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C# Interview Questions

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1. What's the advantage of using System.Text.StringBuilder over System.String?

StringBuilder is more efficient in the cases, where a lot of manipulation is done to the text. Strings are immutable, so each time it's being operated on, a new instance is created.

2. Can you store multiple data types in System.Array?

No.

3. What's the difference between the System.Array.CopyTo() and System.Array.Clone()?

The first one performs a deep copy of the array, the second one is shallow.

4. How can you sort the elements of the array in descending order?

By calling Sort() and then Reverse() methods.

5. What's the .NET datatype that allows the retrieval of data by a unique key?

HashTable.

6. What's class SortedList underneath?

A sorted HashTable.

7. Will *finally* block get executed if the exception had not occurred?

Yes.

8. What's the C# equivalent of C++ catch (...), which was a catch-all statement for any possible exception?

A catch block that catches the exception of type System.Exception. You can also omit the parameter data type in this case and just write catch {}.

9. Can multiple catch blocks be executed?

No, once the proper catch code fires off, the control is transferred to the finally block (if there are any), and then whatever follows the finally block.

10. Why is it a bad idea to throw your own exceptions?

Well, if at that point you know that an error has occurred, then why not write the proper code to handle that error instead of passing a new Exception object to the catch block? Throwing your own exceptions signifies some design flaws in the project.

11. What's a delegate?

A delegate object encapsulates a reference to a method. In C++ they were referred to as function pointers.

12. What's a multicast delegate?

It's a delegate that points to and eventually fires off several methods.

13. How's the DLL Hell problem solved in .NET?

Assembly versioning allows the application to specify not only the library it needs to run (which was available under Win32), but also the version of the assembly.

14. What are the ways to deploy an assembly?

An MSI installer, a CAB archive, and XCOPY command.

15. What's a satellite assembly?

When you write a multilingual or multi-cultural application in .NET, and want to distribute the core application separately from the localized modules, the localized assemblies that modify the core application are called satellite assemblies.

16. What namespaces are necessary to create a localized application?

System.Globalization, System.Resources.

17. What's the difference between `//` comments, `/* */` comments and `///` comments?

Single-line, multi-line and XML documentation comments.

18. How do you generate documentation from the C# file commented properly with a command-line compiler?

Compile it with a `/doc` switch.

19. What's the difference between `<c>` and `<code>` XML documentation tag?

Single line code example and multiple-line code example.

20. Is XML case-sensitive?

Yes, so `<Student>` and `<student>` are different elements.

21. What debugging tools come with the .NET SDK?

CorDBG – command-line debugger, and DbgCLR – graphic debugger. Visual Studio .NET uses the DbgCLR. To use CorDBG, you must compile the original C# file using the `/debug` switch.

22. What does the This window show in the debugger?

It points to the object that's pointed to by this reference. Object's instance data is shown.

23. What are three test cases you should go through in unit testing?

Positive test cases (correct data, correct output), negative test cases (broken or missing data, proper handling), exception test cases (exceptions are thrown and caught properly).

24. What does `assert()` do?

In debug compilation, `assert` takes in a Boolean condition as a parameter, and shows the error dialog if the condition is false. The program proceeds without any interruption if the condition is true.

25. Why are there five tracing levels in `System.Diagnostics.TraceSwitcher`?

The tracing dumps can be quite verbose and for some applications that are constantly running you run the risk of overloading the machine and the hard drive there. Five levels range from None to Verbose, allowing to fine-tune the tracing activities.

26. Where is the output of `TextWriterTraceListener` redirected?

To the Console or a text file depending on the parameter passed to the constructor.

27. How do you debug an ASP.NET Web application?

Attach the `aspnet_wp.exe` process to the DbgClr debugger.

28. What's the difference between the `Debug` class and `Trace` class?

Documentation looks the same. Use `Debug` class for debug builds, use `Trace` class for both debug and release builds.

29. Can you change the value of a variable while debugging a C# application?

Yes, if you are debugging via Visual Studio.NET, just go to immediate window.

30. Explain the three services model (three-tier application).

Presentation (UI), business (logic and underlying code) and data (from storage or other sources).

31. What are advantages and disadvantages of Microsoft-provided data provider classes in ADO.NET?

SQLServer.NET data provider is high-speed and robust, but requires SQL Server license purchased from Microsoft. OLE-DB.NET is universal for accessing other sources, like Oracle, DB2, Microsoft Access and Informix, but it's a .NET layer on top of OLE layer, so not the fastest thing in the world. ODBC.NET is a deprecated layer provided for backward compatibility to ODBC engines.

32. What's the role of the DataReader class in ADO.NET connections?

It returns a read-only dataset from the data source when the command is executed.

33. What is the wildcard character in SQL?

Let's say you want to query database with LIKE for all employees whose name starts with La. The wildcard character is %, the proper query with LIKE would involve 'La%'.

34. Explain ACID rule of thumb for transactions.

Transaction must be Atomic (it is one unit of work and does not dependent on previous and following transactions), Consistent (data is either committed or roll back, no "in-between" case where something has been updated and something hasn't), Isolated (no transaction sees the intermediate results of the current transaction), Durable (the values persist if the data had been committed even if the system crashes right after).

35. What connections does Microsoft SQL Server support?

Windows Authentication (via Active Directory) and SQL Server authentication (via Microsoft SQL Server username and passwords).

36. Which one is trusted and which one is untrusted?

Windows Authentication is trusted because the username and password are checked with the Active Directory, the SQL Server authentication is untrusted, since SQL Server is the only verifier participating in the transaction.

37. Why would you use untrusted verification?

Web Services might use it, as well as non-Windows applications.

38. What does the parameter Initial Catalog define inside Connection String?

The database name to connect to.

39. What's the data provider name to connect to Access database?

Microsoft.Access.

40. What does Dispose method do with the connection object?

Deletes it from the memory.

41. What is a pre-requisite for connection pooling?

Multiple processes must agree that they will share the same connection, where every parameter is the same, including the security settings.

42. What's the implicit name of the parameter that gets passed into the class' set method?

Value, and it's datatype depends on whatever variable we're changing.

43. How do you inherit from a class in C#?

Place a colon and then the name of the base class.

44. Does C# support multiple inheritance?

No, use interfaces instead.

45. When you inherit a protected class-level variable, who is it available to?

Classes in the same namespace.

46. Are private class-level variables inherited?

Yes, but they are not accessible, so looking at it you can honestly say that they are not inherited. But they are.

47. What's the top .NET class that everything is derived from?

System.Object.

48. How's method overriding different from overloading?

When overriding, you change the method behavior for a derived class. Overloading simply involves having a method with the same name within the class.

49. What does the keyword virtual mean in the method definition?

The method can be over-ridden.

50. Can you declare the override method static while the original method is non-static?

No, you can't, the signature of the virtual method must remain the same, only the keyword virtual is changed to keyword override.

51. Can you override private virtual methods?

No, moreover, you cannot access private methods in inherited classes, have to be protected in the base class to allow any sort of access.

52. Can you allow class to be inherited, but prevent the method from being over-ridden?

Yes, just leave the class public and make the method sealed.

53. What's an interface class?

It's an abstract class with public abstract methods all of which must be implemented in the inherited classes.

54. Can you inherit multiple interfaces?

Yes, why not.

55. And if they have conflicting method names?

It's up to you to implement the method inside your own class, so implementation is left entirely up to you. This might cause a problem on a higher-level scale if similarly named methods from different interfaces expect different data, but as far as compiler cares you're okay.

56. What's the difference between an interface and abstract class?

In the interface all methods must be abstract, in the abstract class some methods can be concrete. In the interface no accessibility modifiers are allowed, which is ok in abstract classes.

57. How can you overload a method?

Different parameter data types, different number of parameters, different order of parameters.

58. If a base class has a bunch of overloaded constructors, and an inherited class has another bunch of overloaded constructors, can you enforce a call from an inherited constructor to an arbitrary base constructor?

Yes, just place a colon, and then keyword base (parameter list to invoke the appropriate constructor) in the overloaded constructor definition inside the inherited class.

59. Is it namespace class or class namespace?

The .NET class library is organized into namespaces. Each namespace contains a functionally related group of classes so natural namespace comes first.

60. Where is a protected class-level variable available?

It is available to any sub-class derived from base class

61. Are private class-level variables inherited?

Yes, but they are not accessible.

62. Describe the accessibility modifier "protected internal".

It is available to classes that are within the same assembly and derived from the specified base class.

63. What does the term immutable mean?

The data value may not be changed.

Note: The variable value may be changed, but the original immutable data value was discarded and a new data value was created in memory.

64. What is the syntax to inherit from a class in C#?

Place a colon and then the name of the base class.

Example: class MyNewClass : MyBaseClass

65. Can you prevent your class from being inherited by another class?

Yes. The keyword "sealed" will prevent the class from being inherited.

66. Can you allow a class to be inherited, but prevent the method from being over-ridden?

Yes. Just leave the class public and make the method sealed.

67. What's an abstract class?

A class that cannot be instantiated. An abstract class is a class that must be inherited and have the methods overridden. An abstract class is essentially a blueprint for a class without any implementation.

68. When do you absolutely have to declare a class as abstract?

1. When the class itself is inherited from an abstract class, but not all base abstract methods have been overridden.

2. When at least one of the methods in the class is abstract.

69. What is an interface class?

Interfaces, like classes, define a set of properties, methods, and events. But unlike classes, interfaces do not provide implementation. They are implemented by classes, and defined as separate entities from classes.

70. Why can't you specify the accessibility modifier for methods inside the interface?

They all must be public, and are therefore public by default.

71. What happens if you inherit multiple interfaces and they have conflicting method names?

It's up to you to implement the method inside your own class, so implementation is left entirely up to you. This might cause a problem on a higher-level scale if similarly named methods from different interfaces expect different data, but as far as compiler cares you're okay.

72. What is the difference between a Struct and a Class?

Structs are value-type variables and are thus saved on the stack, additional overhead but faster retrieval. Another difference is that structs cannot inherit.

73. What does the keyword "virtual" declare for a method or property?

The method or property can be overridden.

74. How is method overriding different from method overloading?

When overriding a method, you change the behavior of the method for the derived class. Overloading a method simply involves having another method with the same name within the class.

75. Can you declare an override method to be static if the original method is not static?

No. The signature of the virtual method must remain the same. (Note: Only the keyword virtual is changed to keyword override)

76. What are the different ways a method can be overloaded?

Different parameter data types, different number of parameters, different order of parameters.

77. If a base class has a number of overloaded constructors, and an inheriting class has a number of overloaded constructors; can you enforce a call from an inherited constructor to a specific base constructor?

Yes, just place a colon, and then keyword base (parameter list to invoke the appropriate constructor) in the overloaded constructor definition inside the inherited class.

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