

C - IN DEPTH

Well understood C program

Compilation

Importance of Memory (Variables)

Debugging

Arrays & Pointers

Handling multiple source files

Libraries

'is_prime' -In incremental approach

Simple main

Testing with many numbers

Analyzing code - gcc options
code - "-Wall" and "-Werror"

Fixing Bugs

Code reusability - Using functions

COMPILATION STAGES

Understanding importance of the
compilation

Why many stages are required?

Pre-processing

Compiling

Assembly

Linking

Loading

IMPORTANCE OF MEMORY

STORAGE CLASSES

Automatic

Volatile Vs Registers

Static Vs Extern

Global Vs Local

STORAGE SECTION

Data and BSS

Stack and Heap Memory

Text Section

ROLE OF DEBUGGING

Compilation stage - Basic and easy
Logs and prints - Widely used and
persistence

Using Debugger 'gdb' – Very critical
and powerful

HEART OF C - POINTERS & ARRAYS

Pointers Vs Integers

Pointer type

Pointer de-reference

Pointers and arrays

Pointer arithmetic

STRUCTURES & UNIONS

Why structures and unions are
required

Difference between them

MULTIPLE SOURCE FILES – MAKE SYSTEM

Understanding the purpose

Complexity with multiple files

Basics of Makefile

Understanding dependency

Writing own Makefile

BUILDING OWN LIBRARIES

Building Object files

Creating Static Libraries

Using Static Library

DATA STRUCTURES

Strings

Parsing strings

Building messages

Arrays

Sorting

Deleting elements

Adding elements to array

Linked list

Single Linked list

Double linked list

Hashed list

Circular list

Searching

Linear search

Binary search

Hash based search

OPERATING SYSTEMS

Unix (Linux) Internals

File Management

INODE

Structure of a regular file

Path name to INODE

Super Block

Process Management

Process states and Transition

Layout of a system memory

Process context

Process Scheduling

Memory Management

Swapping

Demand paging

Segmentation and regions

I/O Management

Driver interfaces

Disk Drivers

IPC

Pipes and FIFOs

Message queues

Client and Server communication

Using Message queues

Synchronization

Semaphores

Binary Vs Counting Vs Mutex

semaphores

Shared Memory

Signals

Interrupts

TCP/IP NETWORKING

Network programming

Client Server programming

TCP/UDP client

TCP/UDP server

Iterative server

Concurrent server

Datacom (TCP/IP)

Types of networks

Ethernet Layer

Internet Protocol

IP address classes

Purpose of The Internet Protocol

Routing

Direct and Indirect Delivery

Fragmentation & Re-assembly

ICMP

Internet Control Message Protocol

Error Reporting Vs Error Correction

ICMP Message delivery

User Datagram Protocol

Format of UDP Messages

UDP pseudo-Header

TCP

Properties of The Reliable Delivery Service

Sliding Windows

TCP Segment Format

DNS Application Layer protocol

RIP

SMTP

HTTP

REAL TIME OS

Embedded System Programming (RTOS)

VxWorks/uCOS/pSOS/ucLinux)

Introduction to RTOS

Difference between GPOS Vs RTOS

Embedded programming (Using

VxWorks or VxWorks like OS)

Process Management in VxWorks

IPC in VxWorks

PROJECTS

CPU Usage and Overload Detection & Action

Memory Usage and Overload Detection & Action