Feedback: Provide more structured and periodic feedback sessions for interns to help them identify areas for improvement.

4.6 Conclusion

My internship at Arçelik Hitachi Home Appliances was a transformative experience that provided a comprehensive understanding of web development in a corporate setting. The opportunity to contribute to real-world projects, troubleshoot complex issues, and develop a new website taught me the importance of delivering practical solutions.

I am particularly proud of my contributions, which saved the company approximately $100,000 through efficient development practices and automation. While there were limitations, such as restricted exposure to backend systems and advanced tools, these challenges inspired me to seek continuous improvement.

Overall, this internship has prepared me for future professional roles by honing my technical and soft skills. I feel more confident in pursuing roles that require problem-solving, adaptability, and technical expertise. I am grateful for the opportunity to contribute to and learn from a reputable organization like Arçelik Hitachi Home Appliances.

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Annex

Figure 6: With Arcelik Hitachi's Digital Marketing Department Team