50 C# Interview Questions and Answers for 2019

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C# developers are in high demand today. Entrepreneurs, managers and CTOs alike are all competing to build the best C# and .NET applications. Knowing how to structure your interviews to find the top developers will make sure you stay competitive. In this guide, you'll find example interview questions and answers to help you do exactly that.

First Things First: Select Your Job Requirements

The C# language can be used for countless different applications. To find the C# developer with the right skills for your specific project you need to dig right down and define your job requirements.

Some example C# requirements include:

- **Programming skills -** E.g. Object Oriented Design
- **C# specific skills** - E.g. Multithreading
- **.NET Library/toolkit experience**
- **Design skills** - Performance optimization, building scalable applications, concurrency
- **Communication skills** - Discussing problems and constraints
- **Initiative** - If they'll have to figure out solutions by themselves

It's tempting to include as many skills as possible on the list for your perfect developer. However, you'll actually want to keep the list as short as possible. You want to focus your interview on identifying depth of knowledge in areas that are most important to your project.

Once you know your job requirements, use them to pick the right questions for your interviews.

The questions in this guide are broken down into three categories – Junior, Mid-level, or Senior. Some of the questions can overlap, but it's important that you pay enough attention to the specifics of each of the categories and arrange your interview accordingly.

- Junior Level Interview Questions
- Mid-Level Developer Interview Questions

- Senior Developer Interview Questions

C# Basic Level Interview Questions

Skill RequSkill Requirements for Junior C# Developers

- Basic programming skills
- Object oriented programming
- Foundational C#/.NET knowledge
- Learning on the job
- Following instructions and receiving feedback
- Thinking like a programmer

Example C# Basic Interview Questions and Answers

Note: Important keywords are underlined in the answers. Bonus points if the candidate mentions them!

Question 1: What is an Object and a Class?

Answer: A Class is an encapsulation of properties and methods that are used to represent a real-time entity. It is a data structure that brings all the instances together in a single unit.

An Object in an instance of a Class. Technically, it is just a block of memory allocated that can be stored in the form of Variables, Array or a Collection.

Question 2: What are the fundamental OOP concepts?

Answer: The four fundamental concepts of Object Oriented Programming are:

- Encapsulation – The Internal representation of an object is hidden from the view outside object's definition. Only the required information can be accessed, whereas the rest of the data implementation is hidden.
- Abstraction – It is a process of identifying the critical behavior and data of an object and eliminating the irrelevant details.
- Inheritance – It is the ability to create new classes from another class. It is done by accessing, modifying and extending the behavior of objects in the parent class.
- Polymorphism – The name means, one name, many forms. It is achieved by having multiple methods with the same name but different implementations.

Question 3: What is Managed and Unmanaged code?

Answer: Managed code is a code which is executed by the CLR (Common Language Runtime) i.e all application code based on .Net Platform. It is considered as managed because of the .Net framework which internally uses the garbage collector to clear up the unused memory.

Unmanaged code is any code that is executed by the application runtime of any other framework apart from .Net. The application runtime will take care of memory, security and other performance operations.

Question 4: What is an Interface?

Answer: An Interface is a class with no implementation. The only thing that it contains is the declaration of methods, properties, and events.

Question 5: What are the different types of classes in C#?

Answer: The different types of class in C# are:

- Partial class – Allows its members to be divided or shared with multiple .cs files. It is denoted by the keyword *Partial.*
- Sealed class – It is a class which cannot be inherited. To access the members of a sealed class, we need to create the object of the class. It is denoted by the keyword *Sealed*.
- Abstract class – It is a class whose object cannot be instantiated. The class can only be inherited. It should contain at least one method. It is denoted by the keyword *abstract.*
- Static class – It is a class which does not allow inheritance. The members of the class are also static. It is denoted by the keyword *static*. This keyword tells the compiler to check for any accidental instances of the static class.

Question 6: Explain Code compilation in C#.

Answer: There are four steps in code compilation, which include:
- Compiling the source code into Managed code by C# compiler.
- Combining the newly created code into assemblies.
- Loading the Common Language Runtime(CLR).
- Executing the assembly by CLR.

Question 7: What are the differences between a Class and a Struct?

Answer: Given below are the differences between a Class and a Struct:

Class	Struct
Supports Inheritance	Does not support Inheritance
Class is Pass by reference (reference type)	Struct is Pass by Copy (Value type)
Members are private by default	Members are public by default
Good for larger complex objects	Good for Small isolated models
Can use waste collector for memory management	Cannot use Garbage collector and hence no Memory management

Question 8: What is the difference between Virtual method and Abstract method?

Answer: A Virtual method must always have a default implementation. However, it can be overridden in the derived class, though not mandatory. It can be overridden using *override* keyword.

An Abstract method does not have an implementation. It resides in the abstract class. It is mandatory that the derived class implements the abstract method. An *override* keyword is not necessary here though it can be used.

Question 9: Explain Namespaces in C#.

Answer: They are used to organize large code projects. “System” is the most widely used namespace in C#. We can create our own namespace and use one namespace in another, which are called Nested Namespaces.
They are denoted by the keyword “namespace”.

Question 10: What is “using” statement in C#?

Answer: “Using” Keyword denotes that the particular namespace is being used by the program. For Example, *using System*. Here *System* is a namespace. The class Console is defined under System. So we can use the console.writeline (“....”) or readline in our program.

Question 11: Explain Abstraction.

Answer: Abstraction is one of the OOP concepts. It is used to display only the essential features of the class and hides the unnecessary information.

Let us take an Example of a Car:

A driver of the car should know the details about the Car such as color, name, mirror, steering, gear, brake, etc. What he doesn't have to know is an Internal engine, Exhaust system.

So, Abstraction helps in knowing what is necessary and hiding the internal details from the outside world. Hiding of the internal information can be achieved by declaring such parameters as Private using *the private* keyword.

Question 12: Explain Polymorphism?

Answer: Programmatically, Polymorphism means same method but different implementations. It is of 2 types, Compile-time and Runtime.

Compile time polymorphism is achieved by operator overloading.

Runtime polymorphism is achieved by overriding. Inheritance and Virtual functions are used during Runtime Polymorphism.

For Example, If a class has a method Void Add(), polymorphism is achieved by Overloading the method, that is, void Add(int a, int b), void Add(int add) are all overloaded methods.

Question 13: How is Exception Handling implemented in C#?

Answer: Exception handling is done using four keywords in C#:

- try – Contains a block of code for which an exception will be checked.
- catch – It is a program that catches an exception with the help of exception handler.
- finally – It is a block of code written to execute regardless if an exception is caught or not.
- Throw – Throws an exception when a problem occurs.

Question 14: What are C# I/O Classes? What are the commonly used I/O Classes?

Answer: C# has System.IO namespace, consisting of classes that are used to perform various operations on files like creating, deleting, opening, closing etc.

Some commonly used I/O classes are:

- File – Helps in manipulating a file.
- StreamWriter – Used for writing characters to a stream.

- StreamReader – Used for reading characters to a stream.
- StringWriter – Used for reading a string buffer.
- StringReader – Used for writing a string buffer.
- Path – Used for performing operations related to path information.

Question 15: What is StreamReader/StreamWriter class?

Answer: StreamReader and StreamWriter are classes of namespace System.IO. They are used when we want to read or write charact90, Reader-based data, respectively.
Some of the members of StreamReader are: Close(), Read(), Readline().
Members of StreamWriter are: Close(), Write(), Writeline().

```
Class Program1
{
using(StreamReader sr = new StreamReader("C:\ReadMe.txt")
{
//----------------code to read-------------------//
}
using(StreamWriter sw = new StreamWriter("C:\ReadMe.txt"))
{
//-------------code to write-------------------//
}
}
```

Question 16: What is a Destructor in C#?

Answer: A Destructor is used to clean up the memory and free the resources. But in C# this is done by the garbage collector on its own. System.GC.Collect() is called internally for cleaning up. But sometimes it may be necessary to implement destructors manually.

For Example:

```
~Car()
{
Console.writeline("….");
}
```

Question 17: What is an Abstract Class?

Answer: An Abstract class is a class which is denoted by abstract keyword and can be used only as a Base class. An Abstract class should always be inherited. An instance of the class itself cannot be created. If we do not want any program to create an object of a class, then such classes can be made abstract.

Any method in the abstract class does not have implementations in the same class. But they must be implemented in the child class.

For Example:

```
abstract class AB1
{
Public void Add();
}
Class childClass : AB1
{
childClass cs = new childClass ();
int Sum = cs.Add();
}
```

All the methods in an abstract class are implicitly virtual methods. Hence virtual keyword should not be used with any methods in abstract class.

Example C# Mid-Level Interview Questions and Answers

Next we have interview questions and answers for experienced C# developers. Mid-level developers are the workhorses of the software development world. Whatever system and apps you're using, chances are that most of the code was written, checked and tested by a mid-level developer.

Skip to the Senior developer section for the Java advanced interview questions.

Question 18: What are Boxing and Unboxing?

Answer: Converting a value type to reference type is called Boxing.
For Example:

```
int Value1 -= 10;
//————Boxing——————//
object boxedValue = Value1;
```

Explicit conversion of same reference type (created by boxing) back to value type is called Unboxing.

For Example:

```
//————UnBoxing——————//
int UnBoxing = int (boxedValue);
```

Question 19: What is the difference between Continue and Break Statement?

Answer: Break statement breaks the loop. It makes the control of the program to exit the loop. Continue statement makes the control of the program to exit only the current iteration. It does not break the loop.

Question 20: What is the difference between finally and finalize block?

Answer: *Finally* block is called after the execution of try and catch block. It is used for exception handling. Regardless of whether an exception is caught or not, this block of code will be executed. Usually, this block will have clean-up code.

Finalize method is called just before garbage collection. It is used to perform clean up operations of Unmanaged code. It is automatically called when a given instance is not subsequently called.

Questions on Arrays and Strings

Question 21: What is an Array? Give the syntax for a single and multi-dimensional array?

Answer: An Array is used to store multiple variables of the same type. It is a collection of variables stored in a contiguous memory location.

For Example:

```
double numbers = new double[10];

int[] score = new int[4] {25,24,23,25};
```

A Single dimensional array is a linear array where the variables are stored in a single row. Above example is a Single dimensional array.

Arrays can have more than one dimension. Multidimensional arrays are also called rectangular arrays.

For Example, int[,] numbers = new int[3,2] { {1,2} ,{2,3},{3,4} };

Question 22: What is a Jagged Array?

Answer: A Jagged array is an array whose elements are arrays. It is also called an array of arrays. It can be either single or multiple dimensions.

```
int[] jaggedArray = new int[4][];
```

Question 23: Name some properties of Array.

Answer: Properties of an Array include:

- Length – Gets the total number of elements in an array.
- IsFixedSize – Tells whether the array is fixed in size or not.
- IsReadOnly – Tells whether the array is read-only or not.

Question 24: What is an Array Class?

Answer: An Array class is the base class for all arrays. It provides many properties and methods. It is present in the namespace System.

Question 25: What is a String? What are the properties of a String Class?

Answer: A String is a collection of char objects. We can also declare string variables in c#.

string name = “C# Questions”;

A string class in C# represents a string.

The properties of String class are Chars and Length.
Chars get the Char object in the current String.
Length gets the number of objects in the current String.

Question 26: What is an Escape Sequence? Name some String escape sequences in C#.

Answer: An Escape sequence is denoted by a backslash (\). The backslash indicates that the character that follows it should be interpreted literally or it is a special character. An escape sequence is considered as a single character.

String escape sequences are as follows:

\n – Newline character
\b – Backspace
\\ – Backslash
\' – Single quote
\'' – Double Quote

Question 27: What are Regular expressions? Search a string using regular expressions?

Answer: Regular expression is a template to match a set of input. The pattern can consist of operators, constructs or character literals. Regex is used for string parsing and replacing the character string.

For Example:

* matches the preceding character zero or more times. So, a*b regex is equivalent to b, ab, aab, aaab and so on.
Searching a string using Regex

```
static void Main(string[] args)
{
string[] languages = { "C#", "Python", "Java" };
foreach(string s in languages)
{
if(System.Text.RegularExpressions.Regex.IsMatch(s,"Python"))
{
Console.WriteLine("Match found");
}
}
}
```

The above example searches for “Python” against the set of inputs from the languages array. It uses Regex.IsMatch which returns true in case if the pattern is found in the input. The pattern can be any regular expression representing the input that we want to match.

Question 28: What are the basic String Operations? Explain.

Answer: Some of the basic string operations are:

- Concatenate –Two strings can be concatenated either by using System.String.Concat or by using + operator.
- Modify – Replace(a,b) is used to replace a string with another string. Trim() is used to trim the string at the end or at the beginning.
- Compare – System.StringComparison() is used to compare two strings, either case-sensitive comparison or not case sensitive. Mainly takes two parameters, original string, and string to be compared with.
- Search – StartWith, EndsWith methods are used to search a particular string.

Question 29: What is Parsing? How to Parse a Date Time String?

Answer: Parsing is converting a string into another data type.

For Example:

string text = “500”;

int num = int.Parse(text);

500 is an integer. So, Parse method converts the string 500 into its own base type, i.e int.

Follow the same method to convert a DateTime string.
string dateTime = “Jan 1, 2018”;
DateTime parsedValue = DateTime.Parse(dateTime);

C# Expert Level Interview Questions

This section contains some more technical interview questions and answers for experienced C# developers. Use these to test if your candidates can design and build quality applications using C#.

Skill Requirements for Senior C# Developers

- Expert C# and .NET knowledge
- Data structures and Object Oriented design patterns
- Designing for specific requirements (e.g. security, scalability)
- Maintaining and upgrading applications
- DevOps, continuous delivery
- Efficient programming and clean code
- Asynchronous programming
- Debugging
- Testing
- Leadership skills
- Clear communication skills

Example C# Advanced Interview Questions and Answers

Question 30: What is a Delegate? Explain.

Answer: A Delegate is a variable that holds the reference to a method. Hence it is a function pointer of reference type. All Delegates are derived from System.Delegate namespace. Both Delegate and the method that it refers to can have the same signature.

Declaring a delegate: *public delegate void AddNumbers(int n);*

After the declaration of a delegate, the object must be created of the delegate using the new keyword.

AddNumbers an1 = new AddNumbers(number);

The delegate provides a kind of encapsulation to the reference method, which will internally get called when a delegate is called.

```
public delegate int myDel(int number);
public class Program
{
public int AddNumbers(int a)
{
int Sum = a + 10;
return Sum;
}
public void Start()
{
myDel DelgateExample = AddNumbers;
}
}
```

In the above example, we have a delegate myDel which takes an integer value as a parameter. Class Program has a method of the same signature as the delegate, called AddNumbers().

If there is another method called Start() which creates an object of the delegate, then the object can be assigned to AddNumbers as it has the same signature as that of the delegate.

Question 31: What are Events?

Answer: Events are user actions that generate notifications to the application to which it must respond. The user actions can be mouse movements, keypress and so on.

Programmatically, a class that raises an event is called a publisher and a class which responds/receives the event is called a subscriber. An Event should have at least one subscriber else that event is never raised.

Delegates are used to declare Events.

Public delegate void PrintNumbers();

Event PrintNumbers myEvent;

Question 32: How to use Delegates with Events?

Answer: Delegates are used to raise events and handle them. Always a delegate needs to be declared first and then the Events are declared.

Let us see an Example:

Consider a class called Patient. Consider two other classes, Insurance, and Bank which requires Death information of the Patient from patient class. Here, Insurance and Bank are the subscribers and the Patient class becomes the Publisher. It triggers the death event and the other two classes should receive the event.

```
namespace ConsoleApp2
{
```

```
public class Patient
{
public delegate void deathInfo();//Declaring a Delegate//
public event deathInfo deathDate;//Declaring the event//
public void Death()
{
deathDate();
}
}
public class Insurance
{
Patient myPat = new Patient();
void GetDeathDetails()
{
//-------Do Something with the deathDate event------------//
}
void Main()
{
//--------Subscribe the function GetDeathDetails----------//
myPat.deathDate += GetDeathDetails;
}
}
public class Bank
{
Patient myPat = new Patient();
void GetPatInfo ()
{
//-------Do Something with the deathDate event------------//
}
void Main()
{
//--------Subscribe the function GetPatInfo ----------//
myPat.deathDate += GetPatInfo;
}
}
}
```

Question 33: What are the different types of Delegates?

Answer: The Different types of Delegates are:

Single Delegate – A delegate which can call a single method.

Multicast Delegate – A delegate which can call multiple methods. + and – operators are used to subscribe and unsubscribe respectively.

Generic Delegate – It does not require an instance of delegate to be defined. It is of three types, Action, Funcs and Predicate.

- *Action*– In the above example of delegates and events, we can replace the definition of delegate and event using Action keyword. The Action delegate defines a method that can be called on arguments but does not return a result

  Public delegate void deathInfo();

  Public event deathInfo deathDate;

  //Replacing with Action//

  Public event Action deathDate;

  Action implicitly refers to a delegate.

- *Func* – A Func delegate defines a method that can be called on arguments and returns a result.

  Func <int, string, bool> myDel is same as *delegate bool myDel(int a, string b);*

- *Predicate* – Defines a method that can be called on arguments and always returns the bool.

  Predicate<string> myDel is same as *delegate bool myDel(string s);*

Question 34: What do Multicast Delegates mean?

Answer: A Delegate that points to more than one method is called a Multicast Delegate. Multicasting is achieved by using + and += operator.

Consider the Example from question 32.

There are two subscribers for *deathEvent, GetPatInfo*, and *GetDeathDetails*. And hence we have used += operator. It means whenever the *myDel* is called, both the subscribers get called. The delegates will be called in the order in which they are added.

Question 35: Explain Publishers and Subscribers in Events.

Answer: A Publisher is a class responsible for publishing a message of different types of other classes. The message is nothing but Event as discussed in the above questions.

From the Example in Question 32, Class Patient is the Publisher class. It is generating an Event *deathEvent*, which the other classes receive.

Subscribers capture the message of the type that it is interested in. Again, from the Example of Question 32, Class Insurance and Bank are Subscribers. They are interested in event *deathEvent* of type *void*.

Question 36: What are Synchronous and Asynchronous operations?

Answer: Synchronization is a way to create a thread-safe code where only one thread can access the resource at any given time.

Asynchronous call waits for the method to complete before continuing with the program flow. Synchronous programming badly affects the UI operations, when the user tries to perform time-consuming operations since only one thread will be used.

In Asynchronous operation, the method call will immediately return so that the program can perform other operations while the called method completes its work in certain situations.

In C#, Async and Await keywords are used to achieve asynchronous programming. Look at

Question 43 for more details on synchronous programming.

Question 37: What is Reflection in C#?

Answer: Reflection is the ability of code to access the metadata of the assembly during runtime. A program reflects upon itself and uses the metadata to inform the user or modify its behavior. Metadata refers to information about objects, methods.

The namespace System.Reflection contains methods and classes that manage the information of all the loaded types and methods. It is mainly used for windows applications, for Example, to view the properties of a button in a windows form.

The MemberInfo object of the class reflection is used to discover the attributes associated with a class.

Reflection is implemented in two steps, first, we get the type of the object, and then we use the type to identify members such as methods and properties.

To get the type of a class, we can simply use

Type mytype = myClass.GetType();

Once we have a type of class, the other information of the class can be easily accessed.

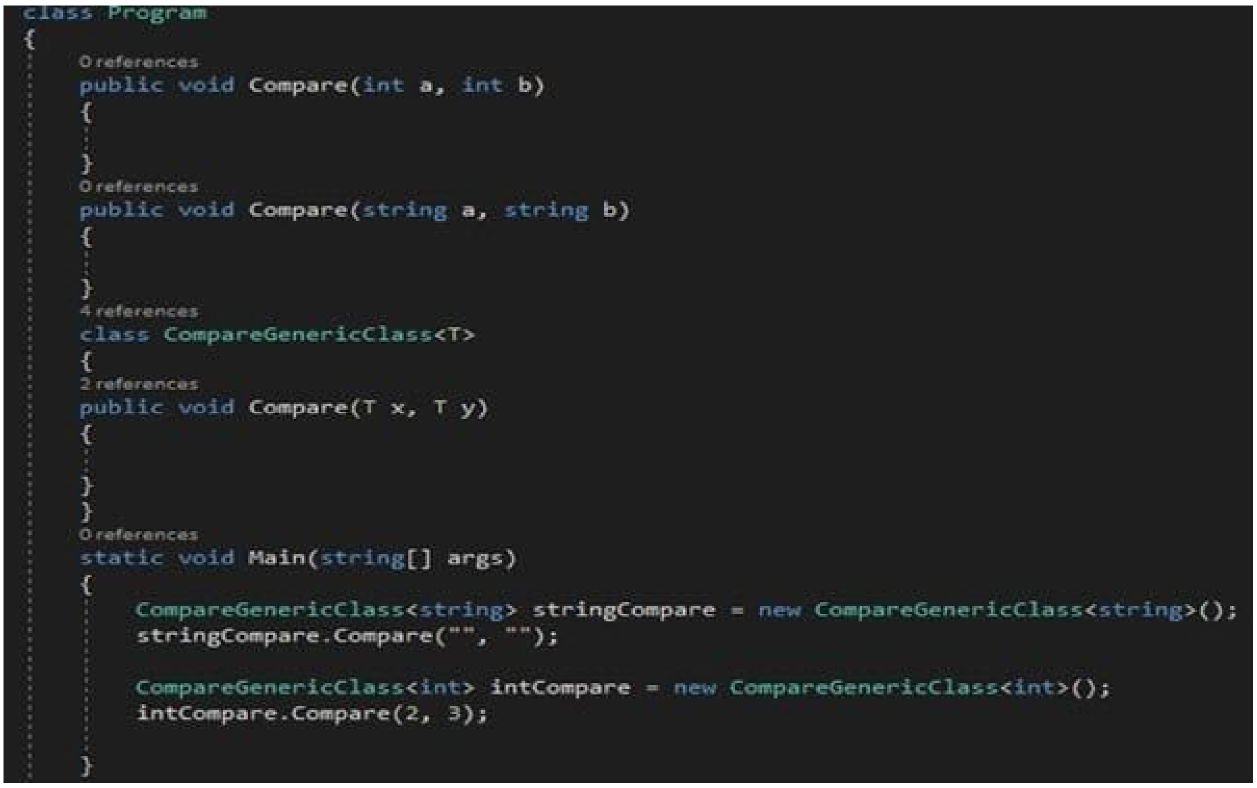
System.Reflection.MemberInfo Info = mytype.GetMethod*("AddNumbers");*

Above statement tries to find a method with name *AddNumbers* in the class *myClass*.

Question 38: What is a Generic Class?

Answer: Generics or Generic class is used to create classes or objects which do not have any specific data type. The data type can be assigned during runtime, i.e when it is used in the program.

For Example:



```
class Program
{
    0 references
    public void Compare(int a, int b)
    {

    }
    0 references
    public void Compare(string a, string b)
    {

    }
    4 references
    class CompareGenericClass<T>
    {
    2 references
    public void Compare(T x, T y)
    {

    }
    }
    0 references
    static void Main(string[] args)
    {
        CompareGenericClass<string> stringCompare = new CompareGenericClass<string>();
        stringCompare.Compare("", "");

        CompareGenericClass<int> intCompare = new CompareGenericClass<int>();
        intCompare.Compare(2, 3);

    }
```

So, from the above code, we see 2 compare methods initially, to compare string and int.

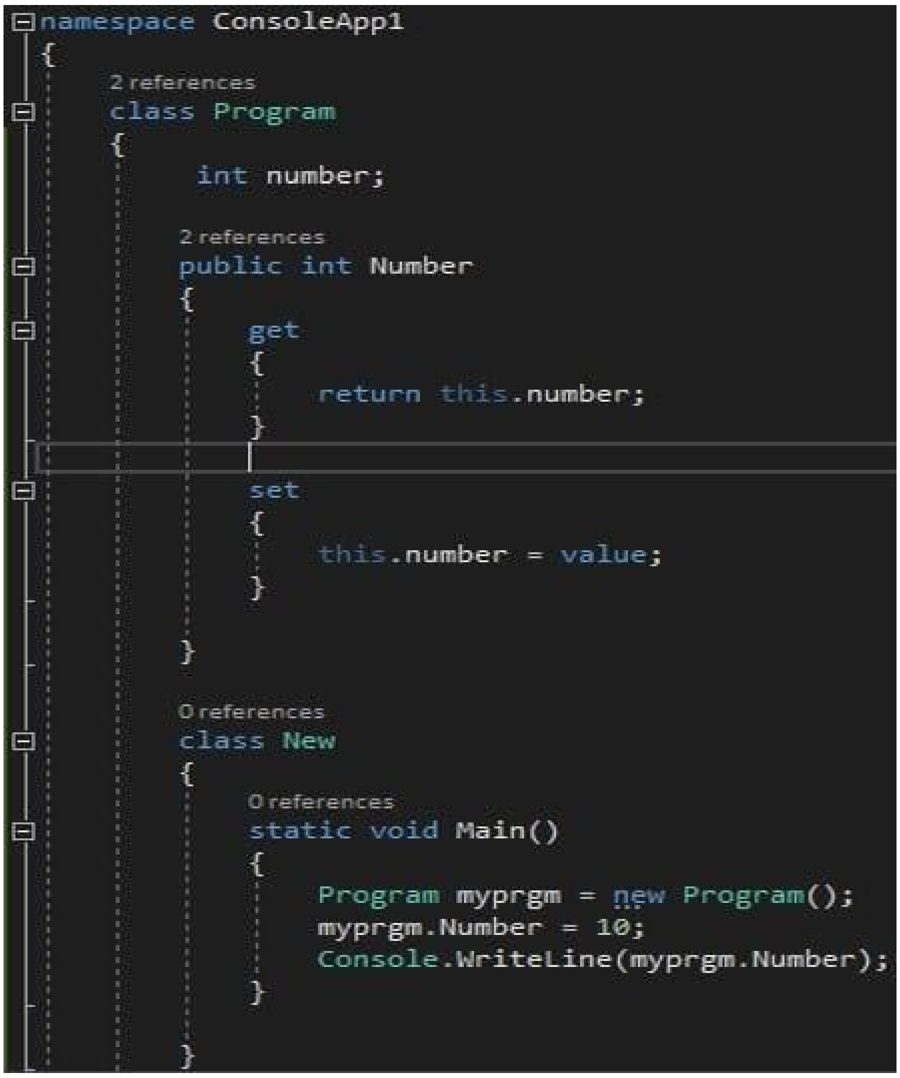
In case of other data type parameter comparisons, instead of creating many overloaded methods, we can create a generic class and pass a substitute data type, i.e T. So, T acts as a datatype until it is used specifically in the Main() method.

Question 39: Explain Get and Set Accessor properties?

Answer: Get and Set are called Accessors. These are made use by Properties. A property provides a mechanism to read, write the value of a private field. For accessing that private field, these accessors are used.

Get Property is used to return the value of a property
Set Property accessor is used to set the value.

The usage of get and set is as below:



```
namespace ConsoleApp1
{
    2 references
    class Program
    {
         int number;

        2 references
        public int Number
        {
            get
            {
                return this.number;
            }

            set
            {
                this.number = value;
            }

        }

        0 references
        class New
        {
            0 references
            static void Main()
            {
                Program myprgm = new Program();
                myprgm.Number = 10;
                Console.WriteLine(myprgm.Number);
            }

        }
```

Question 40: What is a Thread? What is Multithreading?

Answer: A Thread is a set of instructions that can be executed, which will enable our program to perform concurrent processing. Concurrent processing helps us do more than one operation at a time. By default, C# has only one thread. But the other threads can be created to execute the code in parallel with the original thread.

Thread has a life cycle. It starts whenever a thread class is created and is terminated after the execution. *System.Threading* is the namespace which needs to be included to create threads and use its members.

Threads are created by extending the Thread Class. *Start()* method is used to begin thread execution.

```
//CallThread is the target method//
 ThreadStart methodThread = new ThreadStart(CallThread);
 Thread childThread = new Thread(methodThread);
 childThread.Start();
```

C# can execute more than one task at a time. This is done by handling different processes by different threads. This is called MultiThreading.

There are several thread methods that are used to handle the multi-threaded operations:

Start, Sleep, Abort, Suspend, Resume and Join.

Most of these methods are self-explanatory.

Question 41: Name some properties of Thread Class.

Answer: **Few Properties of thread class are:**

- IsAlive – contains value True when a thread is Active.
- Name – Can return the name of the thread. Also, can set a name for the thread.
- Priority – returns the prioritized value of the task set by the operating system.
- IsBackground – gets or sets a value which indicates whether a thread should be a background process or foreground.
- ThreadState– describes the thread state.

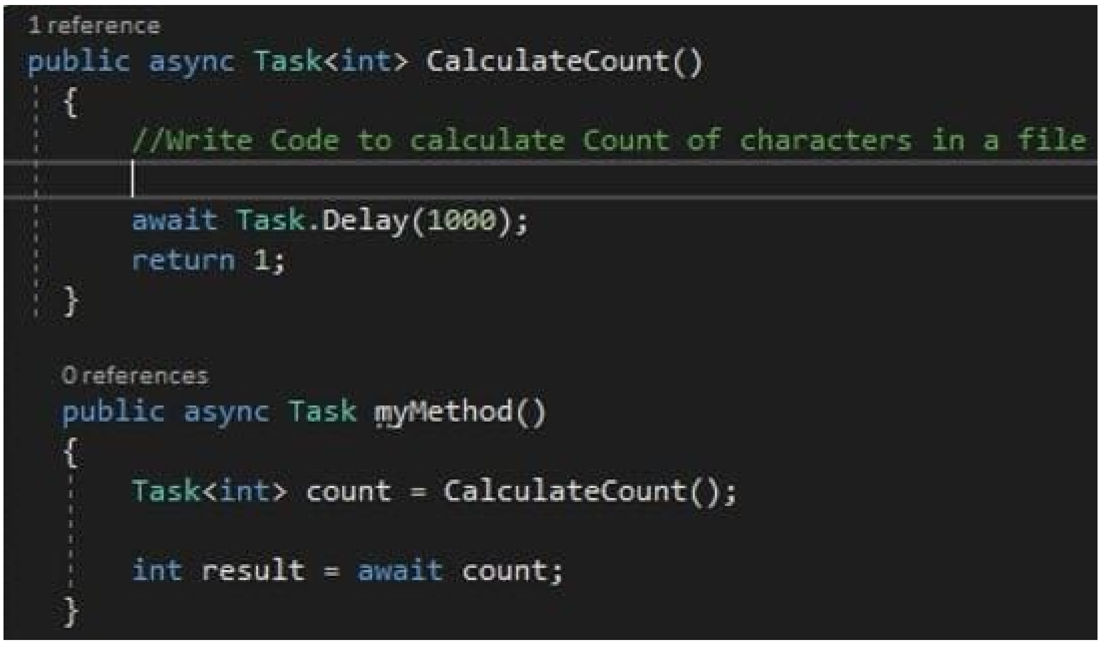
Question 42: What are the different states of a Thread?

Answer: Different states of a thread are:

- Unstarted – Thread is created.
- Running – Thread starts execution.
- WaitSleepJoin – Thread calls sleep, calls wait on another object and calls join on another thread.
- Suspended – Thread has been suspended.
- Aborted – Thread is dead but not changed to state stopped.
- Stopped – Thread has stopped.

Question 43: What are Async and Await?

Answer: Async and Await keywords are used to create asynchronous methods in C. Asynchronous programming means that the process runs independently of main or other processes. Usage of Async and Await is as shown below:



```
1 reference
public async Task<int> CalculateCount()
{
    //Write Code to calculate Count of characters in a file

    await Task.Delay(1000);
    return 1;
}

 0 references
 public async Task myMethod()
 {
     Task<int> count = CalculateCount();

     int result = await count;
 }
```

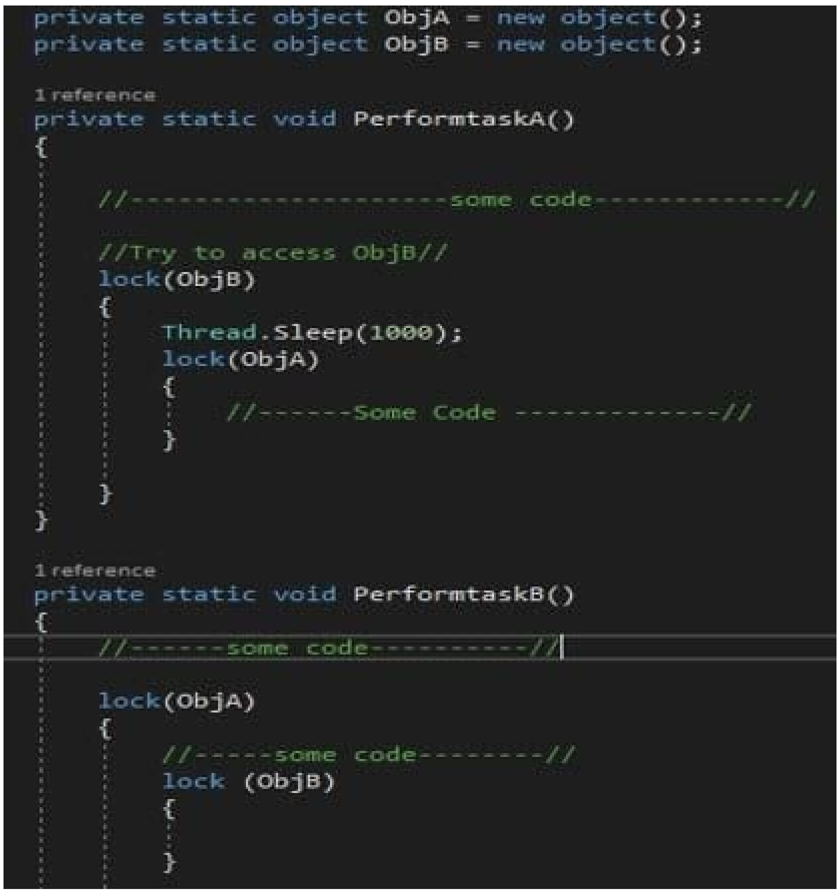
- Async keyword is used for the method declaration.
- The count is of a task of type int which calls the method CalculateCount().
- Calculatecount() starts execution and calculates something.
- Independent work is done on my thread and then await count statement is reached.
- If the Calculatecount is not finished, myMethod will return to its calling method, thus the main thread doesn't get blocked.
- If the Calculatecount is already finished, then we have the result available when the control reaches await count. So the next step will continue in the same thread. However, it is not the situation in the above case where Delay of 1 second is involved.

Question 44: What is a Deadlock?

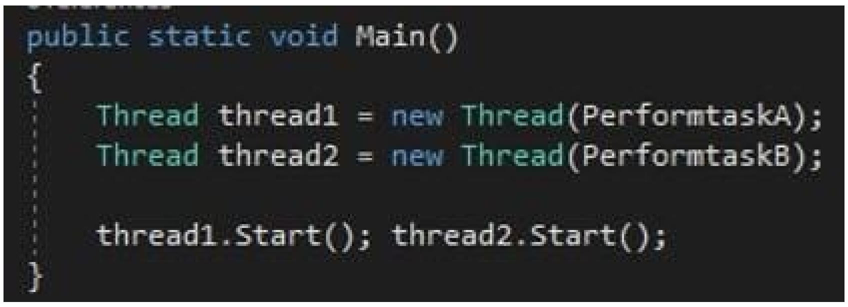
Answer: A Deadlock is a situation where a process is not able to complete its execution because two or more processes are waiting for each other to finish. This usually occurs in multi-threading.

Here a Shared resource is being held by a process and another process is waiting for the first process to release it and the thread holding the locked item is waiting for another process to complete.

Consider the below Example:



```
private static object ObjA = new object();
private static object ObjB = new object();

1 reference
private static void PerformtaskA()
{

    //--------------------some code-----------//

    //Try to access ObjB//
    lock(ObjB)
    {
        Thread.Sleep(1000);
        lock(ObjA)
        {
            //------Some Code ------------//
        }

    }
}

1 reference
private static void PerformtaskB()
{
    //------some code----------//

    lock(ObjA)
    {
        //-----some code--------//
        lock (ObjB)
        {

        }
```



```
public static void Main()
{
    Thread thread1 = new Thread(PerformtaskA);
    Thread thread2 = new Thread(PerformtaskB);

    thread1.Start(); thread2.Start();
}
```

- Perform tasks accesses objB and waits for 1 second.
- Meanwhile, PerformtaskB tries to access ObjA.
- After 1 second, PeformtaskA tries to access ObjA which is locked by PerformtaskB.
- PerformtaskB tries to access ObjB which is locked by PerformtaskA.

This creates Deadlock.

Question 45: Explain Lock, *Monitors*, and *Mutex* Object in Threading.

Answer: Lock keyword ensures that only one thread can enter a particular section of the code at any given time. In the above Example, lock(ObjA) means the lock is placed on ObjA until this process releases it, no other thread can access ObjA.

A Mutex is also like a lock but it can work across multiple processes at a time. WaitOne() is used to lock and ReleaseMutex() is used to release the lock. But Mutex is slower than lock as it takes time to acquire and release it.

Monitor.Enter and Monitor.Exit implements lock internally. a lock is a shortcut for Monitors. lock(objA) internally calls.

```
Monitor.Enter(ObjA);
try
{
}
Finally {Monitor.Exit(ObjA));}
```

Question 46: What is a Race Condition?

Answer: A Race condition occurs when two threads access the same resource and are trying to change it at the same time. The thread which will be able to access the resource first cannot be predicted.

If we have two threads, T1 and T2, and they are trying to access a shared resource called X. And if both the threads try to write a value to X, the last value written to X will be saved.

Question 47: What is Thread Pooling?

Answer: A Thread pool is a collection of threads. These threads can be used to perform tasks without disturbing the primary thread. Once the thread completes the task, the thread returns to the pool.

System.Threading.ThreadPool namespace has classes which manage the threads in the pool and its operations.

```
System.Threading.ThreadPool.QueueUserWorkItem(new
System.Threading.WaitCallback(SomeTask));
```

The above line queues a task. SomeTask methods should have a parameter of type Object.

Question 48: What is Serialization?

Answer: Serialization is a process of converting code to its binary format. Once it is converted to bytes, it can be easily stored and written to a disk or any such storage devices. Serializations are mainly useful when we do not want to lose the original form of the code and it can be retrieved anytime in the future.

Any class which is marked with the attribute [Serializable] will be converted to its binary form.

The reverse process of getting the c# code back from the binary form is called Deserialization.

To Serialize an object we need the object to be serialized, a stream which can contain the serialized object and namespace System.Runtime.Serialization can contain classes for serialization.

Question 49: What are the types of Serialization?

Answer: The different types of Serialization are: XML serialization, SOAP, and Binary.

- XML serialization – It serializes all the public properties to the XML document. Since the data is in XML format, it can be easily read and manipulated in various formats. The classes reside in System.sml.Serialization.
- SOAP – Classes reside in System.Runtime.Serialization. Similar to XML but produces a complete SOAP compliant envelope which can be used by any system that understands SOAP.
- Binary Serialization – Allows any code to be converted to its binary form. Can serialize and restore public and non-public properties. It is faster and occupies less space.

Question 50: What is an XSD file?

Answer: An XSD file stands for XML Schema Definition. It gives a structure for the XML file. It means it decides the elements that the XML should have and in what order and what properties should be present. Without an XSD file associated with XML, the XML can have any tags, any attributes, and any elements.

Xsd.exe tool converts the files to XSD format. During Serialization of C# code, the classes are converted to XSD compliant format by xsd.exe.

Summary

Your ability to identify and hire the best C# developers will ultimately determine the success of your project. Just keep in mind, C# is an incredibly diverse language, and you probably don't need the perfect C# developer to get your job done right.

Use these sample and typical interview questions on C# to pick out the candidate with exactly the right skill set to get your project done right, and within your budget.

Finally, you can simply print out this ready-to-use cheat sheet of questions and answers and bring it with you to the interview. your candidates.

Happy Hiring!

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DevTeam.Space team is proactive, drawing on operating experience to understand not only your vision but also its purpose; they are skilled, making the right judgment calls and iterating quickly; and they get customer service, providing honest counsel on cost-benefit and real-time process transparency. I highly recommend DTS and look forward to working with them again!

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RAHUL THATHOO – MyTime

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JASON JOU – SenStay

Working with DevTeam.Space was a positive and professional experience from the start. They had all the tools in place to support Agile Scrum project management, communicated daily via the dashboard, delivered their Sprints on time, and stayed on top of project blockers. I look forward to working with them again!

Fintech / Backend / Frontend
TONY AMOS - Principis Capital

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