**1. What is the difference between ViewData, ViewBag, and TempData in ASP.NET Core MVC?**

**Answer:**

* **ViewData: Dictionary for passing data from controller to view; works during a single request.**
* **ViewBag: Dynamic wrapper over ViewData.**
* **TempData: Stores data between requests using session; used for redirection scenarios.**

**2. What is the purpose of the ConfigureServices method in ASP.NET Core?**

**Answer: It is used to register application services and configure DI container. Services like EF Core, Identity, CORS, and custom services are added here.**

**3. Explain the concept of Middleware Ordering.**

**Answer: Middleware is executed in the order registered in the pipeline. Incorrect ordering can break request processing. E.g., UseRouting() must come before UseEndpoints().**

**4. What is the difference between Abstract Class and Interface in C#?**

**Answer:**

* **Abstract Class: Can have implementations and fields; supports constructors.**
* **Interface: Only method/property signatures; no implementation (prior to C# 8).**

**5. How do you apply caching in ASP.NET Core?**

**Answer:**

* **In-Memory Caching using IMemoryCache**
* **Distributed Caching (e.g., Redis)**
* **Response Caching using middleware and [ResponseCache] attribute**

**6. What is SignalR and where would you use it?**

**Answer: SignalR is a library for real-time web functionality (e.g., chat, notifications). It abstracts WebSockets, SSE, and Long Polling behind a single API.**

**7. How do you handle concurrency in EF Core?**

**Answer:**

* **Use RowVersion column and [Timestamp] attribute**
* **Handle DbUpdateConcurrencyException to retry or alert users**

**8. What are Global Query Filters in EF Core?**

**Answer: They allow automatic application of filters (like IsDeleted) to all queries involving an entity. Configured in OnModelCreating().**

**9. Explain CQRS and where would you apply it.**

**Answer: Command Query Responsibility Segregation separates read and write operations. Used in systems with high read/write complexity or requiring separate scalability paths.**

**10. What is the difference between Configuration and Options pattern in ASP.NET Core?**

**Answer:**

* **Configuration: Access values directly via IConfiguration**
* **Options Pattern: Bind sections to strongly typed classes using IOptions<T>; encourages better structure and testability**

**11. How do you consume a REST API in C#?**

**Answer: Use HttpClient with GetAsync, PostAsync, or SendAsync. Use HttpRequestMessage for advanced scenarios. Always wrap in using block or inject via DI to avoid socket exhaustion.**

**12. What is Azure Application Insights?**

**Answer: It is a monitoring and telemetry service. It tracks exceptions, requests, dependencies, and performance counters to diagnose issues in live environments.**

**13. What are ARM Templates in Azure?**

**Answer: Azure Resource Manager (ARM) templates define infrastructure as code using JSON. They are used for automated, repeatable deployments of Azure resources.**

**14. How would you troubleshoot a high CPU usage in Azure App Service?**

**Answer:**

* **Analyze Application Insights telemetry**
* **Review logs and memory dump using Kudu console**
* **Use Profiler or Diagnose & Solve Problems blade in Azure Portal**
* **Optimize application code and DB queries**

**15. Code Challenge: Count the frequency of each character in a string**

**Answer:**

**public Dictionary<char, int> GetCharacterFrequency(string input)**

**{**

**return input.GroupBy(c => c)**

**.ToDictionary(g => g.Key, g => g.Count());**

**}**