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TCS TECHNICAL QUESTIONS:

1. What is your strongest programming language (Java, ASP, C, C++, VB, HTML, C#, etc.)?

Point to remember: Before interview You should decide your Favorite programming language and be prepared based on that question.

2. Differences between C and Java?

1. JAVA is Object-Oriented while C is procedural.

2. Java is an Interpreted language while C is a compiled language.

3. C is a low-level language while JAVA is a high-level language.

4. C uses the top-down approach while JAVA uses the bottom-up approach.

5. Pointer go backstage in JAVA while C requires explicit handling of pointers.

6. The Behind-the-scenes Memory Management with JAVA & The User-Based Memory Management in C.

7. JAVA supports Method Overloading while C does not support overloading at all.

8. Unlike C, JAVA does not support Preprocessors, & does not really them.

9. The standard Input & Output Functions--C uses the printf & scanf functions as its standard input & output while JAVA uses the System.out.print & System.in.read functions.

10. Exception Handling in JAVA And the errors & crashes in C.

3. In header files whether functions are declared or defined?

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Functions are declared within header file. That is function prototypes exist in a header file,not function bodies. They are defined in library (lib).

4.What are the different storage classes in C ?

here are four types of storage classes in C. They are extern, register, auto and static

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5. What does static variable mean?

Static is an access qualifier. If a variable is declared as static inside a function, the scope is limited to the function,but it will exists for the life time of the program. Values will be persisted between successive
calls to a function

6. How do you print an address ?

Use %p in printf to print the address.

7. What are macros? what are its advantages and disadvantages?

Macros are processor directive which will be replaced at compile time.
The disadvantage with macros is that they just replace the code they are not function calls. similarly the advantage is they can reduce time for replacing the same values.

8. Difference between pass by reference and pass by value?

Pass by value just passes the value from caller to calling function so the called function cannot modify the values in caller function. But Pass by reference will pass the address to the caller function instead of value if called function requires to modify any value it can directly modify.

9. What is an object?

Object is a software bundle of variables and related methods. Objects have state and behavior

10. What is a class?

Class is a user-defined data type in C++. It can be created to solve a particular kind of problem. After creation the user need not know the specifics of the working of a class.

11. What is the difference between class and structure?

Structure: Initially (in C) a structure was used to bundle different type of data types together to perform a particular functionality. But C++ extended the structure to contain functions also.
The major difference is that all declarations inside a structure are by default public.
Class: Class is a successor of Structure. By default all the members inside the class are private.

12. What is ponter?

Pointer is a variable in a program is something with a name, the value of which can vary. The way the compiler and linker handles this is that it assigns
a specific block of memory within the computer to hold the value of that variable.

13. What is the difference between null and void pointer?

A Null pointer has the value 0. void pointer is a generic pointer introduced by ANSI. Generic pointer can hold the address of any data type.

14. what is function overloading

Function overloading is a feature of C++ that allows us to create multiple functions with the same name, so long as they have different parameters.Consider the following function:

```
int Add(int nX, int nY)
{
  return nX + nY;
}
```

15. What is function overloading and operator overloading?

Function overloading: C++ enables several functions of the same name to be defined, as long as these functions have different sets of parameters (at least as far as their types are concerned). This capability is called function overloading. When an overloaded function is called, the C++ compiler selects the proper function by examining the number, types and order of the arguments in the call. Function

overloading is commonly used to create several functions of the same name that perform similar tasks but on different data types.
Operator overloading allows existing C++ operators to be redefined so that they work on objects of user-defined classes. Overloaded operators are syntactic sugar for equivalent function calls. They form a pleasant facade that doesn't add anything fundamental to the language (but they can improve understandability and reduce maintenance costs).

16. what is friend function?

A friend function for a class is used in object-oriented programming to allow access to public, private, or protected data in the class from the outside.
Normally, a function that is not a member of a class cannot access such information; neither can an external class. Occasionally, such access will be advantageous for the programmer. Under these circumstances, the function or external class can be declared as a friend of the class using the friend keyword.

17. What do you mean by inline function?

The idea behind inline functions is to insert the code of a called function at the point where the function is called. If done carefully, this can improve the application's performance in exchange for increased compile time and possibly (but not always) an increase in the size of the generated binary executables.

18. Tell me something about abstract classes?

An abstract class is a class which does not fully represent an object. Instead, it represents a broad range of different classes of objects. However, this representation extends only to the features that those classes of objects have in common. Thus, an abstract class provides only a partial description of its objects.

19. What is the difference between realloc() and free()?

The free subroutine frees a block of memory previously allocated by the malloc subroutine. Undefined results occur if the Pointer parameter is not a valid pointer. If the Pointer parameter is a null value, no action will occur. The realloc subroutine changes the size of

the block of memory pointed to by the Pointer parameter to the number of bytes specified by the Size parameter and returns a new pointer to the block. The pointer specified by the Pointer parameter must have been created with the malloc, calloc, or realloc subroutines and not been deallocated with the free or realloc subroutines. Undefined results occur if the Pointer parameter is not a valid pointer.

20. What is the difference between an array and a list?

Array is collection of homogeneous elements. List is collection of heterogeneous elements.
For Array memory allocated is static and continuous. For List memory allocated is dynamic and Random.
Array: User need not have to keep in track of next memory allocation.
List: User has to keep in Track of next location where memory is allocated.
Array uses direct access of stored members, list uses sequential access for members.

21. What are the differences between structures and arrays?

Arrays is a group of similar data types but Structures can be group of different data types

22. What is data structure?

A data structure is a way of organizing data that considers not only the items stored, but also their relationship to each other. Advance knowledge about the relationship between data items allows designing of efficient algorithms for the manipulation of data.

23. Can you list out the areas in which data structures are applied extensively?

Compiler Design,

Operating System,

Database Management System,

Statistical analysis package,

Numerical Analysis,

Graphics,

Artificial Intelligence,

Simulation

24. What are the advantages of inheritance?

It permits code reusability. Reusability saves time in program development. It encourages the reuse of proven and debugged high-quality software, thus reducing problem after a system becomes functional.

25. what are the two integrity rules used in DBMS?

The two types of integrity rules are referential integrity rules and entity integrity rules. Referential integrity rules dictate that a database does not contain orphan foreign key values. This means that A primary key value cannot be modified if the value is used as a foreign key in a child table. Entity integrity dictates that the primary key value cannot be Null.

26. Tell something about deadlock and how can we prevent dead lock?

In an operating system, a deadlock is a situation which occurs when a process enters a waiting state because a resource requested by it is being held by another waiting process, which in turn is waiting for another resource. If a process is unable to change its state indefinitely because the resources requested by it are being used by other waiting process, then the system is said to be in a deadlock.

Mutual Exclusion: At least one resource must be non-shareable.[1] Only one process can use the resource at any given instant of time.
Hold and Wait or Resource Holding: A process is currently holding at least one resource and requesting additional resources which are being held by other processes.
No Preemption: The operating system must not de-allocate resources once they have been allocated; they must be released by the holding process voluntarily.
Circular Wait: A process must be waiting for a resource which is being held by another process, which in turn is waiting for the first process to release the resource. In general, there is a set of waiting processes, P = {P1, P2, ..., PN}, such that P1 is waiting for a resource held by P2, P2 is waiting for a resource held by P3 and so on till PN is waiting for a resource held by P1.[1][7]

Thus prevention of deadlock is possible by ensuring that at least one of the four conditions cannot hold.

27. What is Insertion sort, selection sort, bubble sort(basic differences among the functionality of the three sorts and not the exact algorithms)

28. What is Doubly link list?

A doubly linked list is a linked data structure that consists of a set of sequentially linked records called nodes. Each node contains two fields, called links, that are references to the previous and to the next node in the sequence of nodes. The beginning and ending nodes' previous and next links, respectively, point to some kind of terminator, typically a sentinel node or null, to facilitate traversal of the list. If there is only one sentinel node, then the list is circularly linked via the sentinel node. It can be conceptualized as two singly linked lists formed from the same data items, but in opposite sequential orders.

29. What is data abstraction? what are the three levels of data abstraction with Example?

Abstraction is the process of recognizing and focusing on important characteristics of a situation or object and leaving/filtering out the un-wanted characteristics of that situation or object.

Lets take a person as example and see how that person is abstracted in various situations

A doctor sees (abstracts) the person as patient. The doctor is interested in name, height, weight, age, blood group, previous or existing diseases etc of a person
An employer sees (abstracts) a person as Employee. The employer is interested in name, age, health, degree of study, work experience etc of a person.

Abstraction is the basis for software development. Its through abstraction we define the essential aspects of a system. The process of identifying the abstractions for a given system is called as Modeling (or object modeling).

Three levels of data abstraction are:
1. Physical level : how the data is stored physically and where it is stored in database.
2. Logical level : what information or data is stored in the database. eg: Database administrator 3.View level : end users work on view level. if any amendment is made it can be saved by other name.

30. What is command line argument?

Getting the arguments from command prompt in c is known as command line arguments. In c main function has three arguments.They are:

Argument counter
Argument vector
Environment vector

31. Advantages of a macro over a function?

Macro gets to see the Compilation environment, so it can expand #defines. It is expanded by the preprocessor.

32. What are the different storage classes in C?

Auto,register,static,extern

33. Which header file should you include if you are to develop a function which can accept variable number of arguments?

stdarg.h

34. What is cache memory ?

Cache Memory is used by the central processing unit of a computer to reduce the average time to access memory. The cache is a smaller, faster memory

which stores copies of the data from the most frequently used main memory locations. As long as most memory accesses are cached memory locations, the average
latency of memory accesses will be closer to the cache latency than to the latency of main memory.

35. What is debugger?

A debugger or debugging tool is a computer program that is used to test and debug other programs

36. Const char *p , char const *p What is the difference between the above two?

1) const char *p - Pointer to a Constant char ('p' isn't modifiable but the pointer is)
2) char const *p - Also pointer to a constant Char

However if you had something like:

char * const p - This declares 'p' to be a constant pointer to an char. (Char p is modifiable but the pointer isn't)

37. What is Memory Alignment?

Data structure alignment is the way data is arranged and accessed in computer memory. It consists of two separate but related issues: data alignment and data structure padding.

38. Explain the difference between 'operator new' and the 'new' operator?

The difference between the two is that operator new just allocates raw memory, nothing else. The new operator starts by using operator new to allocate memory, but then it invokes the constructor for the right type of object, so the result is a real live object created in that memory. If that object contains any other objects (either embedded or as base classes) those constructors as invoked as well.

39. Difference between delete and delete[]?

The keyword delete is used to destroy the single variable memory created dynamically which is pointed by single pointer variable.

Eg: int *r=new(int)

the memory pointed by r can be deleted by delete r.

delete [] is used to destroy array of memory pointed by single pointer variable.

Eg:int *r=new(int a[10])

The memory pointed by r can be deleted by delete []r.

40. What is conversion constructor?

A conversion constructor is a single-parameter constructor that is declared without the function specifier 'explicit'. The compiler uses conversion constructors to convert objects from the type of the first parameter to the type of the conversion constructor's class.To

define implicit conversions, C++ uses conversion constructors, constructors that accept a single parameter and initialize an object to be a copy of that parameter.

41. What is a spanning Tree?

A spanning tree is a tree associated with a network. All the nodes of the graph appear on the tree once. A minimum spanning tree is a spanning tree organized so that the total edge weight between nodes is minimized.

42. Why should we use data ware housing and how can you extract data for analysis with example?

If you want to get information on all the techniques of designing, maintaining, building and retrieving data, Data warehousing is the ideal method. A data warehouse is premeditated and generated for supporting the decision making process within an organization.

Here are some of the benefits of a data warehouse:

o With data warehousing, you can provide a common data model for different interest areas regardless of data's source. In this way, it becomes easier to report and analyze information.

o Many inconsistencies are identified and resolved before loading of information in data warehousing. This makes the reporting and analyzing process simpler.

o The best part of data warehousing is that the information is under the control of users, so that in case the system gets purged over time, information can be easily and safely stored for longer time period.

o Because of being different from operational systems, a data warehouse helps in retrieving data without slowing down the operational system.

o Data warehousing enhances the value of operational business applications and customer relationship management systems.

o Data warehousing also leads to proper functioning of support system applications like trend reports, exception reports and the actual performance analyzing reports.

Data mining is a powerful new technology to extract data for analysis.

43. Explain recursive function & what is the data structures used to perform recursion?

a) A recursive function is a function which calls itself.

b) The speed of a recursive program is slower because of stack overheads. (This attribute is evident if you run above C program.)
c) A recursive function must have recursive conditions, terminating conditions, and recursive expressions.

Stack data structure . Because of its LIFO (Last In First Out) property it remembers its caller so knows whom to return when the function has to return. Recursion makes use of system stack for storing the return addresses of the function calls. Every recursive function has its equivalent iterative (non-recursive) function. Even when such equivalent iterative procedures are written, explicit stack is to be used.

44. Differentiate between Complier and Interpreter?

An interpreter reads one instruction at a time and carries out the actions implied by that instruction. It does not perform any translation. But a compiler translates the entire instructions

45. What is scope of a variable?

Scope refers to the visibility of variables. It is very useful to be able to limit a variable's scope to a single function. In other words, the variable wil have a limited scope

46. What is an interrupt?

Interrupt is an asynchronous signal informing a program that an event has occurred. When a program receives an interrupt signal, it takes a specified action.

47. What is user defined exception in Java?

The keywords used in java application are try, catch and finally are used in implementing used-defined exceptions. This Exception class inherits all the method from Throwable class.

48. What is java Applet?

Applet is java program that can be embedded into HTML pages. Java applets runs on the java enables web browsers such as mozila and internet explorer. Applet is designed to run remotely on the client browser, so there are some restrictions on it. Applet can't access system resources on the local computer. Applets are used to make the web site more dynamic and entertaining.

49. What do you know about the garbage collector?

Garbage collection is the systematic recovery of pooled computer storage that is being used by a program when that program no longer needs the storage. This frees the storage for use by other programs
(or processes within a program). It also ensures that a program using increasing amounts of pooled storage does not reach its quota (in which case it may no longer be able to function).

Garbage collection is an automatic memory management feature in many modern programming languages, such as Java and languages in the .NET framework. Languages that use garbage collection are often interpreted or run within a virtual machine like the JVM. In each case, the environment that runs the code is also responsible for garbage collection.

50. Write a Binary Search program

```
int binarySearch(int arr[],int size, int item)
{
int left, right, middle;
left = 0;
right = size-1;

while(left <= right)
{
middle = ((left + right)/2);

if(item == arr[middle])
```

```
{
return(middle);
}

if(item > arr[middle])
{
left = middle+1;
}
else
{
right = middle-1;
}
}

return(-1);
}
```

51. What are enumerations?

An enumeration is a data type, used to declare variable that store list of names. It is act like a database, which will store list of items in the variable. example: enum shapes{triangle, rectangle,...

52. What is static identifier?

The static identifier is used for initializing only once, and the value retains during the life time of the program / application. A separate memory is allocated for 'static' variables. This value can be used between function calls. The default value of an uninitialized static variable is zero. A function can also be defined as a static function, which has the same scope of the static variable.

53. What is Cryptography?

Cryptography is the science of enabling secure communications between a sender and one or more recipients. This is achieved by the sender scrambling a message (with a computer

program and a secret key) and leaving the recipient to unscramble the message (with the same computer program and a key, which may or may not be the same as the sender's key).

There are two types of cryptography: Secret/Symmetric Key Cryptography and Public Key Cryptography

54. What is encryption?

Encryption is the transformation of information from readable form into some unreadable form.

55. What is decryption?

Decryption is the reverse of encryption; it's the transformation of encrypted data back into some intelligible form.

56. What exactly is a digital signature?

Just as a handwritten signature is affixed to a printed letter for verification that the letter originated from its purported sender, digital signature performs the same task for an electronic message. A digital signature is an encrypted version of a message digest, attached together with a message.

Write a program to find factorial of a number using recursive function.
Describe 2 different ways to concatenate two strings.
Give syntax for SQL and ORACLE joins.
How is modularity introduced in C++?
What is the difference between a Stack and a Queue.
Give example to differentiate between call by value and call by reference.
Why the usage of pointers in C++ is not recommended ?
What do you mean by Data mining?
Write a program to reverse a string.
Describe these concepts: Polymorphism, Inheritance and Abstraction.
What is full form of SMAC? Discuss few about it.
What is cloud computing? Give some of its applications in real world.
What are stacks? Give some of its applications.
One rectangular plate with length 8inches,breadth 11 inches and 2 inches thickness is there. what is the length of the circular rod with diameter 8 inches and equal to volume of rectangular plate?
How would you connect 8 dots with 3 lines.
Give the difference between the type casting and automatic type conversion. Also tell a suitable C++ code to illustrate both.
Can you declare a private method as static?
How many JVMs can run on a single machine and what is the meaning of Just-In-Time (JIT) compiler?
Differentiate between copy and default constructor.

What is #ifdef ? What is its application?
You are given a singly linked list. How would you find out if it contains a loop or not without using temporary space?
A person was fined for exceeding the speed limit by 10 mph. Another person was also fined for exceeding the same speed limit by twice the same. If the second person was travelling at a speed of 45 mph. find the speed limit .
What are different errors encountered while complying?
How would you implement two stacks using a single array?
Difference between keyword and identifier.
What is the Big-O Notation?
What do you understand by garbage collection in Java? Can it be forced to run?
What happens if an array goes out-of-bounds?
What is the role of C++ shorthand's?
Discuss the function of conditional operator, size of operator and comma operator with examples.
Describe friend function & its advantages.
Differentiate between null and void pointers.
Write a program to add three numbers in C++ utilizing classes.
Devise a program that inputs a 3 digit number n and finds out whether the number is prime or not. Find out its factors.
Explain debugger.
What are the different types of sorting? Explain the difference between them.
What is meant by entry controlled loop? What all C++ loops are exit controlled?

What are access modifiers?

3. How can we access private modifiers?

4. Print * pyramid pattern.

5. What is instance variable?

6. What are constructors?

7. Super and this keyword?

8. Difference between stack and queue?

9. Explain doubly linked list.

10. Type of link lists.