RAMANA M

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CAREER OBJECTIVE

To work in an environment where I can apply what I've learned in embedded programming and microcontrollers, gain practical experience, and help build useful, reliable solutions.

WORK EXPERIENCE

Currently undergoing technical training program – **Advanced Embedded Systems Course** at Emertxe Information Technologies (http://www.emertxe.com) Bangalore

TECHNICAL SKILLS

- Programming Languages:
  - Advanced C programming
  - OOP using C++
  - Data structures
- System programming:
  - Linux Kernel system calls
- Embedded controllers:
  - Hands-on working with GPIOs, Analog I/Os, Memory usage, interfacing, character LCD
  - Peripherals usage - Timers, Counters and Interrupts
  - Communication protocols - UART, SPI, I2C etc
- Embedded platforms:
  - Distributions - Linux (Fedora / Ubuntu)
  - PIC (18F4520) board

- Development environment and tools:
  - Dev environment: Vim, Makefiles, MPLAB
  - Compilers: GCC, XC8, ARM-Linux-gcc
  - Debuggers: GDB

COURSE WORK

- Microprocessor
- Digital Electronics
- Digital Signal Processing

EDUCATION

- B.E (ECE), Kongu Engineering College, KEC, 6.99%, 2021-2025
- Class – XII, Sri Vidya Mandir Matric Higher Secondary School, 91.31%, 2021
- Class – X, Sri Vidya Mandir Matric Higher Secondary School, 91.00%, 2019

PROJECTS AT EMERTXE

Project Number:1

Title	Inverted Search
Project brief	Inverted Search is a C project where I created an inverted index from multiple text files. Each word found in the files is stored in a hash table along with the names of the files where it appears and how many times it occurs. This makes searching for any word across multiple files fast and efficient.
Technologies used	Advanced C - File Handling, Hash Tables, Linked Lists, and Dynamic Memory, Command line arguments
Key challenges & Learnings	✓ Learned how to analyze files properly and extract words while handling case differences and repeated words. ✓ Used hash tables and linked lists to store data efficiently and speed up search operations. ✓ During Creating the Hash Table same word comes in different files, the count of the words should be incremented and issue in fetching the backup data resolved easily by using the file concept and and the formate specified sscanf. ✓ Faced segmentation faults due to incorrect handling of node addresses, but fixed them by understanding proper NULL checks and

memory usage.

Project Number:2

Title	Arbitrary Precision Calculator
Project brief	Arbitrary Precision Calculator is a C based project performing mathematical operations on very large numbers that cannot fit into standard data types like `int` or `long long`. To handle such numbers using linked lists, treating each digit as a separate element. Using these structure, the program can accurately perform addition, subtraction, multiplication, and division on numbers of any size without losing precision.
Technologies used	Advanced C – Pointers, Linked Lists, Structure, Dynamic Memory Allocation, Command line arguments
Key challenges & Learnings	✓ Implemented custom arithmetic for arbitrarily large numbers without built-in types. ✓ Faced a struggle in the dividing part where both the subtraction and addition part both combined to get the solutions. ✓ Identified unused list nodes and memory that was not freed, and resolved these issues during debugging. Cleared all unused heap memory by using the Linux tool Valgrind..

Project Number:3

Title	Image Steganography using LSB Encoding and Decoding
Project brief	The goal was to transfer data or information to the receiver without anyone else being able to read it. I stored the length of the text and then embedded each bit of the message into the least significant bits of the image data. The BMP file was encoded with a magic string to make it easy to identify. During decoding, this magic string helps the receiver confirm that the BMP file contains hidden data. Once verified, the receiver decodes the LSBs one by one and reconstructs the original message.
Technologies used	Embedded C – File operations, Pointers, Bitwise operations, Functions, Makefiles, Command line arguments
Key challenges & Learnings	✓ Understanding of pixels and header of image file by doing literature study ✓ Learned how to hide data in an BMP image with unnoticeable change in the image ✓ Major challenge is to encoding the files with their extension and the total size of the file, but solved them with understanding the clear concept of bitwise and file pointer.

Project number:4

Title	Mp3 Tag Reader
Project brief	MP3 Tag Reader is a C-based project that reads and displays metadata from MP3 audio files. The program extracts information such as the song title, artist name, album, year, genre, and comments from the ID3 tags stored inside the MP3 file. It uses file handling and byte-level parsing to locate the tag header and decode the stored fields, allowing the user to easily view the details of any MP3 file.
Technologies used	Advanced C – File Pointers,Structure.
Key challenges & Learnings	✓ Faced a challenge while reading the tag size because the integer values were stored in big-endian format , resolved the issue by converting them to little-endian before processing. ✓ Improved knowledge of string handling, pointer usage, and modular programming while parsing different metadata fields. ✓ Editing a tag was done by updating the tag fields inside the structure and then overwriting the MP3 file with the new user-provided data.

Project number:5

Title	Address Book
Project brief	The Address Book is a C application that built to store and manage contact details like name, phone number, and email. It lets the user add new contacts, search for existing ones, update details, delete entries, and view the full list. Used proper input checks and a modular design to keep the data handling clean and efficient.
Technologies used	Advanced C – Pointers, Structures, File Handling, Command line arguments
Key challenges & Learnings	✓ Faced difficulties while adding proper input validation for names, phone numbers, and emails, which helped me understand error handling better. ✓ Had challenges managing file operations and making sure data was stored and retrieved correctly, which improved my skills in data persistence. ✓ Learned more about the structure and the file pointers to store and initialize the stored content back to the sturucture. ✓ Added an extra feature to manage separate categories like family, friends, and colleagues, which required careful planning of data structure and menu flow.

ACADEMIC PROJECTS

Title	Automation in Vacuum Ironing Table
Project brief	The project focuses on automating a vacuum ironing table so that it turns ON only when a person is nearby and turns OFF automatically when not in use. A PIR sensor is used to detect human presence, and based on the sensor output, the ESP32 controls a relay circuit that powers the ironing table. This helps save electricity and prevents overheating or accidents.
Technologies used	Arduino IDE, ESP-32, PIR sensor, Relay
Key challenges & Learnings	✓ Faced challenges in calibrating the PIR sensor to correctly detect human presence and avoid false triggers. ✓ Learned to interface ESP32 with relay and transistor driver circuits to safely switch AC loads. ✓ Improved understanding of automation, safety control, and sensor-based switching for real-time applications.