

REPORT ON SUMMER DEVELOPMENT PROGRAM SPRINT-1

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DAY 1: Dated on 15th May, 2024 had 2-Sessions.

Session One: Industry Perspective of Embedded Systems

Dr. Rajesh Sola was the instructor for this session was engaging and informative, shedding light on the industry perspective of embedded systems. The session had following topics covered:

- What exactly is an embedded system?
- The different segments of embedded systems—both vertical and horizontal.
- The revolutionary technologies that are transforming the field.
- Key companies that are leading the way in embedded systems.

To make things more practical, sir assigned us a task: each row had to research a major company in a specific sector that uses embedded systems. Our row was given the medical industry. This task was both fun and informative as we explored companies like Abbott, Medtronic, and Medi Buddy, discovering how they integrate embedded systems into their medical technologies.

Session Two: Introduction to Product Development Life Cycle

Dr. Prithvi Sekhar Pagala, led our session, starting with an video on how PDLC is utilized in the industry. Key Takeaways on PDLC:

- Idea Generation: Identifying requirements using the 4W & 1H method and performing SWOT analysis. Deriving HLR and LLR.
- Design and Development: Creating the product's design and developing prototypes. HLD and LLD using UML tools.
- Testing and Validation: Rigorous testing of prototypes for performance, safety, and regulatory compliance. Using feedback to make necessary adjustments.
- Implementation: Writing code, conducting tests, performing quality checks, and peer reviews.

The PDLC is a structured process that streamlines product development, minimizes risks, and enhances the likelihood of a successful launch. It's practical and efficient for our future projects.

DAY 2: Dated on 16th May, 2024 had 2-Sessions.

Session One: Workshop on Agile Methodology



Priyadarshini Kabaka & Anurag Kumar were the instructors for this session. They started the session with a ice-breaker followed with a fun group activity to practically show how Agile Methodology is efficient when compared to traditional methodology. The session also included an activity named 'Planning poker' to understand how setting timeline for that particular task.

The session covered key aspects as:

- What is Agile Methodology? Why Agile Methodology?
- What is scrum? Why scrum ceremonies?
- Importance of daily scrum.
- What is Kanban? Usage of kanban chart in projects.

The session ended with a true/false quiz for the quick recap.

Session Two: CV Making & LinkedIn Profile Optimization



Bharadwaj Y.S.N was the instructor of this session. The session was fun & crucial as it dealt with resume making & linkedin.

Session covered topics such as,

- What is resume? Types of resumes and their importance.
- Why is LinkedIn so crucial?
- LinkedIn profile optimization & AI tools used.
- Cold Emails for job findings
- How to make our posts more efficient & how to increase networking?

This ended with the task of making our resume & reviewing our LinkedIn profiles.

DAY 3: Dated on 17th May, 2024.

Session: Introduction to Git and GitHub

Bharath.G was the instructor for this session and session covered following points:

- How PDLC is used in Industry projects?
- Types of Collaborations: Source Control Management (SCM) & Version Control System (VCS)
- Differences Between Git and GitHub:
Git: A local tool for tracking changes in your code.
GitHub: A website that hosts your Git repositories and provides additional tools for collaboration and project management.
- How to Create a Repository in GitHub.
- Learnt about git commands to push commands from VS Code to Github.
- Code-space is a cloud-based development environment from GitHub. It allows you to code directly in your browser, making collaboration easier and ensuring everyone has the same setup.

Activities done in this session:

- Took design of calculator as the problem statement.
- Made a PDLC analysis on the problem statement.
- Captured Requirements. Use an Excel sheet to document project requirements: HLR & LLR.
- Used draw.io to create flow charts and block diagrams, which help visualize project workflows and system architecture.
- Wrote and implemented code and tested the code in VS Code.
- Created a repository & pushed all the above files to the Github.

DAY 4: Dated on 20th May, 2024.

Session: PCB Workshop

Dr. Arvind Kumar & Girish Shankar Mishra were the instructors for this session. The session included following topics:

- What is breadboard? Advantages & Disadvantages of breadboard.
- What is PCB? Advantages of PCB.
- Comparison of PCB & Breadboard.
- PCB manufacturing process.
- Tools used to create PCB design.

After this introduction we were walked through process where we first created circuit on TinkerCad followed with creating that circuit in EasyEDA and creating a Gerber file.

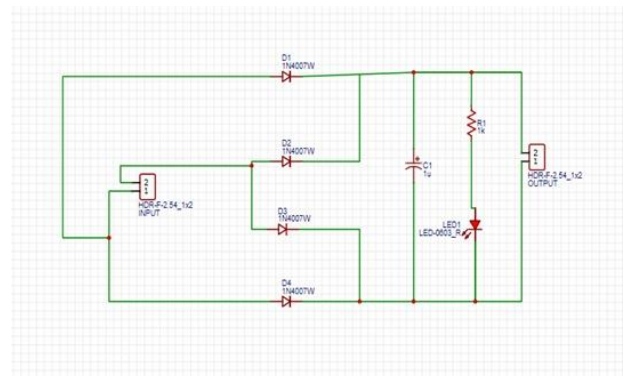
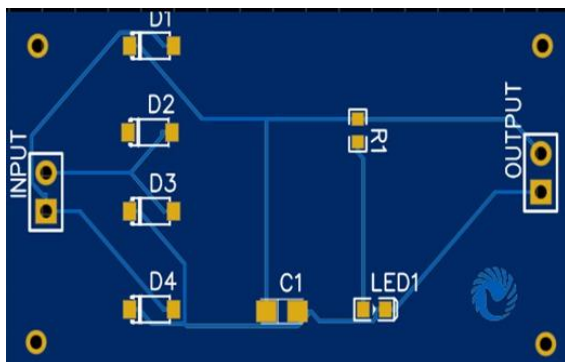
Following these steps we completed the below listed tasks:

1. Implemented 555 timer circuit in TinkerCad.
2. PCB design for the same circuit in EasyEDA.
3. Hardware connection of LED blinking using 555 on breadboard and checked for results.

Tasks provided as a practice:

1. Select an analog circuit of your choice and design it on TinkerCad and EasyEDA.
2. Select a digital circuit and design it on TinkerCad and EasyEDA.
3. Choose a real life problem statement and solve it . Design a circuit for that using TinkerCad and EasyEDA.

Sample pics of tasks I completed in the workshop:



DAY 5: Dated on 21st May, 2024 had 2-Sessions.

Session One: PCB Workshop

Dr. Arvind Kumar & Girish Shankar Mishra were the instructors for this session.

Implemented previous day's circuit on the hardware ie, both analog and digital circuit on to the breadboard. Then compared output obtained by software and hardware implementation.



Session Two: Implementation of Arduino circuits in Wokwi

Dr. Rajesh Sola was the instructor for this session.

Concepts covered were:

- Digital Out (LED Blinking): Status indicators in projects.
- Digital Input (Push Button/Switch): Trigger events with button presses.
- Analog Input (Potentiometer): Adjust settings like volume or brightness.
- Fading LED (Analog Output): Smooth lighting effects.
- Serial Input & Output: Debugging and data interaction.

Wokwi:

Go to Wokwi > Sign up or log in > Start a new Arduino project and try the examples.

TinkerCAD:

Visit TinkerCAD > Sign up or log in > Explore Arduino simulations with the examples.

DAY 6 to 8 : 21st May, 2024 to 24th May, 2024.

Session: C/Embedded C/ Circuits



- LED Blinking (Digital Output)
Objective: Make an LED blink on and off.
Application: Status indicators.
- LED Turn On and Off Using Push Button (Digital Input)
Objective: Control an LED with a push button.
Application: User-controlled actions.
- Turning On LED if Resistance is High and Off if Resistance is Low (Analog Read)
Objective: Use a potentiometer to control an LED.
Application: Variable input control.
- LED Dimming Using Analog Ports (Analog Output)
Objective: Create a fading effect on an LED.
Application: Smooth lighting effects.
- Using Serial Port, Printing Output When Push Button is Pressed
Objective: Print a message to the serial monitor when a button is pressed.
Application: Debugging and user interaction feedback.

Conclusion

This series of sessions was both educational and fun, mixing theory with hands-on activities. We learned a lot about embedded systems, agile methodology, product development, version control, and circuit design.

These new skills will be really useful for our future projects and careers in embedded systems and electronics.

The practical tasks and real-world examples we worked on have given us the tools to solve complex problems in an efficient and creative way. Overall, it was a great experience that has prepared us well for what's ahead.