INTERNSHIP REPORT
AT CODE BIND TECHNOLOGIES ,

Attended by

G . Dhivya bharathi

(18121064)

in partial fulfilment for the award of the degree of

Bachelor of Technology

In

ELECTRONICS AND COMMUNICATION

From 27.01.2021 to 31.01.2021

HINDUSTAN
INSTITUTE OF TECHNOLOGY & SCIENCE
(DEEMED TO BE UNIVERSITY)
CHENNAI

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHOOL OF ELECTRICAL SCIENCES

HINDUSTAN INSTITUTE OF TECHNOLOGY AND SCIENCE

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HINDUSTAN
INSTITUTE OF TECHNOLOGY & SCIENCE
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CHENNAI

BONAFIDE CERTIFICATE

This is to certify that the “Internship report” submitted by “G.Dhivyabharathi” of is the work done by him and submitted during 2021-2022 academic year, in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology in ELECTRONICS AND COMMUNICATION , at INTERNSHALA TRAININGS.

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INTERNSHIP COORDINATOR
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CERTIFICATION

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CERTIFICATE OF INTERNSHIP

CERTIFICATE NUMBER	CBTINE272005210101

This certificate is awarded to **Mr/Ms. G.DHIVYA BHARATHI,** for the successful completion of **Internship in Embedded Systems** at **CodeBind Technologies, Chennai** from **27th January 2021 to 31st January 2021.**

During the course of the internship **Mr/Ms. G.DHIVYA BHARATHI,** exhibited an enthusiastic attitude for learning in addition to being quite industrious and dependable.

We are extremely satisfied with the candidate's performance and would like to wish them very success in their future endeavors.

D.Parthiban.
Training Co-Ordinator

Issuing Authority

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TABLE OF CONTENT

1.Introduction

Services: Internship matching, Workshop, Inplant Training

Founder: Parthiban

Industry: Education, Employment

Headquarters: Chennai , India

CodeBind Technologies is a certified (ISO 9001:2015), IAF, DAC, which is accredit in the software development, industrial seminars, technical training oriented programs. We are extending the relationship with our clients and make familiar in the world around your customers through the digital marketing sectors. Our support is also providing in the optimizing your website in popular search engines that we are certified by the “Google”.

A CodeBind Technologies is one of the development infrastructures in various platforms. We are striving to stand the superior position in competitive world. In which, we mainly

focusing our infrastructure in the platforms of Website development, Mobile application development, Digital marketing and Embedded Products requirements for all business enterprises on globally.

In this Internship, I had learnt about Embedded Systems . Such that 5 Days of internship has 15 topics and did mini projects and final assessment in the end of internship.

2. AGENDA

Day 1 - Introduction to Embedded systems, Components, Processors and its type, Examples.

Day 2 - Hardware components, Working methodology, Android

Day 3 - IOT Architecture, Embedded systems and IOT, Implementation, Industrial analysis, Research activities

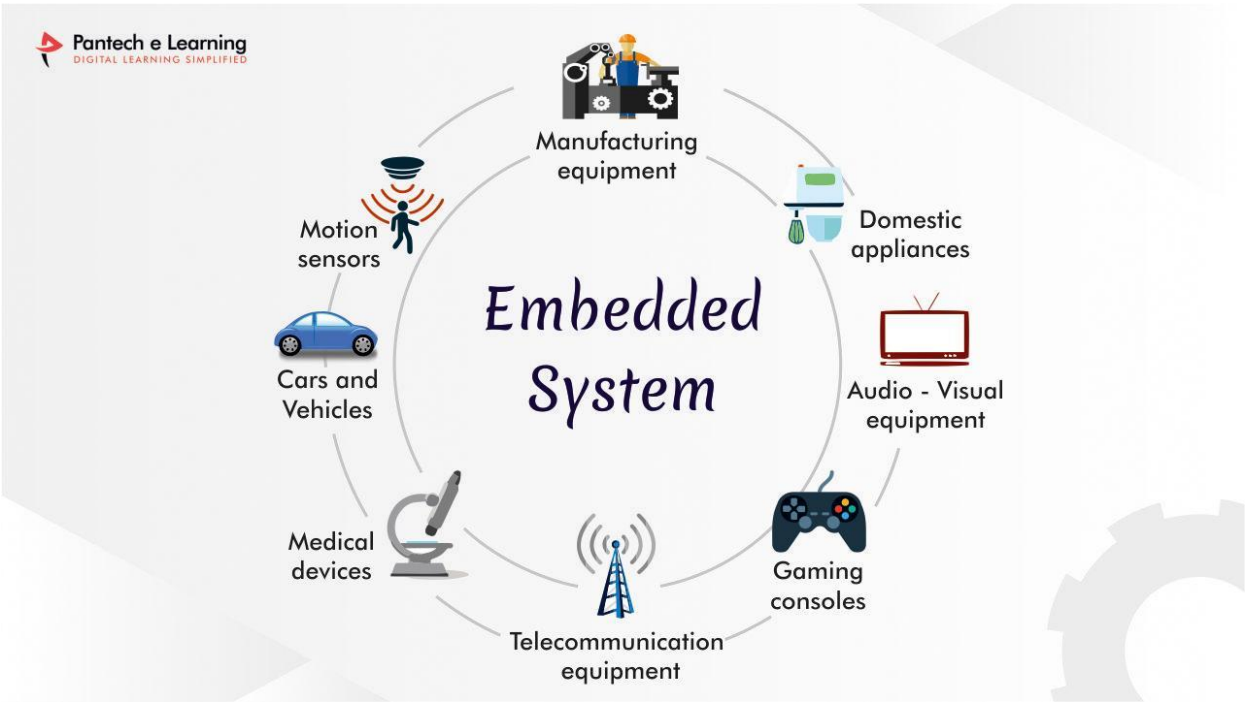
Day 4 - IoT and Embedded Systems questions and explanations, Android and Embedded systems questions and explanations, Android and Embedded systems questions and explanations.

Day 5 - Exam on Embedded Systems, IoT exponents and components, Project explanation, Project result and verification.

3. Topics

3.1 Introduction

An Embedded system is a combination of computer hardware and software. As with any electronic system, this system requires a hardware platform and that is built with a microprocessor or microcontroller. The Embedded system hardware includes elements like user interface, Input/output interfaces, display and memory, etc.



An embedded system is a microprocessor-based computer hardware system with software that is designed to perform a dedicated function, either as an independent system or as a part of a large system. At the core is an integrated circuit designed to carry out computation for real-time operations embedded system is an electronic or computer system that is designed to control, access the data in electronics based systems.

3.2. Classification of Embedded Systems :

Embedded Systems are classified based on the two factors i.e.

1.Performance and Functional Requirements

2.Performance of Micro-controllers

Based on Performance and Functional Requirements it is divided into 4 types as follows :

1.Real-Time Embedded Systems :

A Real-Time Embedded System is strictly time specific which means these embedded systems provides output in a particular/defined time interval. These type of embedded systems provide quick response in critical situations which gives most priority to time based task performance and generation of output. That’s why real time embedded systems are used in defense sector, medical and health care sector, and some other industrial

applications where output in the right time is given more importance.

Further this Real-Time Embedded System is divided into two types i.e.

i)Soft Real Time Embedded Systems –

In these types of embedded systems time/deadline is not so strictly followed. If deadline of the task is passed (means the system didn't give result in the defined time) still result or output is accepted.

ii)Hard Real-Time Embedded Systems In these types of embedded systems time/deadline of task is strictly followed. Task must be completed in between time frame (defined time interval) otherwise result/output may not be accepted.

2.Stand Alone Embedded Systems :

Stand Alone Embedded Systems are independent systems which can work by themselves they don't depend on a host system. It takes input in digital or analog form and provides the output.

Examples :

MP3 players

Microwave ovens

calculator

3.Networked Embedded Systems :

Networked Embedded Systems are connected to a network which may be wired or wireless to provide output to the attached device. They communicate with embedded web server through network.

Examples :
Home security systems

ATM machine

Card swipe machine

4.Mobile Embedded Systems :

Mobile embedded systems are small and easy to use and requires less resources. They are the most preferred embedded systems. In portability point of view mobile embedded systems are also best.

Examples :

MP3 player

Mobile phones

Digital Camera

3.2 Components :

The embedded system's components are basically divided into two parts:

Hardware Components

Software Components

Embedded Systems Hardware Components:

1.Power Supply

The power supply is an essential part of any embedded systems circuits. An embedded system may need a supply of 5 volts or if it is low power then maybe 3.3 or 1.8v. The supply may be provided with the help of battery or we can use any wall adapter.

2.Processor

A processor is the main brain inside any embedded systems. This is a major factor that affects the performance of the system. There are different processors available in the market. An embedded system may use microprocessor or microcontroller.

3.Memory

types of memory in the embedded systems

Read-Only memory(RAM)

Random Access

Memory(ROM)

Electrically Erasable Programmable Read-Only Memory (EEPROM)

RAM memory is volatile memory and used for temporary storage of the data. And the selection of it depends on the user need and the application.The ROM memory or Code Memory. This is used for the storage of the program. Once system powered, the system fetches the code from the ROM memory. The EEPROM is a unique memory. The content can be erased and reprogrammed by a high voltage pulse input. This is used to store the data by the program itself.

4.Communication Ports

Embedded systems hardware has different types of communication ports to communicate with the other embedded devices.

5.Input and Output

To interact with the embedded systems we need input. The input may be provided by the user or by some sensor. Sometimes some systems need more input or output. So the processor selection will be based on I/O.

Software components:

Tools that are generally used in embedded system development are

1. Assem

bler

2.Emulator

3.Debugger

4.Compiler

1.Assemble

r

When you program in assembly language. This assembly language program is converted into the HEX code using this utility. Then using some hardware called as a programmer we write the chip.

2.Emulator

An emulator is hardware or software tool that has a similar functionality to the target system or guest system. It enables the host system to execute the functionality and other components. It is a replica of the target system. And used for debugging the code and issues.

3.Debugger

Sometimes we are not getting expected results or output due to errors or bug. There are certain tools that are specifically used for the debugging process. Where we can see the controls flow and register value to identify the issue.

4.Compiler

A compiler is a software tool that converts one programming language into target code that a machine can understand. The compiler basically used for translating the high-level language into the low-level language like machine code, assembly language or object code

The Processes of Embedded Systems:

In summary, an embedded system controls various other electronic devices, which makes it a controller. As I am sure you are aware, it consists of embedded software, embedded hardware, and an environment. Overall, there are two categories of embedded systems: microcontrollers and microprocessors. We discussed the basics of the origin of the microcontroller earlier. However, the basis for the microprocessor derives from the von Neumann architecture.

The von Neumann architecture's primary elements are as follows:

Storing instructions and data as binary digits.

Storing instructions and data in primary storage.

Retrieves instructions from memory serially, i.e., in order and one at a time.

The Steps in the Embedded System Design Process

The various steps in the embedded system design process are as follows:

Abstraction: During this step, we abstract issues related to the system.

Software + hardware architecture: In this stage, we obtain a complete understanding of the software and hardware before initializing the design process.

Extra functional properties: During this stage, we assess the main design to gain a total understanding of the additional functions we need to implement.

System-related family of design: When you design a system, it is necessary to refer to any previous system-related designs within the same family of designs.

Modular design: One should make separate module designs so that you can utilize them later when needed.

Mapping: Here is where we conduct software mapping; for example, we map program flow and data flow into one.

User interface design: As its name implies, this correlates to the requirements of the user. Therefore, we are considering

user requirements, the function of the system, and environmental analysis.

Refinement: At this stage, we will refine each module and every component to ensure that the software team fully understands the requirements to meet.

4.Assessment and Vivavoce

Assessment

Software Design And Implementation

A. Software Design

We have used three different Software for programmingand controlling. IDE is an open-source software which is not only used for writing programme but also for uploading code to Arduino. Android application for ESP8266-01 is available in the play store(Android smart phone) provides a platform to control different loads. This will only work if it is connected to the IP address and the port which is provided by the ESP8266-01 module as shown in Fig.5.User can customize the application like load name, number of loads, its ON duration etc. For controlling ESP8266-01 through web browser or computer for real time notification ESPlorer is used (Figure.5 and 6).

B. Implementation

Figure-7 is providing idea of overall operation of the system. Initially through Arduino programming, the system checks the modules as well as their connections. If any kind of error is detected by the system then it will indicate the ERROR status. If no error is found then the system will indicate the status OK and proceed for establishing the connection with the local Wi-Fi. Here the system will again check whether the ESP8266- 01 module is connected to the internet. If there is no connection then the system will indicate the ERROR status or else the display will show status SYSTEM ONLINE and show the IP address. The system will wait for the signal and switch the load accordingly after receiving the command and update the display.

2. Conclusion and Future Scope

In this paper we focused on different process of operating or controlling electrical and

electronic appliances remotely with the help of Arduino. This method of controlling such applications is referred to as automation. The experimental setup which we designed has its focal point on controlling different home appliances providing 100% efficiency. Due to advancement in technology, Wi-Fi network is easily available in all places like home, Office Building and Industrial Building so proposed wireless network easily controlled using any Wi-Fi network. The wiring cost is reduced. Since less wiring is required for the switches. This also eliminates power consumption inside the building when the loads were in off conditions. This system is also platform independent allowing any web browser in any platform to connect ESP8266-01.

The system is fully functional through android application known as “ESP8266 Wifi control”. The delay to turn ON is 3 sec and turn OFF is 2 sec for any load. For future use, the researchers would recommend as : (i)Reducing

the time delay to turn on and off of an appliance

(ii) Adding speech recognition to the system

(iii) using automatic smart phone detection through Wi-fi such that it will operate the loads automatically when it is in range.

(iv) Expansion of range of Wi-Fi such that one can operate in permissible long distance through smart phone.

VIVA VOCE :

1.Which memory storage is widely used in PCs and Embedded Systems?

a) EEPROM

b) Flash memory

c) SRAM

d) DRAM

D

2.How is the protection and security for an embedded system made?

a) Security chips

b) Memory disk security

c) IPR

d) OTP

C

3.How an embedded system communicate with the outside world?

a) Memory

b) Output

c) Peripherals

d) Input

C

4.What does MESI stand for?

a) modified exclusive system input

b) modifies embedded shared invalid

c) modified exclusive shared invalid

d) modified exclusive stale invalid

C