INDUSTRIAL TRAINING REPORT

Internship training report on
ModusToolbox™

submitted in partial fulfilment of the
Requirements for the award of

Bachelor of Engineering
in
School of Electronics and Communication Engineering

Carried out at

Cypress Semiconductor (An Infineon Technologies Company)

Submitted By-
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01FE18BEC171

Under the guidance of

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SUBMITTED TO:
School of Electronics and Communication Engineering
KLE TECHNOLOGICAL UNIVERSITY
Hubballi

DECLARATION

I hereby declare that the Industrial Internship Training Report entitled **ModusToolbox™** is an authentic record of my own learning as requirements of Industrial Internship Training during the period from Jan 15, 2022 to June 30, 2022 for the award of degree of Bachelor of Engineering at KLE Technological University,Hubballi under the guidance of Prof. Tanuja R. Patil

Shridatha Mohan Hegde

01FE18BEC171

Date:

K.L.E SOCIETY'S
KLE Technological University,
HUBBALLI-580031
2021-2022

CERTIFICATE

This is to Certify that Shridatha Mohan Hegde studying in final year has undergone Industrial Internship Training in Cypress Semiconductor(An Infineon Technologies Company) at Bengaluru from 20-01-2022 to 30-06-2022 in partial fulfillment for the award for Bachelor of Engineering in Electronics and Communication in the School of Electronics and Communication Engineering of KLE Technological University, Hubballi for the academic year 2021-2022.

Prof. Tanuja R. Patil	**Dr. Nalini C. Iyer**	**Dr. N.H. Ayachit**
Guide	**Head of School**	**Registrar**

External Viva:

Name of Examiners **Signature with date**

1.

2.

IFIN HR- 2022
24-05-2022

CERTIFICATE

To Whom It May Concern

Formal Data:

Student Name: Shridatha Mohan Hegde

Institution: KLE Technological University

Organization: Infineon Technologies India Pvt. Ltd.

Project Instructors/ Managers: Jaya Bindra

Evaluation of work:

Shridatha Mohan Hegde was working as a Student Trainee with us from 20-Jan-2022 till 30-Jun-2022 and is working on the project "**Intelligent voice control wearable".**

Shridatha Mohan Hegde is an avid and independent learner, has good analytical & application skills and has shown exemplary performance during the internship period.

We wish Shridatha Mohan Hegde a long fruitful career and success in future endeavors.

For Infineon Technologies India Pvt. Ltd.

Thara Aiyanna
HR Manager

ACKNOWLEDGMENT

The sense of contentment and relation that accompanies the successful completion of this project would be incomplete without mentioning the names of the people who helped me in accomplishing this project, and people whose constant guidance, support and encouragement resulted in its realization. I would like to take this opportunity to express my heartfelt gratitude to each and every individual who directly or indirectly played a role in this journey of my project and industry training.

I am grateful to **Mrs. Jaya Bindra**, Senior Manager Applications Engg and **Mr. Arvind Krishnan**,Principal Engineer Applications Engg, for being my mentors at Cypress Semiconductor (An Infineon Technologies Company), Bengaluru. Their constant support and belief is helping me to develop both personally and professionally. Their in-depth knowledge and expertise in solving issues and having regular meetings with them helped me gain insights into various industry issues related to my project. I sincerely thank Cypress Semiconductor for providing me an opportunity to work on real-time industry issues that always kept me on my toes. I also want to thank **Mr. Narayanan, Mr. Ajay, Mr. Meenakshi, Mr. Chandrashekahr, Mr. Praveen and Mr. Ashutosh** at **CSS ICW APP SOL** team, **Infineon Technologies** for including me in their discussions and for providing me a friendly work environment.

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- Shridatha Mohan Hegde

ABOUT COMPANY

Cypress Semiconductor Corporation is an American semiconductor design and manufacturing company, and is now owned by Infineon Technologies. It offeres NOR flash memories, F-RAM and SRAM Traveo microcontrollers, the industry's only PSoC programmable system-on-chip solutions, analog and PMIC Power Management ICs, CapSense capacitive touch-sensing controllers, Wireless BLE Bluetooth Low-Energy and USB connectivity solutions. Its headquarters are in San Jose, California, and it has operations in the United States, Ireland, India and the Philippines.

In June 2019, Infineon Technologies announced it would acquire Cypress for 9.4 billion USD, making Infineon one of the world's top 10 semiconductor manufacturers. Infineon markets semiconductors and systems for automotive,industrial, and multimarket sectors, as well as chip card and security products.

Cypress 3.0 is the plan to target markets growing faster than the broader semiconductor industry with embedded systems solutions: combinations of MCUs, wireless connectivity, analog, USB and memory products plus the software to enable them to work together flawlessly. The solutions give innovators the foundation they need to go above and beyond. With built-in security and PSoC® MCUs, products can get to market faster, safer and smarter. Embedded systems enable solutions that sense, connect, learn and respond to make life easier, save time and energy, and provide a better user experience. It is committed to the success of the customers, the development of the employees, and the increase of shareholder value

ABSTRACT

This report documents the trainings and learnings carried out at Cypress Semiconductor(An Infienon Technologies company) during the internship period. The report is divided into three sections. The first section lists out the HR related (online) courses completed within the first month of the internship. The HR courses imbibe a supportive and professional behavior among the employees. The second section reviews the technical courses carried out during the second month of the internship. These trainings familiarize an Application Engineer with several tools that aid him during the solution development process. This learning helped in understanding the current market trends and challenges in the world of IoT and how as an solution engineer approaches it to execute successfully.

Contents

Chapter 1

HR Training

1.1 Need for Management skills and business ethics

A good engineer is not just the one who solves problems but also adheres to industry standards of conduct. A good engineer upholds the work-culture. A good engineer understands work and business ethics. Decisions taken within an organization may be made by individuals or groups, but whoever makes them will be influenced by the culture of the company. The decision to behave ethically is a moral one; employees must decide what they think is the right course of action.

As an Infineon employee, one is required to follow all of Infineon's specifications, policies, and practices. Among many other things, this includes (but is not limited to) your responsibility to follow Infineon's Code of Business Conduct and Ethics.

The Internship required the candidate to go through several online courses on ethics, responsible behavior, safe communication, etc. to bridge the gap between a graduate and a professional.

1.2 Overview of HR courses

The list of courses completed as a part of the HR training are covered in the upcoming sections.

1.3 Antitrust Training

This training familiarizes employees about the how various US laws promote Fair competition and protect businesses and consumers from anti-competitive business practices.

1.4 Code of Business Conduct and Ethics

At Infineon, one is guided by values that are central to work, business, relationships with each other and with customers and suppliers. Most of the time the right conduct is obvious. But in some situations, it is not and that's why one has to learn about the Code of Business Conduct and Ethics. This course reinforces the Company's core values, namely; to do what's right for Infineon. The course helps employees achieve and sustain the highest standard of business conduct and ensure compliance with legal requirements.

1.5 Infineon Corporate Social Responsibility Primer

The Corporate Social Responsibility (CSR) Primer course helps employees understand how Infineon incorporates sustainable CSR principles into our business operations.

1.6 Foreign Corrupt Practices Act Course

This training class familiarizes employees with the Foreign Corrupt Practices Act (FCPA), a law that governs how US persons or entities work with foreign officials and political parties.

1.7 Global Whistle-blower Policy

This global policy outlines guidelines and procedures for receiving, responding and managing issues raised or complaints made by any employee, supplier, customer, contractor or other individual or third party (each, a "whistle-blower") regarding questionable accounting, auditing matters or internal accounting controls; suspected fraud; non-compliance with Infineon accepted business practices, including the Company's Code of Conduct and Business Ethics, Infineon established policies, or country specific, regional, federal, state, and local laws.

1.8 Hazard Communication - General Safety

This course reviews employee expectations, general safety requirements,emergency procedures, and Environmental, Health, and Safety resources.

1.9 Introduction to IT Training

This course provides the Infineon employee with an overview of all corporate information technology tools, methods and policies for working at Cypress Semiconductor.

1.10 IT Security for End Users: Secure Corporate Communications and Networking

The advancement in corporate communications and social networking has opened countless opportunities and new ways for people to perform their jobs. But just as our IT communications options have advanced, so have the security threats posed by these advancements. This course highlights about the common threats to corporate computers and devices that exploit vulnerabilities in communications and networking methods such as e-mail, Internet, and social networking platforms. This course also covers best practices and techniques to mitigate security risks while conducting communications as part of the job. Finally, this course covers what social engineering is, and how as an end user of corporate computers and devices one can protect oneself and the company from the intelligent ways hackers use social engineering.

1.11 Patent and Confidentiality Agreement

A patent is an exclusive right granted by a country to an inventor, allowing the inventor to exclude others from making, using or selling his or her invention in that country during the life of the patent. It does NOT give the inventor the right to use or "practice" the invention, and thus the right is subject to any prior rights that others may have to related inventions. Many companies view a patent portfolio as essential, even if they don't plan a vigorous program of enforcement litigation. They believe that having a portfolio of patents allows them to settle infringement claims against them by "cross licensing" patents with the other side.

1.12 Workplace Harassment Prevention for Individual Contributors for Employees

Harassment at work can have a corrosive effect on an organization's culture and can lead to low employee morale, reduced productivity, and even criminal liability. Focusing on the forms of harassment prohibited by federal law, this course provides an overview of the types of behaviours that can give rise to harassment claims, including those based on sex, race, colour, national origin, religion, age, and disability. It also discusses the benefits of and strategies for promoting a respectful work environment that is free of all forms of harassment, intimidation, and discrimination.

1.13 Inferences from the HR Training

The above mentioned courses were effectively completed in the given time. Universities need to appreciate the importance of managerial skills and business ethics and incorporate them into the curriculum.

Chapter 2

Technical Training

2.1 Need for a multi-skilled design engineer

Cross-domain knowledge is one of the vital things that makes a candidate stand out among the crowd. Unfortunately, there is still some gap between the university and the industry in this regard.

In a company like Infineon, where, for example, a Solution Engineer works alongside with a Technical Marketing team to understand current trends and aspects of IoT market at the global level, based on customer requirements and revenue perspective. So, the flow of development of an IP (Intellectual Property) is required.

One of the most valuable part of the company is its database. The database must be handled in a well-organized and robust manner for its effective use, not just for now, but for the coming generation of engineers as well. Hence the knowledge of how the database is prepared and handled within the company is very important.

The Internship required the candidate to go through several courses on competitor analysis and market analysis to get insights on solution development.

2.2 Overview of Technical Training

The list of courses completed as a part of the technical training are covered in the upcoming sections.

2.3 Technical writing

Technical writing is a highly valuable skill. It is crucial for anyone working in a tech-related business, for engineers communicating their technical knowledge.

"Best Engineers are the best writers", says Samuel C. Florman.

Technical writing is not just about understanding technical information and recording it in a document. Technical writing takes high-level information and processes it into digestible content for a specific audience.

Process involved in Technical Writing-

- Project preparation
- Project preparation
- Understand the user

Types of Technical Reports-

- Technical Manuals
- Technical proposals
- Technical specification datasheets
- Guides and handbooks
- Standard Operating Procedure

2.4 Technical Presentation

Communication includes effective presentation capabilities. One must be able to discuss their own thoughts, projects, proposals, tactics in front of an audience, team, and venture capitalists both online and offline.

To accomplish the end result of this relationship, it is necessary to have both technical and non-technical presenting skills.Presentation skills are needed for successful communication. Presentation skills enable to engage with your audience, manager, teammates in a more efficient and competent manner.

Following are the aspects of good technical presentation-

- Knowing in depth of subject matter
- Knowing type of audience
- Knowing the presentation flow
- Proper structuring the presentation document
- Minimized distraction

2.5 ModusToolbox™ Software Training

This section contains ModusToolbox™ training classes that are organized into three levels. Each class is focused on a specific area so that one can learn about a topic quicker and build upon the knowledge.

The level 1 getting started class covers the basic concepts and building blocks of ModusToolbox™. Level 2 classes cover a product or product family such as PSoC™. Level 3 classes cover more advanced systems such as Bluetooth®, Wi-Fi, or Machine Learning.

2.5.1 ModusToolbox™ Software Training Level 1

This is the entry-level ModusToolbox™ training class. It is a pre-requisite for all level 2 and level 3 ModusToolbox™ training classes.

This class is a survey of the ModusToolbox™ development platform. The learning objective is to introduce the tools in the ModusToolbox™ ecosystem and help to develop some familiarity with using them. The class is a mile wide and an inch deep. This enables to understand the scope of the development ecosystem.

2.5.2 ModusToolbox™ Software Training Level 2

This is a 2nd level ModusToolbox™ training class. It covers PSoC™ 6 and PSoC™ 4 MCUs.

The material and examples demonstrate the use of peripherals such as GPIOs, PWMs, ADCs, UARTs, etc. CAPSENSE™ and DMA are covered in detail, as is the use of low power modes.

2.5.3 ModusToolbox™ Software Training Level 3

This is a class to teach how to use Bluetooth® Low Energy and Wi-Fi in ModusToolbox™ applications. This enables to create and debug full Bluetooth® applications using the ModusToolbox™ ecosystem including peripherals, centrals, and beacons.

The descriptions and exercises use a PSoC™ 6 MCU as a host to a CYW43012 connectivity device.

2.6 PicoVoice™

Picovoice™ is a scalable cloud-based platform for designing voice interfaces and training speech models. It provides API support across multiple platforms, which describes what to do with the text input and export them as trained models. These models are then deployed into the edge devices.

Picovoice™ provides web-based GUI that enables to create new projects and run exported models without requiring constant connectivity. It also provides SDK and, console to build and iterate models.

2.7 SensiML™

SensiML™, a subsidiary of QuickLogic, offers cutting-edge software that enables ultra-low power IoT endpoints that implement AI to transform raw sensor data into meaningful insight at the device itself. The company's flagship solution, the SensiML Analytics Toolkit, provides an end-to-end development platform spanning data collection, labeling, algorithm and firmware auto generation, and testing.

Chapter 3

Conclusion

During my internship, I learned how to communicate and build relationships with the people I worked with. I learnt how to ask questions and gain a better understanding of businesses not only in the co-working space, but also others in the market. This process overall helped me develop my professional network and emphasised the importance of creating these connections.

Asking for and receiving professional feedback is very important. It is essential to take note of both the positive and negative points for the future, so one can grow and excel in their career. I learned that sometimes asking for feedback or receiving feedback is difficult to hear, but it will have a significant impact on your future career and success.

References

[1] ModusToolbox™ Software Training Level 1 - Getting Started

[2] ModusToolbox™ Software Training Level 2 – PSoC™ MCUs

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[5] Embedded C for IoT Developers

[6] Deploying Keras model - Embedded Computing Design

[7] TinyML Professional certificate

[8] Edge AI for IoT Developers

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