

Programming Interview Notes

Hardware:

RAID: RAID 0 – Striping : RAID 1 – Mirroring : RAID 5 – Striping with a parity bit : RAID 10 – Striped set of mirrors : RAID 0+1 - Mirrored pair of stripes

Windows Memory: 32 bit = 4 GB : 64 bit = 512 GB

SMP: Symmetric Multi-Processing - All processors connected to a common system bus.

NUMA: Non-Unified Memory Architecture - Groups of processors with its own pool of memory - A processor can access its own local memory

C#:

Syntax: FOR(int I = 1; i < 5; i++) : Switch (x) {case 1 : break; Default: break;}

Access Modifiers:

public: Access is not restricted.

protected: Access is limited to the containing class or types derived from the containing class.

internal: Access is limited to the current assembly.

protected internal: Access is limited to the current assembly or types derived from the containing class.

private: Access is limited to the containing type.

Modifiers:

Virtual: Method can be overridden in derived class

Override: Overrides virtual method in base class

New: Hides non-virtual method in base class

Sealed: Prevents derived class from inheriting

Abstract: Must be implemented by subclass

Value Types (stored on stack): int, enum, byte, decimal, double, float, long

Reference Types (stored on Heap): string, class, interface, object

Delegate: a type that references a method - Defines a method signature - Similar to function pointers but type-safe. Once a delegate is assigned a method, it behaves exactly like that method. A delegate in C# allows you to pass method of one class to objects of other class that can call these methods.

Boxing : Converting a value type to reference type - Unboxing: Converting a reference type to value type.

Primitives: int, long, float(32 bit), double(64 bit), decimal, string, char, bool

OOP / Programming:

Queue: FIFO - Stack: LIFO

Delegate: Function pointer - Object that holds a reference to a method

OOP: Abstraction, Polymorphism(classes with same interface can have different functionality/ implementation),

Encapsulation(Data & methods together), Inheritance

Abstract Class vs Interface: interfaces may be multiple-inherited / interface must implement all methods / Class can have data members

Big-O: O(1) Constant/O(N) Linear/O(N²)Quadratic/O(log N)Logarithmic/O(N!)Factorial/O(C^N) Exponential

Sorting: Bubble(Swap adjacent values), Selection, Merge, Quick(pivot to split values into 2 lists)

SOLID: Single responsibility principle, Open/closed principle(Open for extension, closed for modification), Liskov substitution principle(objects should be replaceable with instances of subtypes), Interface segregation principle(multiple specific interfaces over one general one), Dependency inversion principle(Depend on abstractions, not concretions)

Law Of Demeter: Principal Of Least Knowledge - Only talk to your immediate friends.

Data Structures: Array, Vector, Linked List, Hashtable, Tree, Graph, Stack, Queue

Is-a (inheritance) vs has-a (composition) relationships.

Idempotent: Can be called many times without different outcomes.

Deterministic function: Always return the same result when called with a specific set of input values.

WCF (Windows Communication Foundation):

ABC: Address (Endpoint), Binding(Protocols), Contract(Interface, define the service)

Bindings: HTTP, TCP, MSMQ, Named Pipes

Contracts: Service (service interface), Operation(methods exposed by service), Data(class of data objects), DataMember(Properties of data objects), Fault (errors), Message(message format - MessageHeader, MessageBody attributes)

LINQ:

IEnumerable queries are compiled to delegates - queries that execute in process.

IQueryable queries are compiled to expression trees - queries that execute out of process.

Syntax: Query, Method, Mixed

Quantifiers: Return bool – Any(), All(), Contains()

Conversion Operators: ToList(), ToArray(), ToDictionary()

Element Operators: Single(), SingleOrDefault(), First(), FirstOrDefault()

Immediate Execution: Singleton(Avg, Sum, Count) or ToList, ToArray.

Into: store results of group, join or select into a temp variable

Let: stores result of a sub expression into a new variable

IEnumerable: LINQ to Objects - Applies filter client side - Best for in memory: IQueryable: Extends

IEnumerable - External data

Enterprise Application Architecture Patterns:

Gateway: An object that encapsulates access to an external system or resource.

Repository: Collection to implement CRUD - Mediates between the domain and data mapping layers

Unit Of Work: Transaction - Used with Repository

Active Record: An object that wraps a row in a database table or view, encapsulates the database access, and adds domain logic on that data - putting data access logic in the domain object.

Domain Model: An object model of the domain that incorporates both behavior and data.

Powershell:

Get-ChildItem : Get-Content : New-Object : Out-File : Remove-Item : Set-Location : Sort-Object : Write-Host

Pattern: -match, -notmatch (RegEx) : -like, -notlike (Wildcard) : -replace

Comparison: -eq, -ne, -lt, -gt

Set-ExecutionPolicy RemoteSigned

Add-Type: Make call to .Net Framework

Entity Framework:

Table per concrete type(separate tables) – per hierarchy(1 table – discriminator value) – per type(Common-unique)

EDMX: Entity Data Model XML: CSDL(Conceptual),SSDL(Storage), MSL(Mapping)

DbContext: Wrapper aroundObjectContext – simplified

IsConcurrencyToken() - SaveChanges()

DBSet - Collection of entities

TransactionScope=>.Complete()

Context class - Inherit from DbContext - OnModelCreating(ModelBuilder) - Define entity collections from DbSet(virtual)

Model Builder - EntityTypeConfiguration<entity> - Define properties, Required, Ignore, etc.

Data Annotations: [Table("Table")], [Key], [Column("Name", TypeName="ntext")], [NotMapped]

FluentAPI: modelBuilder.Entity<Entity>().ToTable("Table");

Networking:

SNI – SQL Server Network Interface – protocol layer – establishes network connection between client and server

TDS- Tabular Data Stream – Microsoft proprietary protocol – one TDS endpoint for each network protocol – Queries sent as a TDS message across a TCP/IP connection.

SS Network Protocols – TCP/IP, Shared Memory, Named Pipes, VIA (Virtual Interface Adapter)

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SAN: Storage area network

NAS: Network attached storage

LUN: Logical Unit Number - Used to refer to logical disk on SAN.

WINS - Windows Internet Naming Service - Manages the association of workstation names and locations with IP addresses.

DHCP - Dynamic Host Configuration Protocol - to centrally manage and automate the assignment of IP addresses in a network.

NAT - Network Address Translation - Allow mapping from a public IP address to a private address

WINS - Windows Internet Name Service

Command Line:

CD-Change Directory : DIR-Directory : MKDIR-Make directory : DEL-Delete : REN-Rename :COPY-Copy :

CLS-Clear Screen