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1. What are IIS 'Application Pools' used for?

   IIS 'Application pools are used to host web applications. These Application pools allow for web application to be isolated from one another. This isolation means that problems with one application do not affect the other web applications running on the same server.

2. What investigations could be undertaken to resolve a user seeing the following error page on the web application:

   Some investigations that could be undertaken are to:

   1. Check the application pool status and if the application has stopped then one can restart it.
   2. Look into the web server logs. These logs may contain information about what had caused the error.
   3. Check the resource usage, the pool may have reached its maximum number of worker processes. The worker processes may be causing memory bandwidth issues
   4. Finally, network issues could be causing the problem. The servers network connection or a firewall issue could be preventing access.

3. What colour is #666666 in CSS?

   The color #666666 in CSS is grey

4. What port is normally used for HTTPS/SSL traffic?

   The port normally used is port 443

5. What port is normally used for Microsoft SQL Server?

   The default port for a Microsoft SQL Server is port 1433

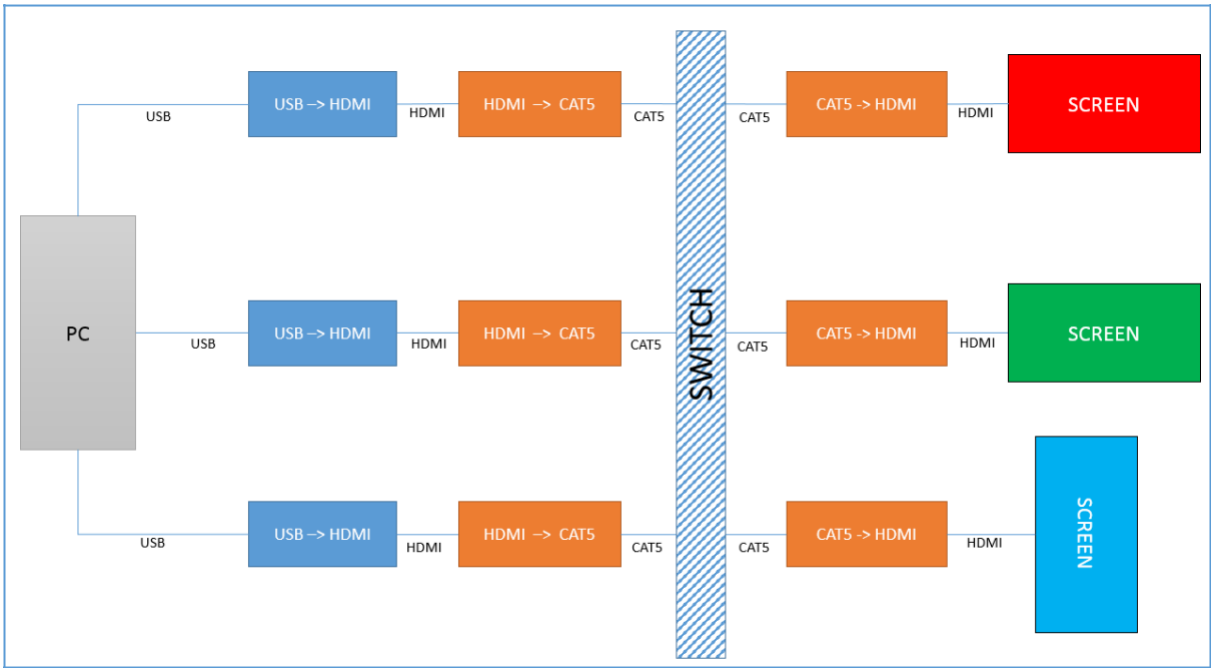
6. What are SOAPUI or POSTMAN applications normally used for?

   SOAPUI and POSTMAN application are commonly used testing and debugging web APIS

7. Using C# code – write a method to take input integer, and turn these into words (make the range **from -9999 to 9999**) – so convert:

   12 into the word "Twelve", 45 into the words "Forty Five" and 634 in "Six Hundred and Thirty Four", and -1987 as 'Minus One Thousand, Nine Hundred and Eight Seven'

8. Some screens have been installed to show media content at a customer site, with the following cabling:



In summary – a PC showing media content is connected to 3 screens. The display is out via 3 USB to HDMI convertors - connected into HDMI-CAT5 transmitter/receivers connected over a network via a network switch. The screens are then connected to the CAT5->HDMI convertors, therefore receiving the media content.

You do not need to have knowledge of networking to answer this question.

These screens were installed last night and the engineers report said that the screens were working fine when they tested them before leaving. However, this morning on the first day of opening, the Customer Support Manager raises an urgent call that **all** the screens are 'blank'.

8.1 Detail 2 or more possible causes for **all** screens being blank and manner in which the issue can be diagnosed?

There are a few possible causes for the screens being blank. One cause could be power failure, to figure the issue out, one should check the power to the PC, HDMI-CAT5 transmitter/receivers, and screens to make sure that they are all receiving power. You should also check power cables and outlets to make sure they are functioning. Another reason the screens could malfunctioning is a network connectivity issue.

There could be a connectivity issue between the PC and the screens. This connectivity issue would mean checking the network switch and the cables connecting the HDMI-CAT5 transmitter/receivers. Another important thing to investigate is the network settings on the PC to ensure that it is configured correctly.

8.2 How does this investigation change if only **one** screen is blank?

If only one screen is blank, then the investigation would focus on diagnosing the specific issue with that screen. You could check the power supply and connectivity to that specific screen, and check the cables and connections between the screen and the PC or THE HDMI-CAT5. It could also involve checking the screen itself for any hardware issues or malfunctions.

9. Using the following database tables:

Industry

ID	Industry Name	Market Value
J	Consumer Electronics	8 Billion
B	Mobile Telecoms	2 Billion

Salesperson

ID	Name	Age	Salary
1	Abe	61	140000
2	Bob	34	44000
5	Chris	34	40000
7	Dan	41	52000
8	Ken	57	115000
11	Joe	38	38000

Customer

ID	Name	City	Industry Type
4	Samsonic	pleasant	J
6	Panasonic	oaktown	J
7	Samung	jackson	B
9	Orange	Jackson	B

Orders

Number	order_date	cust_id	salesperson_id	Amount
10	8/2/19	4	2	5400
20	30/1/19	4	8	18000
30	7/6/19	9	1	4600
40	1/7/19	7	2	24000
50	2/3/18	6	7	6000
60	3/2/19	6	7	7200
70	5/6/18	9	7	1500
80	5/5/19	7	2	3400
90	1/1/20	9	1	22000

a. Write SQL to show: The names of all salespeople that have an order with Samsonic.

```
SELECT s.Name
FROM SalesPerson s
JOIN Orders o ON s.ID =
o.salesperson_id
JOIN Customer c ON o.cust_id = c.ID
WHERE c.Name = 'Samsonic'
```

b. Write a single query that shows the number of sales, largest sale, and average sale per sales person, i.e.:

Salesperson	No_of_sales	Largest_sale	Average_sale
Bob	3	24000	10933.33

```
SELECT sp.Name, COUNT(o.Amount) AS NumSales,
MAX(o.Amount) AS LargestSale, AVG(o.Amount) AS
AverageSale

FROM Orders o
JOIN SalesPerson sp ON o.salesperson_id = sp.ID
GROUP BY sp.Name
```

c. A manager asks you to propose a report that shows ways in which salespeople could be ranked to their 'value'. Propose **2 or more** ways how the 'value' of a salesperson be evaluated.

There are multiple different ways in which the 'value' of salesperson can be evaluated. Some examples of how the value can be determined are

1. Total sales revenue: Using a salesperson total revenue is one way to access value. Total revenue can be calculated by adding the sales amounts for all the orders that the salesperson has closed. The approach shows a salesperson's ability to generate revenue for the business.

2. Average sales amount is another metric that can be used to determine value. This is calculated by dividing total sales revenue by the total number of sales. This metric highlights salespeople who can sell products or services with a high price point.

Other metrics that could be considered are their conversion rate, sales per customer, and sales revenue per unit of time.

10. Please explain the differences between the following two SQL commands and any observations or issues or errors:

a.
```
INSERT INTO Account VALUES
(1,'John','Adams','john@abc.com',123456,'12 Street', 'AB12 3DE', '01235 632563');
```

This command inserts a new row into the "Account" table, with values provided for all columns in the table. The values are specified in the order in which the columns appear in the table.

b.
```
INSERT INTO Account (ID,FirstName,LastName,Email,AccountNumber) VALUES
(1,'John','Adams', 123456, john@abc.com);
```

This command also inserts a new row into the "Account" table, but it specifies only the values for the "ID", "FirstName", "LastName", "Email", and "AccountNumber" columns. The values are still specified in the order in which the columns appear in the table.

Some issues with the function are that the AccountNumber and Email values are swapped. Another issue is the Email is missing quotation marks: ' john@abc.com'

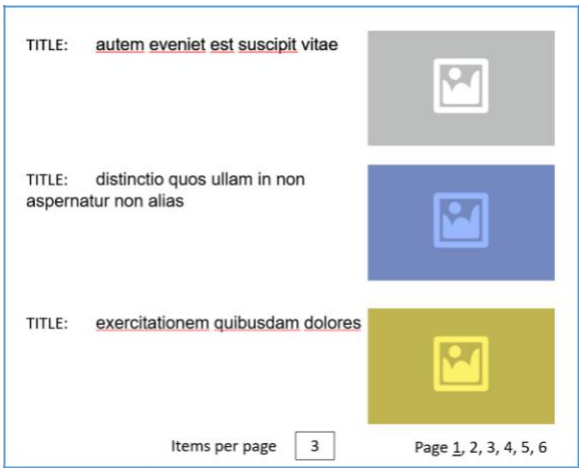
A corrected version:

```
INSERT INTO Account (ID, FirstName, LastName, Email, AccountNumber) VALUES
(1,'John','Adams', 'john@abc.com', 123456);
```

11.

a) Using the following publicly available example REST API:
https://jsonplaceholder.typicode.com/photos

Write a simple Visual Studio MVC based web application to show a paged list of the items in the results.



It should show the Title, the Thumbnail that is a link to the full image, a Textbox to define the number of items per page, and a selector for the page number.

b) Assuming we could alter any aspect of the site, or API, comment of some options for how to improve performance or efficiency of the MVC site, API or any other aspects.

A few options that could be implemented to improve performance or efficiency Would be:

Implementing caching: This could be done by storing frequently accessed data in a temporary location. The data can be retrieved quickly without having to make new requests to the servers. This would reduce the processing load on the server and improve overall speed on the site or API. Another way to improve the efficiency would be asynchronous programming.

With asynchronous programming multiple tasks could be processed concurrently rather than sequentially. This would be useful for tasks that require waiting for external resources, i.e., network requests. Along with concurrency load balancing would be a viable option.

If a site or API experiences high levels of traffic load balancing would help distribute the load across multiple servers. Thus, improving the overall performance and scalability.

c) Considering that the API **is** a third party API that we **cannot** alter, propose a solution on how we could allow a web-user to mark a photo as 'favourite, and to be able to come back at a later point and see a list of their 'favourite' photos. Provide as much detail for the solution as you feel is necessary.

One Solution that would allow for user to mark a photo as 'favorite' and see a list of their chosen photos would be to implement a server-side data base to sore this information.

This could be done by creating a database table to store these selected photos. The table would have two columns, one to store the user's unique ID(email address) and one to store the photo ID (obtained from the third party API).

Then one would need to modify the user interface to allow for an individual to mark a photo as a favorite. To accomplish this, the programmer(s) could do this by adding a favorite button next to each photo. When the person using the application clicks the button, a server-side script would be triggered and would add the photo to the user's favorite photos.

Finally, the user interface would need to be adjusted to display the user's favorite photos. A new page or section on the website would display a list of favorite photos retrieved from by querying the databases for photos that are marked and have a specific user ID.

This solution would allow for web user to have a selection of favorite photos even if a third-party API does not have this functionality.