Adv C Module

1. Subjective

2.1 Basic Refreshers

1. Explain the Scope in C.
2. Explain the bitwise operator in detail.
3. What is the output of ~5?
4. Which operator is used to clear a bit?
5. Explain 5 xor with 3 output in c.
6. What is the output of the following code #include
   <stdio.h>
   int main
   {
   int arrI= (1,2,3,4,5,6,7,8,9);
   int* ptr 1 = arr;
   int* ptr2 = arr+5;
   printf(*%d ", ptr2-ptr1);
   printf(%d", (char*)ptr2- (char*)ptr1);
   }
7. Given the following code, which option correctly prints the second element of the first array?
   int arr[3][4] = ((1,2,3,4),(5,6,7,8),(9,10,11,12)) ;
   int (*ptr)[4] = arr;
8. What will be the output of the following code snippet?
   void solve()
   {
   bool ok = false;
   printf(ok?"YES"."NO");
   }
   int main()
   {
   solve;
   return 0;
   }
9. What is the purpose of _attribute((packed)) in C?

2.2 1D Pointers and Functions

1. Explain the difference between pass-by-value and pass-by-reference with an example program.
2. Explain the use of a pointer.

2.3 String

1. Explain the string library function in detail.
2. Explain the strcat, strcmp, strlen, strstr, strchar, and strtok in detail.

2.5 Storage classes and memory segments

1. Explain the Memory segment with a block diagram.
2. Difference between constant keyword and volatile.
3. Explain about Memory segments.
4. Explain the compilation stages.
5. Explain the static, extern, register, and auto keywords in detail.
6. Explain synchronisation Techniques. It's working.

2.6 2D Pointers and DMA

1. Explain the function pointer in detail.
2. Explain the use of function pointer array in detai.
3. How do you define a structure pointer?
4. How do you define a function pointer?
5. Explain the calloc and malloc function. With sample code.
6. malloc(0); memory will allocate in heap segement? Explain in detail.
7. malloc(1); memory will allocate in heap segement? Explain in detail.
8. What is the diffrence between memcpy and memmove?

2.7 Preprocessing

1. What is the use of #include?

2.8 UDT

1. Explain the structure and union in detail.
2. Explain the use of structure.

2.9 Miscellaneous

1. Explain the Volatile keyword with an example program.
2. List some applications of volatile keywords.

2.10 FILE I/O

1. Explain the fopen, fread, fwrite, and fseek in detail.
2. Which function is used to set the file position to the beginning in C

2. Programming

1. WAP to swap two numbers without using the third variable.
2. WAP to count the number of set bits.
3. WAP to rotate the array for n times.
4. Write a C program that uses function pointers to perform addition, subtraction, and multiplication.
5. Write a C program to convert the endianness of a given number
6. Write a C program to read from the status register.
7. Write a program to reverse the string.
8. WAP to find the min and max of array element.
9. WAP to swap the nth and mth bits of an integer.
10. WAP using Function Pointer and Explanation.
11. WAP to swap last bits of an integer.
    ex: 1001 0110 => 0001 0111
12. WAP Dynamic memory allocation using Calloc & Malloc for 2D array Using Double Pointer. and its differences.
13. Write a C program to dynamically allocate memory for N string, take input, sort them, and print both the original and sorted lists. Ensure proper memory allocation and deallocation.
    Example:
        linter number of strings: 3
        Enter 3 strings:
        Processor
        Command
    Given array is:
        0; Controller

1: Processor
2: Command

The sorted array is:

0: Command
1: Controller
2. Processor

14. Implement a Library Management System in C using structures and dynamic memory allocation. Structure should contain Book ID, Title,Author. The system should allow:
    1)Adding Books dynamically.
    2)Searching for a Book by ID.
    3)Displaying all Books stored in the system.
15. Write a C program to find the all non-repeating characters in a given string and print them.
16. Write a C program to find a pair of numbers in an array that sum up to a given farget value.
17. Write a C program to determine if a given number can be expressed as the sum of two prime numbers. The program should take an integer input and check all possible prime pairs that sum to the given number.
18. Print all possible prime number pairs whose sum is equal to the entered number
19. Read an array of size n. Find all possible pairs from an array whose sum is equal to the entered number.
20. WAP: Print all non-repeating characters from the string.

MC Module

1. Basic electronics

1. Explain the CLCD.
2. Explain the multimeter in detail.
3. Explain the transformer.
4. Explain the pc power supply voltage.
5. How to check continuity in multimeter
6. Short circuit resistance in ohms

7. Types of transformers
8. Explain the Digital circuits and Analog circuits.

2. Basics

1. What is the program counter?
2. Explain the architecture of the microcontroller.
3. In a microcontroller timer, what is the function of the prescaler?
4. What is the primary advantage of using Direct Memory Access (DMA) in a microcontroller?

3. Interrupts

1. Explain the interrupt latency.
2. Explain the timer interrupt in detail.
3. How timer interrupt happens
4. While executing one interrupt, if another interrupt occurs, what happens? How to we come?
5. What is the primary function of an input capture unit in a microcontroller's timer module?
6. A microcontroller has an 8-bit timer with a clock of 10MHz and prescaler of 64. What is the maximum time delay that can be generated before overflow?

4. Projects

1. What are the difficulties you faced in the car block box?
2. What are the protocols used inthe Car black box project?

5. ADC

1. Explain ADC and how it is working. How many bit ADCs did you use?
2. What is the resolution of a 10-bit ADC with a 5V reference?

6. Embedded Systems

1. Explain the components of embedded systems in details.

7. Protocols

1. Explain about UART Protocol.
2. Explain the CAN protocol.
3. Explain the SPI protocol.

4. Explain the I2C protocol.
5. What is the way, if slave wants to share some information.
6. In an SPI communication, what happens if the clock polarity (CPOL) and clock phase (CPHA) settings of the master and slave do not match?
7. In CAN protocol, what is the function of the arbitration process?
8. In SPI communication, what happens if the MISO line is floating
9. Which communication protocol is best suited for long-distance and high-noise environments

8. PWM

1. How to control the brightness of LED?
2. In PWM-based timer control, what happens if the duty cycle is increased?

9. programming

1. User has 2 options..
    1. Blink the LED continuously
    2. On the led for 1 minute, off it for 1 minute, again on it...

CPP Module

1. Explain the qualifiers and Modifiers.
2. (in C++) you have 2 arrays that will be in a sorted order in that some common element may be there (Find the sum of (max to min) of that array). You can start from one array to another
3. Explain the use CLASS
4. Explain function overloading.
5. Difference between the structure and class.

6. How will we call the cpp function in the qml file
7. Methods to expose cpp file to qml
8. They asked one class and how will declare this calss using unique pointer
9. They gave 2 cplu plus code and wrote the output for that
10. Methods for QAbstraclistmodel
11. How will start the thread on cpp
12. Which property will you use to insert one rectangle next to another rectangle
13. and connect object syntax
14. How will you write the syntax for declaring the var Q property as a Boolean variable?
15. Explain the pillars of OOPs.
16. Explain the inheritance in detail.

Ds Module

1. Basics

1. What is meant by the resolution of a register?
2. What is the worst-case time complexity of searcing for an element in an unordered array?

2. Linked lists

1. WAP swaps the two nodes in the single linked list.
2. WAP swaps the two nodes without a third member in the single linked list.
3. Explain the use of single linked list.
4. Explain the difference between the single linked list and double linked list.
5. Insert a node in the middle of a single linked list.
6. Why linked lists are preferable to arrays.
7. WAP Delete Node at given position in Doubley Linked list.
8. Program with time complexity.

3. Stack

1. Explain the use of stack in detail.

2. Explain the stack application.

4. Searching and Sorting Techniques

1. Explain the sorting and searching algorithms.
2. Explain any searching technique with the algorithm.

5. Queue

1. Explain the use of queue

6. Hashing

1. What is meant by hashtable, what was used, and where can we use it?
2. What is the main advantage of using a hash table over a binary search tree BST for searching?

7. Trees

1. Where we will apply tree concepts in real life.
2. Explain the binary search tree.

LI Module

1. Basics

1. About the "RPM" command from Red Hat Linux,
2. Explain the OSI model layers.
3. Explain how to install the dual boot loader in linux
4. Ls command to check the IP address.
5. Command to check the system config in linux
6. Command to get the configuration of the device.
7. Explain the CHMOD command in detail.
8. Difference between user and kernel Spaces.

2. System call

1. Explain the use of system calls.

3. Networking

1. Explain the difference between TCP and UDP.
2. Explain the TCP protocol in detail.

4. Process

1. How do you check the current running process in Linux?
2. Explain the use of the fork system call.

5. IPC

1. Explain the use of the IPC mechanism in detail.
2. Explain how the pipe works
3. Difference between pipe and fifo.
4. What is Shared memory? why?(with real time Example)
5. Explain the SHM in detail.
6. Explain the FIFO in detail.
7. Explain the PIPE in detail.

6. Signal

1. Explain the signal handler.
2. Explain the signal handler and sigaction.
3. Explain the SIGALRM signal.
4. Explain the SIGCHLD signal.

7. Socket

1. Explain the TCP socket and UDP socket.
2. Explain the classes of IP addresses.
3. Explain TCP/IP protocol.

8. Threads

1. Explain the difference between the Process and Thread.
2. Explain the race condition in detail.
3. Explain the critical section.
4. How to do synchronisation in thread.
5. What are Semaphores.
6. Race condition? Critical section Implementation with mutex method and Semaphore (Using real-time example)
7. when we are using mutex method and when we are using Semaphore (with real time example)

8. Instead of mutex, if you use a semaphore? Instead of semaphore, if you use mutex, what happened is explained in detail.
9. Difference between "binary mutex" and "mutex" with example.

9. Process and Memory Management

1. Explain the process and memory management.

Qt Module

1. Write C++ code in QT. Get user input and output should be stored in file
2. Experience debug methods
3. How does qdebug impact
4. How does Qwarning impact
5. Explain the device driver.
6. Which property is used to insert one rectangle next to another rectangle

General Questions

1. Implement the firmware to change the RGB LED color each time Switch 1 is pressed.
2. Tell me about ur phone configuration, laptop configuration
3. How the adapter in ur charger works
4. How many volts can ur phone take
5. How many volts are given to ur controller board
6. Explain the networking devices like router, switch, and hub.
7. If the price of the commodity is increased by 50%, by what fraction must its consumption be reduced so as to keep the same expenditure on its consumption?
8. A sum of Rs. 1360 has been divided among A, B, and C such that A gets 2/3 of
   what B gets and B gets 1/4 of what C gets. B's share is?
9. In a class, there are 15 boys and 10 girls. Three students are selected at 2 random points. The probability that 1 girl and 2 boys are selected is:

10. The present ages of Sameer and Anand are in the ratio of 5:4, respectively. Three years hence, the ratio of their ages will become 11:9 respectively. What is Anand's present age in years?
11. The average temperature for Wednesday, Thursday, and Friday was 40°C. The average for Thursday, Friday, and Saturday was 41°C. If the temperature on Saturday was 42°C, what was the temperature on wednesday?