

C#**Name the access modifiers – describe them**

```
public
protected
internal
private
```

And some additional ones:

`protected internal` - The type or member can be accessed by any code in the assembly in which it is declared, or from within a derived class in another assembly.

`private protected` The type or member can be accessed only within its declaring assembly, by code in the same class or in a type that is derived from that class.

Describe the difference between a reference type and a value type

Value types: struct (stack memory)

Reference types: class (heap memory)

What is Boxing?

Converting a value type to a reference type.

What's the difference between an Interface and an Abstract class

An interface cannot have implementations.

Give an example of an interface you have used.

```
IDisposable
IEnumerable
```

What is the name of the mechanism or process used in .NET to free up memory?

Garbage collection.

What is a delegate?**Describe the difference between a *Thread* and a *Task***

Thread resource hungry; allocated stack

Task run from a thread-pool (CLR), reduces context switching.

What is a Dead Lock?

Two or more activities/threads awaiting on each other to finish.

Describe a technique that can be used to handle synchronisation of resources shared across threads.

Use of the lock keyword.

HTML**What HTML verb would typically be used to request a page from a server?**

GET

WebForms : what is the difference when sending from data to the server by GET or POST

GET data sent in the URL

POST data sent in HTTP message body

Possible issues with GETs...

- Requests can be **cached**
- Requests remain in browser history
- Sensitive data?
- Length restrictions (URL)
- Only be used to retrieve data – do not perform an action

CRUD

RESTful services

CREATE	POST to base URI returning new URI PUT new URI
READ	GET
UPDATE	PUT
DELETE	DELETE

What do you understand by responsive web design?**What the difference between onload and onDocumentReady?**

The onload function is not run until all the information on the page is loaded. This leads to a substantial delay before any code is executed; whereas `onDocumentReady` loads the code just after the DOM is loaded. This allows early manipulation of the code.

CSS**What are CSS selectors?**

Patterns used to select the element(s) in DOM.

Which selector would you use to:

Select a class: `.` (dot)

Select an ID: `#` (hash)

Select all P elements inside a div: `div > p`

What is a Mixin?

A mixin lets you make groups of CSS declarations that you want to reuse throughout your site. You can even pass in values to make your mixin more flexible.

Can you Name some CSS Pre-Processors?

SASS; SCSS; LESS, PostCSS

What do you use a CSS Pre-Processors for?**JavaScript****What are the JavaScript Data Types**

Number, String, Boolean, Object, Undefined.

What is Variable Typing

Variable typing assigns a number to a variable and then assigns a string to the same variable:

```
i=5;
i="Hello!";
```

What are undeclared and undefined variables?

```
if( x==10 ) { } // undeclared
var y;
foo.bar++; // undefined.
```

What could protect against using undeclared?

"use strict"

What Is the result of:

```
5 + 7 + "12"
"1212"
```

What is the function of the delete operator

To delete a property as well as its value.

What would you use void(0) for?

To obtain the `undefined` primitive value. When used with href, the browser will stay on the same page.

What is the Identify operator do (triple equals)

Returns true if operands are of the same value and same type

What is a JavaScript closure?

A closure is a function defined inside another function (called the parent function) and has access to variables that are declared and defined in the parent function scope.

How would you empty an array?

```
arrayList = []; // not so good; references!
```

```

arrayList.length=0;
while(arrayList.length) { arrayList.pop(); }

```

What is the difference between classical inheritance and prototypal inheritance?

Φ What would you expect the output to from the following to be?

```

function foo1() {
  return { a: 10 };
}
function foo2() {
  return
  { a: 10 };
}
console.log("foo1(): "+foo1());
console.log("foo2(): "+foo2());

```

foo1 returns object and foo2 returns undefined; why – newline and no semi-colon. Semi colons are optional in JavaScript.

When would you use .bind()?

Commonly used when registering an event handler and you need to set what 'this' refers to

What is a Promise?

A promise is an object that represents the eventual completion (or failure) of an asynchronous operation and its resulting value.

What is ECMAScript?

It is a JavaScript standard meant to ensure the interoperability of Web pages across different Web browsers.

How would you ensure JS is compatible with as many browsers and versions of the browsers as possible?

Transpile; Polyfills; Shimms.

Provides the ability to write in a lower EMCA script yet maintaining browser support.

jQuery

How do you select an item using an Id?

```

$("#myDivId");

```

SQL

What's the difference between a Table and a View

Describe a query to list all of your friends that are 18 years or older.

```

SELECT * FROM friends WHERE Age>=18

```

Assuming several hundred items are returned, can you suggest a means of structuring a query to page through the data:

```

SELECT * FROM friends WHERE Age>=18 LIMIT 5, 10
(Offset 5, Range 10)

```

C / C++

What is the difference between C and C++?

C++ is an objected orientated programming language whereas C is not.

In C++, what is the special name given to a function or method to define its behaviour as one that can be overridden by an inheriting class?

Virtual

What does sizeof return?

It returns the size of the data type in BYTES

To get a pointer to a variable, what do you precede the variable name with?

The reference operator, ampersand sign (&)

What is object slicing?

Object slicing occurs when an object of a subclass type is copied to an object of superclass type: the superclass copy will not have any of the member variables defined in the subclass. These variables have, in effect, been "sliced off".

Why is it important to declare a destructor as virtual?

When you delete an instance of a derived class, ensures resources created by the derived classes can be freed, e.g. it calls their constructors.

Gherkin

What is the purpose of Gherkin

Gherkin serves two purposes — documentation and automated tests.

Describe the general syntax of a Gherkin source file.

Feature:

Scenarios:

```

Given <precondition>
When <action by actor>
  And <some other action>
Then <testable observable outcome>

```

Selenium Web Driver

What is Selenium?

Selenium is a web Automation tool which can be used to perform testing ONLY on Web Applications not Desktop based applications / browser automation.

Using the Webdriver, how would you request a page from the server?

```

WebDriver driver = new ChromeDriver(); // or other?
driver.get(string URL)

```

or you can use the navigation object

How would you write a value into a text element?

Identify and element by ID, CLASS, NAME and CSS.

Use `driver.sendKeys()`:

```

driver.findElement(By.id("element id"))
driver.findElement(By.className("element class"))
driver.findElement(By.name("element name"))
driver.findElement(By.tagName("element html tag name"))
driver.findElement(By.cssSelector("css selector"))
driver.findElement(By.link("link text"))
driver.findElement(By.xpath("xpath expression"))

```

Then use something like `sendKeys` to send the value.

OO GENERAL

What are the four principles of OOP?

- Encapsulation
- Abstraction
- Inheritance
- Polymorphism

When would you use an abstract class as opposed to an interface?

Re-using common code (Abstract).

Polymorphism

A way to use a class exactly like its parent so there is no confusion with mixing types and each child sub-class keeps its own functions/methods as they are.

Cyber Security

Can you name any Cyber Security Standards?

- IEC-62351 (security of protocols)
- IEC-62443
- NIST 800-82/800-53
- ISO 15408
- RFC 2196

What is the OWASP Top Ten and can you cite examples?

Open Web Application Security Project (OWASP) - The Ten Most Critical Web Application Security Risks.

OWASP Top 10 (2017):

- Injection
- Broken Authentication (weak passwords)
- Sensitive Data Exposure
- XML External Entities (XXE)
- Broken Access Control
- Security Misconfiguration
- Cross Site Scripting (XSS)
- Insecure Deserialization
- Using Components with Known Vulnerabilities
- Insufficient Logging & Monitoring (failed logins etc); suspicious use of APIs.

AngularJS

Explain data binding in angularJS.

Data-binding in Angular apps is the automatic synchronization of data between the model and view components.

What are directives in AngularJS?

Directives are attributes (and elements) that you code into your HTML template to bind to your application.

Describe the lifecycle of an AngularJS application

Bootstrap

When the AngularJS JavaScript library is downloaded to the browser; AngularJS initializes its own necessary components and then initializes your module (ng-app). The module is loaded, and dependencies are injected into your module.

Compilation

HTML compilation stage. Initially when a web page is loaded, a static form of the DOM is loaded in the browser. During the compilation phase, the static DOM is replaced with a dynamic DOM that represents the AngularJS view.

Runtime (Data Binding Phase)

Changes in the scope are reflected in the view, and any changes in the view are directly updated in the scope, making the scope the single source of data for the view.

Some common directives..

`ng-app` : Initializes application.
`ng-model` : Binds HTML controls to application data.
`ng-Controller` : Attaches a controller class to view.
`ng-repeat` : Bind repeated data HTML elements. Its like a for loop.
`ng-if` : Bind HTML elements with condition.
`ng-show` : Used to show the HTML elements.
`ng-hide` : Used to hide the HTML elements.
`ng-class` : Used to assign CSS class.
`ng-src` : Used to pass the URL image etc.

How do you write an angular expression

'double quotes; e.g. {{ 5 + 7 }}

How would you format the output of the expression?

Use a filter.

Give an example of how to filter an expression.

```
<h1>Price: {{ price | currency }}</h1>

<tr ng-repeat="x in names | orderBy:'country'">
  <td>{{ x.name + ', ' + x.country }}</td>
</tr>
```

Which directive would you use to populate rows of a table from a collection in the module and give an example of how this would be structured?

```
ng-repeat
or
<element ng-repeat="expression"></element>
or
<tr ng-repeat="x in records">
  <td>{{x}}</td>
</tr>
```

What is the difference between ng-repeat and ng-options?

An option element can only be bound to string values, and although `ng-repeat` can be used on the `<option>` element, `ng-options` provides some benefits, such as more flexibility in how the `<select>` modal is assigned via the select as part of the comprehension expression, and additionally in reducing memory and increasing speed by not creating a new scope for each repeated instance.

Multi-Threading

What is a Dead-Lock?

When every thread is stuck waiting on each-other; UK road analogy, 3-way-aroundabout, everyone is waiting for someone else to go [it happens!].

What is a Priority Inversion?

Occurs when a higher priority task is waiting on a lower priority task.

Behavioural Interview Questions

Ideally candidates will structure their answers using S.T.A.R.

Situation summary; who involved; why did it happen.

Task what was your role?

Action what steps were taken; why did you do it this way?

Result Outcome? Lessons, How did you feel? Accomplishments;

Describe a time when you had to deliver against a tight schedule.

How do you learn new skills?

Tell me about a failure?

Describe something that you are proud of

Why are you interested in working for XXXXX?

Describe a situation when you used persuasion to successfully convince someone to adopt your approach.

Give me an example of how you helped a co-worker improve their skills.