Professional Developer technical interview

Differences between pointer and reference

1. A pointer can be re-assigned any number of times while a reference can't be reassigned after initialization.
2. A pointer can point to NULL while reference can never point to NULL
3. You can't take the address of a reference like you can with pointers

- Use references in function parameters and return types to define attractive interfaces.
- Use pointers to implement algorithms and data structures.

Unified Modeling Language (UML)

UML: is used to manage large and complex systems.

With UML you can:

- Manage project complexity.
- Create database schema.
- Produce reports.

Types of UML Diagrams:

1. Class Diagrams
2. Package Diagrams
3. Object Diagrams
4. Use Case Diagrams
5. Sequence Diagrams
6. Collaboration Diagrams
7. State chart Diagrams
8. Activity Diagrams
9. Component Diagrams
10. Deployment Diagrams

A constructor:

Is used to initialize data members during object initialization

Static constructors have the following properties:

- Doesn't take access modifiers or have parameters.
- Is called automatically to initialize the class before the first instance is created or any static members are referenced.
- A static constructor cannot be called directly.
- Has the same name of the class.

Database Questions:

1- What is the difference between primary key and foreign key?

- A **primary key** is a field or combination of fields that uniquely identify a record in a table, so that an individual record can be located without confusion.

  Primary keys must contain UNIQUE values

- A **foreign key** (sometimes called a referencing key) is a key used to link two tables together.

2- What is Normalization 1NF, 2NF and 3NF (one, second and third normal form)?

- Eliminating redundant data
  - 1NF: ميكونش فيه اي عمود مركب يعني مكون من عمودين وميكونش قيم مختلفه
  - 2NF:جميع الأعمدة العادية في الجدول تعتمد على المفتاح الأساسي كاملا وليس جزء منه
  - 3NF: ميكونش فيه عمود بيعتمد علي عمود تاني

3- Relationship types (one to one, one to many and many to many)?

- One-to-one: Both tables can have only one record on either side of the relationship. Each primary key value relates to only one (or no) record in the related table. They're like spouses—you may or may not be married, but if you are, both you and your spouse have only one spouse. Most one-to-one relationships are forced by business rules and don't flow naturally from the data. In the absence of such a rule, you can usually combine both tables into one table without breaking any normalization rules.
- One-to-many: The primary key table contains only one record that relates to none, one, or many records in the related table. This relationship is similar to the one between you and a parent. You have only one mother, but your mother may have several children.
- Many-to-many: Each record in both tables can relate to any number of records (or no records) in the other table. For instance, if you have several siblings, so do your siblings (have many siblings). Many-to-many relationships require a third table

4- What are the advantages and disadvantages of Databases?

Advantages

- Reduced data redundancy
- Reduced updating errors and increased consistency
- Greater data integrity and independence from applications programs
- Improved data access to users through use of host and query languages
- Improved data security
- Reduced data entry, storage, and retrieval costs
- Facilitated development of new applications program

Disadvantages

- Database systems are complex, difficult, and time-consuming to design
- Substantial hardware and software start-up costs
- Damage to database affects virtually all applications programs
- Extensive conversion costs in moving form a file-based system to a database system
- Initial training required for all programmers and users

5- Examples of Databases management systems (Oracle, Microsoft SQL Server, DB2, MySQL)

6- What is RDBMS (Relational database management system)?

- RDBMS stands for Relational Database Management System. RDBMS data is structured in database tables, fields and records. Each RDBMS table consists of database table rows. Each database table row consists of one or more database table fields.
- RDBMS store the data into collection of tables, which might be related by common fields (database table columns). RDBMS also provide relational operators to manipulate the data stored into the database tables. Most RDBMS use SQL as database query language.

7- What is an Entity?

An Entity is a person, place, thing or concept about which data can be collected. Examples include EMPLOYEE, HOUSE, and Car.

8- What is Weak Entity?

- A Strong Entity is one that exists on its own, independent of other entities.
- A Weak Entity is one whose existence depends on another entity.

9- What are the different types of attributes?

- Simple and Composite Attribute
- Single Valued and Multi Valued attribute
- Complex Attribute

SQL Questions:

1- What is SQL (Structured Query language)?
2- What is the difference between Where and Having?

- ال where تستخدم مع الحقول العادية التي من قاعدة البيانات
- ام ال having فهي تستخدم مع الحقول التجميعية فهي تعمل نفس عمل ال Select ولكن على النتائج التي ظهرت من جملة ال Group By يعني أن وجودها مرهون بوجود الGroup By

3- What is the order of Select statement clauses (Select, From, Where)?
4- What is the different between Delete and Truncate?
    - Truncate: fast and cannot undo
    - Delete: can undo this delete
5- Define View and its types?
6- Define Index and its types?
7- Define Sub query and its types?
8- What is Join and the different types of Join?
9- What is the difference between DML, DDL and DCL?
10- What is the difference between Group by and Order By?
11- What is the difference between Delete and Drop?
12- After creating Database table can you add additional column?
13- What is the difference between Function and Stored Procedure?
14- What are the different types of Constraints?

Object Oriented

1. What is OOP?
   OOP is abbreviated as Object Oriented Programming system in which programs are considered as a collection of objects. Each object is nothing but an instance of a class.

2. Write basic concepts of OOPS?
   Following are the concepts of OOPS and are as follows:
   1. Encapsulation.
   2. Inheritance.
   3. Polymorphism.
   4. Abstraction.

3. What is a class?
   A class is simply a representation of a type of object. It is the blueprint/ plan/ template that describe the details of an object.

4. What is an object?
   Object is termed as an instance of a class, and it has its own state, behavior and identity.

5. What is Encapsulation?

   Encapsulation is a set of variables and methods inside the class, or an attribute of an object, And it contains all data which is hidden.
   Levels are Public, Protected, Private, Internal and Protected Internal.

6. What is Polymorphism?

   Polymorphism takes more than one form and it contains 3 objects:
   1. Overloading.
   2. Overriding.
   3. Inheritance.

7. What is Inheritance?

   Inheritance is a concept where one class shares the structure and behavior defined in another class. If inheritance applied on one class is called Single Inheritance, and if it depends on multiple classes, then it is called multiple Inheritances.

8. Define a constructor?

   Constructor is a method used to initialize the state of an object, and it gets invoked at the time of object creation. Rules for constructor are:.

   - Constructor Name should be same as class name.
   - Constructor must have no return type.

9. Define Destructor?

   Destructor is a method which is automatically called when the object is made of scope or destroyed. Destructor name is also same as class name but with the tilde symbol before the name.

10. What is Inline function?

    Inline function is a technique used by the compilers and instructs to insert complete body of the function wherever that function is used in the program source code.

11. What is a virtual function?

    Virtual function is a member function of class and its functionality can be overridden in its derived class. This function can be implemented by using a keyword called virtual, and it can be given during function declaration.
    Virtual function can be achieved in C++, and it can be achieved in C Language by using function pointers or pointers to function.

12. What is friend function?

    Friend function is a friend of a class that is allowed to access to Public, private or protected data in that same class. If the function is defined outside the class cannot access such information. Friend can be declared anywhere in the class declaration, and it cannot be affected by access control keywords like private, public or protected.

13. What is function overloading?

    Function overloading is defined as a normal function, but it has the ability to perform different tasks. It allows creation of several methods with the same name which differ from each other by type of input and output of the function.

    Example

    ```
    void add(int& a, int& b);
    void add(double& a, double& b);
    void add(struct bob& a, struct bob& b);
    ```

14. What is operator overloading?

    Operator overloading is a function where different operators are applied and depends on the arguments. Operator,-,* can be used to pass through the function , and it has their own precedence to execute.

    Example:

    ```
    class complex {
    double real, imag;
    public:
    complex(double r, double i) :
    real(r), imag(i) {}
    complex operator+(complex a, complex b);
    complex operator*(complex a, complex b);
    complex& operator=(complex a, complex b);
    }
    ```

    a=1.2, b=6

15. What is an abstract class?

    An abstract class is a class which cannot be instantiated. Creation of an object is not possible withabstract class , but it can be inherited. An abstract class can contain only Abstract method.

16. What is a ternary operator?

    Ternary operator is said to be an operator which takes three arguments. Arguments and results are of different data types , and it is depends on the function. Ternary operator is also called asconditional operator.

17. What is the use of finalize method?

    Finalize method helps to perform cleanup operations on the resources which are not currently used. Finalize method is protected , and it is accessible only through this class or by a derived class.

18. What are different types of arguments?

    A parameter is a variable used during the declaration of the function or subroutine and arguments are passed to the function, and it should match with the parameter defined. There are two types of Arguments.

- Call by Value – Value passed will get modified only inside the function, and it returns the same value whatever it is passed it into the function.
- Call by Reference – Value passed will get modified in both inside and outside the functions and it returns the same or different value.

19. What is super keyword?

    Super keyword is used to invoke overridden method which overrides one of its super class methods. This keyword allows to access overridden methods and also to access hidden members of the super class.

    It also forwards a call from a constructor to a constructor in the super class.

20. What is method overriding?

    Method overriding is a feature that allows sub class to provide implementation of a method that is already defined in the main class. This will overrides the implementation in the super class by providing the same method name, same parameter and same return type.

21. Which OOPS concept exposes only necessary information to the calling functions?

    Data Hiding / Abstraction

22. What is an interface?

    An interface is a collection of abstract method. If the class implements an inheritance, and then thereby inherits all the abstract methods of an interface.

23. What is exception handling?

    Exception is an event that occurs during the execution of a program. Exceptions can be of any type – Run time exception, Error exceptions. Those exceptions are handled properly through exception handling mechanism like try, catch and throw keywords.

24. What are tokens?

    Token is recognized by a compiler and it cannot be broken down into component elements. Keywords, identifiers, constants, string literals and operators are examples of tokens.

    Even punctuation characters are also considered as tokens – Brackets, Commas, Braces and Parentheses.

25. Difference between overloading and overriding?

    Overloading is static binding whereas Overriding is dynamic binding. Overloading is nothing but the same method with different arguments, and it may or may not return the same value in the same class itself.

    Overriding is the same method names with same arguments and return types associates with the class and its child class.

26. Difference between class and an object?

    An object is an instance of a class. Objects hold any information , but classes don't have any information. Definition of properties and functions can be done at class and can be used by the object.

    Class can have sub-classes, and an object doesn't have sub-objects.

27. What is an abstraction?

    Abstraction is a good feature of OOPS, and it shows only the necessary details to the client of an object. Means, it shows only necessary details for an object, not the inner details of an object. Example – When you want to switch On television, it not necessary to show all the functions of TV. Whatever is required to switch on TV will be showed by using abstract class.

28. What are access modifiers?

    Access modifiers determine the scope of the method or variables that can be accessed from other various objects or classes. There are 5 types of access modifiers , and they are as follows:.

- Private.
- Protected.
- Public.
- Friend.
- Protected Friend.

29. What is sealed modifiers?

    Sealed modifiers are the access modifiers where it cannot be inherited by the methods. Sealed modifiers can also be applied to properties, events and methods. This modifier cannot be applied to static members.

30. How can we call the base method without creating an instance?

    Yes, it is possible to call the base method without creating an instance. And that method should be Static method.
    Doing inheritance from that class.-Use Base Keyword from derived class.

31. What is the difference between new and override?

    The new modifier instructs the compiler to use the new implementation instead of the base class function. Whereas, Override modifier helps to override the base class function.

32. What are the various types of constructors?

    There are three various types of constructors , and they are as follows:.

    - Default Constructor – With no parameters.
    - Parametric Constructor – With Parameters. Create a new instance of a class and also passing arguments simultaneously.
    - Copy Constructor – Which creates a new object as a copy of an existing object.

33. What is early and late binding?

    Early binding refers to assignment of values to variables during design time whereas late binding refers to assignment of values to variables during run time.

34. What is ‘this’ pointer?

    THIS pointer refers to the current object of a class. THIS keyword is used as a pointer which differentiates between the current object with the global object. Basically, it refers to the current object.

35. What is the difference between structure and a class?
    Structure default access type is public , but class access type is private. A structure is used for grouping data whereas class can be used for grouping data and methods. Structures are exclusively used for data and it doesn't require strict validation , but classes are used to encapsulates and inherit data which requires strict validation.

36. What is the default access modifier in a class?
    The default access modifier of a class is Private by default.

37. What is pure virtual function?
    A pure virtual function is a function which can be overridden in the derived class but cannot be defined. A virtual function can be declared as Pure by using the operator =0.
    Example -.
    Virtual void function1() // Virtual, Not pure
    Virtual void function2() = 0 //Pure virtual

38. What are all the operators that cannot be overloaded?
    Following are the operators that cannot be overloaded -.
    1. Scope Resolution (::)
    2. Member Selection (.)
    3. Member selection through a pointer to function (.*)

39. What is dynamic or run time polymorphism?
    Dynamic or Run time polymorphism is also known as method overriding in which call to an overridden function is resolved during run time, not at the compile time. It means having two or more methods with the same name, same signature but with different implementation.

40. Do we require parameter for constructors?
    No, we do not require parameter for constructors.

41. What is a copy constructor?
    This is a special constructor for creating a new object as a copy of an existing object. There will be always only on copy constructor that can be either defined by the user or the system.

42. What does the keyword virtual represented in the method definition?
    It means, we can override the method.

43. Whether static method can use non static members?
    False.

44. What are base class, sub class and super class?
    Base class is the most generalized class , and it is said to be a root class.
    Sub class is a class that inherits from one or more base classes.
    Super class is the parent class from which another class inherits.

45. What is static and dynamic binding?
    Binding is nothing but the association of a name with the class. Static binding is a binding in which name can be associated with the class during compilation time , and it is also called as early Binding.
    Dynamic binding is a binding in which name can be associated with the class during execution time , and it is also called as Late Binding.

46. How many instances can be created for an abstract class?
    Zero instances will be created for an abstract class.

47. Which keyword can be used for overloading?
    Operator keyword is used for overloading.

48. What is the default access specifier in a class definition?
    Private access specifier is used in a class definition.

49. Which OOPS concept is used as reuse mechanism?
    Inheritance is the OOPS concept that can be used as reuse mechanism.

Operating System Interview Questions and Answers

1. **What's OPERATING SYSTEM?**
   An Operating System, or OS, is a software program that enables the computer hardware to communicate and operate with the computer software. Without a computer Operating System, a computer would be useless.
2. **OPERATING SYSTEM TYPES**
   As computers have progressed and developed so have the types of operating systems. Below is a basic list of the different types of operating systems and a few examples of Operating Systems that fall into each of the categories. Many computer Operating Systems will fall into more than one of the below categories.

   GUI - Short for Graphical User Interface, a GUI Operating System contains graphics and icons and is commonly navigated by using a computer mouse. See our GUI dictionary definition for a complete definition. Below are some examples of GUI Operating Systems.

   System 7.x
   Windows 98
   Windows CE

   Multi-user - A multi-user Operating System allows for multiple users to use the same computer at the same time and/or different times. See our multi-user dictionary definition for a complete definition for a complete definition. Below are some examples of multi-user Operating Systems.

Linux
Unix
Windows 2000
Windows XP
Mac OS X

Multiprocessing - An Operating System capable of supporting and utilizing more than one computer processor. Below are some examples of multiprocessing Operating Systems.

Linux
Unix
Windows 2000
Windows XP
Mac OS X

Multitasking - An Operating system that is capable of allowing multiple software processes to run at the same time. Below are some examples of multitasking Operating Systems.

Unix
Windows 2000
Windows XP
Mac OS X

Multithreading - Operating systems that allow different parts of a software program to run concurrently. Operating systems that would fall into this category are:

Linux
Unix
Windows 2000
Windows XP
Mac OS X

3. **What are the basic functions of an operating system?**

Operating system controls and coordinates the use of the hardware among the various applications programs for various uses. Operating system acts as resource allocator and manager. Since there are many possibly conflicting requests for resources the operating system must decide which requests are allocated resources to operating the computer system efficiently and fairly. Also operating system is control program which controls the user programs to prevent errors and improper

use of the computer. It is especially concerned with the operation and control of I/O devices.

4-What is CPU Scheduler?
- Selects from among the processes in memory that are ready to execute, and allocates the CPU to one of them. CPU scheduling decisions may take place when a process: 1.Switches from running to waiting state. 2.Switches from running to ready state. 3.Switches from waiting to ready. 4.Terminates. Scheduling under 1 and 4 is non-preemptive. All other scheduling is preemptive.

Data Structure Interview Question and Answers :

1- What is data structure?
The logical and mathematical model of a particular organization of data is called data structure.
There are two types of data structure

1. Linear
2. Nonlinear

//

2- What is a linked list?

A linked list is a linear collection of data elements, called nodes, where the linear order is given by pointers. Each node has two parts first part contain the information of the element second part contains the address of the next node in the list.

//

3- What is a queue? A queue is an ordered collection of items from which items may be deleted at one end (front end) and items inserted at the other end (rear end). It obeys FIFO rule there is no limit to the number of elements a queue contains.

4- What are the goals of Data Structure?

It must rich enough in structure to reflect the actual relationship of data in real world. The structure should be simple enough for efficient processing of data.

//

5- What is the difference between a Stack and an Array?

Stack

- Stack is a dynamic object whose size is constantly changing as items are pushed and popped .
- Stack may contain different data types.
- Stack is declared as a structure containing an array to hold the element of the stack, and an integer to indicate the current stack top within the array.
- Stack is a ordered collection of items.

Array

- Array is an ordered collection of items.
- Array is a static object.
- It contains same data types.
- Array can be home of a stack i.e. array can be declared large enough for maximum size of the stack.

//

6-what is binary tree?

A binary tree is a tree data structure in which each node has at most two child nodes, usually distinguished as left and right.

"لو انت خريج تجاره عربى وسألك فى الانترفيو المصطلحات انجلش قوله انا كنت تجاره عربى ومادرستش الممصطلحات دى انجلش"

Good Refernces

1- http://www.a2zinterviews.com/
2- http://www.w3schools.com/sql/default.asp
3- http://www.erptips.com/

Good Luck for all of you Guys ☺

الحمد لله رب العالمين

بالتوفيق ليكم جمعيا باذن الله