

## **Linux Internals :**

### **a) Networking :**

1. You are given an IP address 192.168.5.0 and need to create 16 subnets. What would the subnet mask ?
2. Ubuntu comes under which OS ?
3. What is the maximum number of IP addresses that can be assigned to hosts on a local subnet that uses the 255.255.255.224 subnet mask?
4. What is the subnet id of a host with an IP address 172.16.66.0/21?
5. If an Ethernet port on a router were assigned an IP address of 172.16.112.1/25, what would be the valid subnet address of this host?
6. Determine the total number of valid IPs in each subnet for the given IP 192.168.10.0/26 using the CIDR value.

## **Microcontrollers :**

### **a) Communication protocols :**

1. What do you mean by communication protocol and where it is used ?
2. Explain about UART, SPI , I2C and CAN protocol in Details
3. Differences between I2C and SPI
4. How I2C is working(Sending and receiving)
5. Which protocol is used for the Car black Box project?  
And explain how it's working?
6. Describe about standard frame format of CAN.
7. What are the Types of errors in CAN?
8. What are the difference between UART and I2C
9. Where we use UART and where we use I2C?
10. which are receiver side error and transmitter side error in CAN ?
11. Difference between microcontroller and microprocessor
12. What are the uses of microcontroller and microprocessor ?

**b) Embedded Systems :**

13. Explain about the car black box

14. What is interrupt?
15. How many bits are in the data bus of 8051?
16. How many bits are transferred in 1 sec in 8051?
17. How many datatypes are there in embedded C?
18. Explain about the temperature Sensor
19. List out differences between Register and EEPROM
20. Explain Volatile Memory and Non-Volatile Memory.
21. How microcontroller communicate with devices ?
22. what is duty-cycle?

## **Data Structures :**

1. You have two arrays, add the two arrays elements in one sorted Single linked list.
2. Explain about the Create node
3. Write a program to delete a node with a specific value from a singly linked list

Original List: 10 -> 20 -> 30 -> NULL

4. Write a program to merge two sorted singly linked lists into a single sorted linked list. For example, given two lists {1, 3, 5} and {2, 4, 6},

## **C++ :**

1. Explain about late binding .

## **Advanced C :**

### **a) Basic Refresher:**

1. How to set a bit and count the number of set bits ?
2. Explain about constant keyword
3. Data types and size
4. int main()

```
{  
    for(char a = 10; a < 300; a++)  
    {  
        printf("a = %d\n", a);  
    }  
  
    return 0;
```

```
}
```

What is the output of this code?

5. How many nibbles are present in 1 byte ?
6. Take a integer variable, set the bits(pos given by client) and print output.
7. Type conversion(implicit and explicit).why implicit type conversion happen give an example.
8. Can the size of datatypes be changed ?
9. char var=600; is the statement correct? Explain
10. What are qualifiers. explain different qualifiers in C?
11. difference between logical and bit-wise operator.
12. What will be the output of the program ?. If there is any error, what is the error and what is the reason

```
#include<stdio.h>
```

```
int main()
```

```
{
```

```
    int i=32, j=0x20, k, l, m;
```

```
    k=i|j;
```

```
    l=i&j;
```

```
    m=k^l;
```

```
    printf("%d, %d, %d, %d, %d\n", i, j, k, l, m);
```

```
    return 0;
}
```

### **b) Functions and pointers :**

13. Which of the following return type cannot be used for a function in C? (Options :- char\* ,struct ,void ,int\*)
14. Write a function to count the number of even numbers in an array .
15. What will happen to the recursive function call continuously?
16. What do you mean by void pointer?
17. #include<stdio.h>

```
int main(){
    int i = 5;
    void *ptr;
    ptr = &i;
    printf("\nValue of iptr = %d ", *ptr);
    return 0;
}
```

- Tell whether the code is correct or wrong. Why?
18. Explain about the call by reference and call by variable with an example
  19. Explain the Pointer & its types
  20. What is the use of pointer, explain with example.
  21. What is null pointer ? what is the size of null pointer?
  22. does context switching happens in inline function?
  23. What are the difference between pointer to const and const pointer?
  24. `(int const *p = &var)` what is this? Explain.
  25. What is function declaration and function definition.
  26. `int var=0x12345678;` explain your approach to extract 34 and write the code.

**c) Strings:**

27. Write a program for `my_strcat()`
28. What the difference between array and string?

**d) Storage Classes and memory segments:**

29. Explain about static local and static global
30. Static variables stored in which segments ?
31. Why heap is needed?

32. List out the differences between malloc and calloc
33. Explain about the storage classes.
34. What is the use of the register keyword?
35. What do you mean by memory leakage?
36. what is the use of the Static keyword and where we can use it ?
37. Explain about volatile and const
38. Difference between static and dynamic memory allocation
39. How will you allocate the memory dynamically?
40. What will happen, if we don't free the memory at the end of the program?
41. Can i access a static variable using extern?
42. What is the use of code segment. what is stored in code segment ?
43. how to access the static variable outside the file?
44. where the memory is allocated for the string. can we change the string

```
#include<stdio.h>
```

```
int main()
```

```
{
```



```
char *str;  
str = "%s";  
printf(str, "K\n");  
return 0;  
}
```

### **e) Advanced Pointers and functions :**

- 45. Write a program to define 6\*6 matrix.
- 46. What are function pointers?

### **f) User Defined Data types :**

- 47. Write a program to calculate the total and average marks of a student using pointers to structures.
- 48. Define a structure Student with fields:
  - name (string of 50 characters), roll\_no (integer),
  - marks (array of 5 floats).

Use structure pointers to:

Input the student's details, Calculate the total and average marks and Display the details.

- 49. What's the use of typedef and give an example.

50. Why do we use enum and give an example

51. Difference between structure and union

52. What is macro and tell the use of it.

53. Explain about User defined data types

54. struct structure

```
{  
    int a;  
    Char b;  
    Char arr[4];  
};
```

What is the sizeof this structure ?

55. What is structure padding?

56. When we can use structure and when we can use union ?

#### **g) Preprocessor :**

57. What is macro and Define a macro to reset the bit in a given position.

58. Write a program to find largest of two numbers using macro

59. Describe about compilation stages
60. What is #define #ifndef, macro. Give an example of a macro.

## **Python :**

1. Given an array arr[] of size n, Write a program to rearrange it in alternate positive and negative manner without changing the relative order of positive and negative numbers. In case of extra positive/negative numbers, they appear at the end of the array.

Example:     Input: arr[] = {1, 2, 3, -4, -1, 4}

                 Output: arr[] = {1, -4, 2, -1, 3, 4}

2. Write a program to reverse a string while keeping special characters in their original positions.

Example:

input\_string = "a@bc%d\$e"

output\_string = "e@dc%b\$a"

3. Write a program to find smallest missing positive number .

Example:

Input: arr[] = {2, -3, 3, 5, 1, 7}

Output: 4

4. Write a program to remove a character(s) from a string to make it a palindrome.

Example:

Input : str = "Never odd nor even"

Output : Yes