

# **Adv C Module**

## **1. Subjective**

### **2.1 Basic Refreshers**

1. Explain the Different types of datatypes.
2. Explain the post increment in detail.
3. Explain the ternary operator.
4. Explain the causes of the compiler error.

### **2.2 1D Pointers and Functions**

1. Explain pass by reference and pass by value.
2. Explain the use of the function.
3. Explain about recursion in detail.
4. Explain context switching.
5. What is the size of a pointer?
6. What is the size of a void pointer
7. What is the datatype of a pointer?
8. Is a pointer a datatype or a variable?
9. What is the difference between a constant pointer and a pointer to a constant?
10. What is the difference between a string and a character array?

### **2.3 String**

1. Explain about string and char arrays.
2. Explain strcmp and strncmp in detail.
3. Explain the strcpy function in detail.

### **2.5 Storage classes and memory segments**

1. Explain the use of #include in detail.
2. Explain the storage classes in detail.
3. Explain the compilation stage in detail.
4. Explain about static and dynamic libraries.
5. Can we use any other executable file instead of ./a.out?

### **2.6 2D Pointers and DMA**

1. Explain the function pointer in detail.
2. Explain the DMA in detail.
3. Explain the static and dynamic memory allocation.

4. How to overcome the memory leakage.
5. Explain calloc and malloc in detail.
6. Explain the use of a void pointer.

## **2.7 Preprocessing**

1. It is possible to declare a macro inside a structure parameter.
2. Write a custom macro for sizeof in C.
3. Explain the #define and const difference in detail.
4. List the intermediate files in compilation.
5. What is a compilation error?
6. What is optimization? Give an example.
7. Where are macros stored?
8. What is a macro? Give an example. Why should I use a macro?
9. What are the different types of macros?
10. What is optimization? Give an example.
11. Is a macro always a constant value, or can it be a function?
12. How many .o (object) files will be generated if I compile two separate C source files?
13. What is the use of a compiler?

## **2.8 UDT**

1. Explain the user-defined data types in detail.
2. Explain the difference between the structure and union in detail.
3. Write a declaration of a function pointer and a structure pointer.

## **2.9 Miscellaneous**

1. Explain the volatile keyword in detail.

## **2.10 FILE I/O**

1. Explain the different types of file I/O functions in detail.

## **2. Programming**

1. WAP to find the Armstrong number.
2. WAP to swap the nibbles of the two numbers.
3. WAP to find the prime number between M and N.

4. WAP to check the endianness of the computer.
5. WAP to split the array into two.
6. Write a program to reverse the bits in an integer number
7. Write a function to find the kth Max and min using an array and return both values.
8. Pattern program  
1  
23  
345  
4567  
56789
9. WAP to remove the duplicates in 2 arrays using a function.
10. WAP to find the 3rd largest number in the array.
11. WAP to remove duplicate characters in the string.
12. WAP to find whether the number is odd or even by using the bitwise operator.
13. WAP to find the largest of three numbers.
14. WAP to reverse the number.
15. WAP to reverse the elements of an array
16. WAP to count the number of set bits in an integer.

## ***MC Module***

### **1. Basic electronics**

1. What are digital and analog i/p and o/p peripheral devices
2. What are transistors?
3. What are the types of registers in a microcontroller?

### **2. Basics**

1. Explain the difference between the microcontroller and the microprocessor.
2. What is bare metal programming?
3. Which is an 8-bit MC, and what is the difference between 8, 16, and 32-bit MC?

### **3. Interrupts**

1. Explain the watchdog timer in detail.
2. Explain the interrupt in detail.
3. Tell no of clock pins are there in the controller.
4. Can you interrupt inside the while loop?
5. What is a timer? Explain in detail.
6. Explain the interrupt and polling method.
7. Explain how the timer is working. How to calculate 1 second using an 8-bit timer at 20MHz frequency.
8. What is going to be the count of the timer for generating a delay of 10 milliseconds in a controller running at a speed of 4 MHz.

## **4. Projects**

1. Explain the car black box project.
2. Explain the Pick light project.

## **5. ADC**

1. How to use ADC in detail.

## **6. Protocols**

1. Explain the communication protocol.
2. Explain the difference between the SPI and I2C protocols.
3. Explain the SPI in Full duplex and I2C in half duplex.
4. What is the reason I2C is half duplex? Why is it not full duplex
5. Draw the data frame of any protocol.
6. Explain the UART protocol in detail.
7. How many UARTs are used in your MC?
8. Explain the UART protocol in detail.
9. Explain the CAN protocol in detail.
10. Explain the I2C protocol in detail.
11. Explain the SPI protocol in detail.

## **7. PWM**

1. Explain the Use of PWM.

## **8. programming**

1. WAP to blink the LED every 30 seconds.

## **CPP Module**

1. Explain the function overriding.
2. Explain the virtual function in detail.
3. What is the size of an empty class?
4. Explain the abstraction and polymorphism.
5. unique ptr moved from one ptr to another, then which one will be null?
6. If the class has one virtual fun and we create 5 objects of that class, then how many virtual tables are created?
7. What is friend class and friend function? Explain with example. Give me the real time example where we use this concept.
8. What is constexpr in C++? Explain with the given Example.
9. What is set? Give an example.
10. What is a map? Give an example.
11. What is a queue? WAP to Implement a Queue using C++.
12. WAP to implement bubble sort and queue using C++.
13. What are data types in C++?

## ***DS Module***

### **1. Basics**

1. Define data structure.
2. Explain the makefile and its advantages.
3. Explain linear and non-linear data structures.

### **2. Linked lists**

1. What is the difference between an array and a linked list?
2. Explain the difference between a single-linked list and a double-linked list.

### **3. Stack**

1. Explain the stack application in detail.
2. Explain the conversion from prefix to postfix.
3. Explain the use of a stack in detail.

## **4.Searching and Sorting Techniques**

1. Explain the linear search in detail.
2. Explain the selection sort.
3. Explain the insertion sort.
4. Explain the bubble sort.
5. WAP to sort the given array by using quick sort and its time complexity
6. Explain quick sort algorithms.
7. Explain searching algorithms.

## **5.Queue**

1. Explain the queue in detail.
2. Explain enqueue and dequeue in detail.
3. WAP to implement a Queue using an array
4. Explain the applications of a Queue.

## **6.Hashing**

1. Explain the hash table in detail with its advantages.
2. What is a hash table, and what is the use of the hash table? Give an example of a hash table briefly about with an example. What is the time complexity of the hash program?

## **7.Trees**

1. Explain the binary search tree in detail.
2. WAP to insert the element into the tree.
3. WAP to print the pre-order output of a given BST.
4. WAP to print in-order output of a given BST

# ***LI Module***

## **1.Basics**

1. Explain the use of the PS command.
2. What is the linking? And its types.
3. What is Vim? Explain in detail.
4. Explain about BIOS.

## **2.System call**

1. Explain about file operation system calls.
2. Explain about getopt().
3. Explain time-related system calls.
4. Differences between function calls and library calls. How do they work?
5. What is "kernel?" Explain the difference between privilege mode and user mode.
6. What a "Monolithic" and "Micro" kernels?
7. How real-time systems (RTS) design is connected with kernel designs? Explain.

## **3.Networking**

1. Explain TCP/IP in detail.
2. Explain the difference between TCP/IP and UDP protocols.
3. Explain broadcasting in networking
4. Explain a network switch
5. Where do you use TFTP?
6. Write the functions for the server and client using sockets.
7. What is the use of connect and accept?

## **4.Process**

1. Explain the use of the fork system call.
2. Explain about the exec family and its use.
3. Explain the use of the system.
4. Explain about COW in detail.

## **5.IPC**

1. Explain about IPC in detail.
2. Explain about PIPE and its advantages.
3. Explain about FIFO and when we will use FIFO.
4. How many processes can be able to access the SHM at the same time?

## **6.Signal**

1. Explain the difference between the signal and sigaction.

2. Explain how to handle the signal.

## **7.Socket**

1. Explain the TCP/IP socket programming.
2. Explain the UDP socket programming.
3. In Socket Programming, write the system calls that are used on the client side and server side for the communication between them.
4. Explain the three-way handshake, how to close the connection b/w the server and the client
5. How does communication using a socket work?

## **8.Threads**

1. Explain the race condition in detail.
2. How to execute functions in parallel.
3. What is a Mutex? Explain with an example program.
4. What is a Semaphore? Explain with an example program.
5. What are the differences between Mutex & Semaphore?
6. Explain spin lock synchronization

## ***General Questions***

1. Explain the key shift keying.
2. Explain QPSK.
3. Explain digital communication like NAND and AND gates.
4. How to implement a NAND gate using an OR gate.
5. Explain Sampling and quantization.
6. Representation of sine wave, sync wave, and overlapping sidelines.
7. How to implement an AND gate using only NAND gates.
8. How to make a disk partition in Windows/Linux
9. How to install Windows/Linux on a PC
10. Which version of Ubuntu or Windows you using?
11. Take an IP address from the user and assign it to the system ( shell scripting)
12. How to connect two brand new systems and make communication between them, how to debug them if they are not communicating?
13. Questions based on the resume.



## ***Aptitude***

1. Find the heavier ball out of 9 balls using a balance scale.
2. Find two consecutive even numbers whose product is 1680.
3. A train running at 90 kmph crosses a pole in 10 seconds. What is the length of the train?
4. If a certain sum is doubled in 8 years on simple interest, in how many years will it be 4 times?
5. There are two questions about ages: one to find the age of a father and the other to find the age of a mother.
6. A contractor undertakes to build a wall in 50 days. He employs 50 people for the same. However, after 25 days, he finds that only 40% of the work is complete. How many more men need to be employed to complete the work in time?
7. If the 5th day of a month is Tuesday. What will be 26 day of that month?
8. A man walks 4 m north, then he turns right and walks 3 m, then how far is he now, and which direction is he from his initial position?
9. 25 horses are there, and having 3 hostiles at a time, we have started the race with 5 horses. How many races are required to find out the fastest three horses