

1. **List of Persons' full name, all their fax and phone numbers, as well as the phone number and fax of the company they are working for (if any).**

Results		Messages			
	Fullname	PhoneNumber	FaxNumber	PhoneNumber	FaxNumber
1	Waldemar Fisar	(308) 555-0100	(308) 555-0101	(308) 555-0100	(308) 555-0101
2	Laimonis Berzins	(308) 555-0100	(308) 555-0101	(308) 555-0100	(308) 555-0101
3	Lorena Cindric	(406) 555-0100	(406) 555-0101	(406) 555-0100	(406) 555-0101
4	Hung Van Groesen	(406) 555-0100	(406) 555-0101	(406) 555-0100	(406) 555-0101
5	Bhaargav Rambha...	(480) 555-0100	(480) 555-0101	(480) 555-0100	(480) 555-0101
6	Mudar Jevtic	(480) 555-0100	(480) 555-0101	(480) 555-0100	(480) 555-0101
7	Daniel Roman	(316) 555-0100	(316) 555-0101	(316) 555-0100	(316) 555-0101
8	Leyla Radnia	(316) 555-0100	(316) 555-0101	(316) 555-0100	(316) 555-0101
9	Johanna Huiting	(212) 555-0100	(212) 555-0101	(212) 555-0100	(212) 555-0101
10	Robert Ruutli	(212) 555-0100	(212) 555-0101	(212) 555-0100	(212) 555-0101
11	Biswajeet Thakur	(701) 555-0100	(701) 555-0101	(701) 555-0100	(701) 555-0101
12	Radha Shah	(701) 555-0100	(701) 555-0101	(701) 555-0100	(701) 555-0101
13	Kalidas Nadar	(423) 555-0100	(423) 555-0101	(423) 555-0100	(423) 555-0101
14	Filip Nedvidek	(423) 555-0100	(423) 555-0101	(423) 555-0100	(423) 555-0101
15	Kanti Kotadia	(303) 555-0100	(303) 555-0101	(303) 555-0100	(303) 555-0101

2. **If the customer's primary contact person has the same phone number as the customer's phone number, list the customer companies.**

	CustomerName	CustomerPhoneNumber	PrimaryContact
1	Tailspin Toys (Head Offic...	(308) 555-0100	(308) 555-0100
2	Tailspin Toys (Sylvanite,...	(406) 555-0100	(406) 555-0100
3	Tailspin Toys (Peeples Va...	(480) 555-0100	(480) 555-0100
4	Tailspin Toys (Medicine L...	(316) 555-0100	(316) 555-0100
5	Tailspin Toys (Gasport, N...	(212) 555-0100	(212) 555-0100
6	Tailspin Toys (Jessie, ND)	(701) 555-0100	(701) 555-0100
7	Tailspin Toys (Frankewing...	(423) 555-0100	(423) 555-0100
8	Tailspin Toys (Bow Mar, C...	(303) 555-0100	(303) 555-0100
9	Tailspin Toys (Netcong, N...	(201) 555-0100	(201) 555-0100
1...	Tailspin Toys (Wimbledon,...	(701) 555-0100	(701) 555-0100
1...	Tailspin Toys (Devault, P...	(215) 555-0100	(215) 555-0100
1...	Tailspin Toys (Biscay, MN)	(218) 555-0100	(218) 555-0100
1...	Tailspin Toys (Stonefort,...	(217) 555-0100	(217) 555-0100
1...	Tailspin Toys (Long Meado...	(240) 555-0100	(240) 555-0100
1...	Tailspin Toys (Batson, TX)	(210) 555-0100	(210) 555-0100
1...	Tailspin Toys (Coney Isla...	(314) 555-0100	(314) 555-0100
1...	Tailspin Toys (East Fulto...	(216) 555-0100	(216) 555-0100
1...	Tailspin Toys (Goffstown,...	(603) 555-0100	(603) 555-0100
1...	Tailspin Toys (Lemeta, AK)	(907) 555-0100	(907) 555-0100

3. List of customers to whom we made a sale prior to 2016 but no sale since 2016-01-01.

Results		Messages
	CustomerID	CustomerName
1	1	Tailspin Toys (Head Offic...
2	2	Tailspin Toys (Sylvanite,...
3	3	Tailspin Toys (Peeples Va...
4	4	Tailspin Toys (Medicine L...
5	5	Tailspin Toys (Gasport, N...
6	6	Tailspin Toys (Jessie, ND)
7	7	Tailspin Toys (Frankewing...
8	8	Tailspin Toys (Bow Mar, C...
9	9	Tailspin Toys (Netcong, N...
10	10	Tailspin Toys (Wimbledon,...
11	11	Tailspin Toys (Devault, P...
12	12	Tailspin Toys (Biscay, MN)
13	13	Tailspin Toys (Stonefort,...
14	14	Tailspin Toys (Long Meado...
15	15	Tailspin Toys (Batson, TX)
16	16	Tailspin Toys (Coney Isla...
17	17	Tailspin Toys (East Fulto...
18	18	Tailspin Toys (Goffstown,...
19	19	Tailspin Toys (Lemeta, AK)

4. List of Stock Items and total quantity for each stock item in Purchase Orders in Year 2013.

Results		Messages	
	StockItemID	StockItemName	total_quantity
1	23	DBA joke mug - it depends...	13
2	46	Developer joke mug - a fo...	13
3	215	Air cushion machine (Blue)	267
4	69	Ride on toy sedan car (Bl...	10
5	192	Black and orange fragile ...	9612
6	92	"The Gu" red shirt XML ta...	3708
7	115	Superhero action jacket (...)	309
8	138	Furry animal socks (Pink)...	3708
9	209	Packing knife with metal ...	1335
10	161	20 mm Double sided bubble...	2670
11	29	DBA joke mug - two types ...	13
12	169	20 mm Anti static bubble ...	2670
13	175	Bubblewrap dispenser (Blu...	267
14	75	Ride on big wheel monster...	10
15	201	Red and white urgent desp...	6408
16	132	Furry gorilla with big ey...	309
17	9	USB food flash drive - ba...	5

5. List of stock items that have at least 10 characters in description.

Results		Messages
	StockItemID ▼	StockItemName ▼
1	1	USB missile launcher (Gre...
2	2	USB rocket launcher (Gray)
3	3	Office cube periscope (Bl...
4	4	USB food flash drive - su...
5	5	USB food flash drive - ha...
6	7	USB food flash drive - pi...
7	8	USB food flash drive - di...
8	10	USB food flash drive - ch...
9	13	USB food flash drive - sh...
10	14	USB food flash drive - fo...
11	15	USB food flash drive - de...
12	16	DBA joke mug - mind if I ...
13	17	DBA joke mug - mind if I ...
14	18	DBA joke mug - daaaaaa-ta...
15	19	DBA joke mug - daaaaaa-ta...
16	20	DBA joke mug - you might ...
17	21	DBA joke mug - you might ...

6. **List of stock items that are not sold to the state of Alabama and Georgia in 2014.**

Results		Messages
	StockItemID	▼
1	18	
2	33	
3	43	
4	143	
5	86	
6	93	
7	204	
8	136	
9	118	
10	211	
11	68	
12	138	
13	186	
14	187	
15	154	
16	153	
17	36	
18	11	

7. **List of States and Avg dates for processing (confirmed delivery date – order date).**

Results		Messages		
	StateProvinceName	▼	avgdates	▼
1	Alabama		5	
2	Alaska		5	
3	Arizona		6	
4	Arkansas		4	
5	California		5	
6	Colorado		4	
7	Connecticut		4	
8	Florida		4	
9	Georgia		3	
10	Hawaii		4	
11	Idaho		5	
12	Illinois		4	
13	Indiana		7	
14	Iowa		4	
15	Kansas		4	
16	Kentucky		3	
17	Louisiana		5	

8. **List of States and Avg dates for processing (confirmed delivery date – order date) by month.**

Results		Messages	
	StateProvinceName ▾	orderdatetime ▾	(No column name) ▾
1	Alabama	2013-1	6
2	Alabama	2013-10	3
3	Alabama	2013-11	6
4	Alabama	2013-12	10
5	Alabama	2013-2	1
6	Alabama	2013-3	9
7	Alabama	2013-4	6
8	Alabama	2013-5	1
9	Alabama	2013-6	1
10	Alabama	2013-7	27
11	Alabama	2013-8	1
12	Alabama	2013-9	3
13	Alabama	2014-1	17
14	Alabama	2014-10	9
15	Alabama	2014-11	25
16	Alabama	2014-12	4
17	Alabama	2014-2	6

9. **List of StockItems that the company purchased more than sold in the year of 2015.**

Results		Messages	
	StockItemID ▾		
1	86		
2	204		
3	98		
4	184		
5	77		
6	95		
7	78		
8	80		
9	193		

10. List of Customers and their phone number, together with the primary contact person's name, to whom we did not sell more than 10 mugs (search by name) in the year 2016.

Results		Messages				
	CityID	CityName	StateProvinceID	Location	LatestRecordedPopulation	L
1	164	Adrian	24	0xE6100000010CF447629346D...	1257	1
2	5368	Carlton	17	0xE6100000010C6ABBAE04F75...	43	1
3	9908	East Smithfield	39	0xE6100000010C0F23298EA8E...	NULL	1
4	11095	Fairfax	37	0xE6100000010C070628FFEE4...	1435	1
5	18834	Laupahoehoe	12	0xE6100000010CF8AB5B98E0F...	604	1
6	21614	McWhorter	51	0xE6100000010C50244EDD4B9...	NULL	1
7	24452	Norborne	26	0xE6100000010CCB3ED9DEB8A...	736	1
8	24608	North Granby	7	0xE6100000010C155223997AF...	2021	1
9	27500	Pondosa	38	0xE6100000010C1C21A8BF038...	NULL	1
10	28862	Richvale	5	0xE6100000010C210AC10534B...	253	1
11	32517	Springville	25	0xE6100000010C6D0B85BEAA1...	NULL	1
12	33997	Throop	33	0xE6100000010CA618D643EA7...	NULL	1
13	34934	Urbancrest	36	0xE6100000010CEB0BD759E3F...	998	1

11. List all the cities that were updated after 2015-01-01.

Results		Messages			
	CustomerName	PhoneNumber	PrimaryContactName	sum	
1	Tailspin Toys (Mappsburg,...	(276) 555-0100	Pratap Varghese	7	
2	Lana Goransson	(212) 555-0100	Lana Goransson	9	
3	Tailspin Toys (Manchester...	(802) 555-0100	Karie Seymour	7	
4	Wingtip Toys (Isabela, PR)	(787) 555-0100	Ranjit Dikshit	7	
5	Wingtip Toys (Necedah, WI)	(262) 555-0100	Irene Sepp	5	
6	Pari Hosseini	(505) 555-0100	Pari Hosseini	5	
7	Wingtip Toys (Naches, WA)	(206) 555-0100	Rohan Das	2	
8	Debbie Molina	(270) 555-0100	Debbie Molina	9	
9	Wingtip Toys (Plata, TX)	(210) 555-0100	Daniela Sal	9	
10	Victoria Lacusta	(212) 555-0100	Victoria Lacusta	5	
11	Wingtip Toys (Salt Wells,...	(702) 555-0100	Jae-Hwa Min	9	
12	Wingtip Toys (Compass Lak...	(239) 555-0100	Gireesh Bhogireddy	2	
13	Wingtip Toys (Pikeview, C...	(303) 555-0100	Sirirat Kongpaisarn	6	
14	Anand Mudaliyar	(206) 555-0100	Anand Mudaliyar	9	

12. List all the Order Detail (Stock Item name, delivery address, delivery state, city, country, customer name, customer contact

person name, customer phone, quantity) for the date of 2014-07-01. Info should be relevant to that date.

Results Messages					
	StockItemName	DeliveryAddress	state	city	country
1	Developer joke mug - unde...	Unit 212 1837 Vasiljevic ...	Pennsylvania	Rose Tree	Unit...
2	Developer joke mug - that...	Unit 193 583 Aluri Road	Puerto Rico (US Territory)	Rosa Sánchez	Unit...
3	Developer joke mug - ther...	Suite 258 771 Kidambi Road	Texas	Lavon	Unit...
4	DBA joke mug - two types ...	Suite 185 1492 Shah Road	Illinois	Stonefort	Unit...
5	Developer joke mug - (hip...	Shop 20 1046 Saucier Road	Ohio	East Fultonham	Unit...
6	DBA joke mug - mind if I ...	Unit 50 519 Jogi Street	Puerto Rico (US Territory)	Indios	Unit...
7	DBA joke mug - you might ...	Shop 11 965 Horackova Lane	New York	Greig	Unit...
8	DBA joke mug - daaaaaa-ta...	Suite 258 771 Kidambi Road	Texas	Lavon	Unit...
9	Developer joke mug - when...	Unit 15 685 Pavel Road	Alabama	Southside	Unit...
10	Developer joke mug - when...	Shop 104 1889 Smirnov Road	South Carolina	Sans Souci	Unit...
11	DBA joke mug - you might ...	Suite 8 1761 Nastase Aven...	Pennsylvania	Bell Acres	Unit...
12	DBA joke mug - SELECT caf...	Shop 18 1528 Dikshit Cres...	Oklahoma	Seiling	Unit...
13	Developer joke mug - that...	Unit 148 1161 Chang Lane	New Jersey	Absecon	Unit...
14	Developer joke mug - fun ...	Unit 111 983 Cavalcante S...	New York	Lime Lake	Unit...

13. List of stock item groups and total quantity purchased, total quantity sold, and the remaining stock quantity (quantity purchased – quantity sold)

Results Messages				
	StockGroupName	TotalQuantityPurchased	TotalQuantitySold	RemainingStockQuantity
1	T-Shirts	7594938	1800072	5794866
2	USB Novelties	1580	81057	-79477
3	Packaging Materials	2710170	5838043	-3127873
4	Clothing	7595794	2842918	4752876
5	Novelty Items	4638	1168276	-1163638
6	Furry Footwear	587	395849	-395262
7	Mugs	1442	244010	-242568
8	Computing Novelties	7597975	2181299	5416676
9	Toys	1313	121360	-120047

14. List of Cities in the US and the stock item that the city got the most deliveries in 2016. If the city did not purchase any stock

items in 2016, print “No Sales”.

Results Messages		
	CityName	mostdelivereditem
1	Aaronsburg	No Sales
2	Abanda	No Sales
3	Abbeville	No Sales
4	Abbotsford	No Sales
5	Abbott	No Sales
6	Abbottsburg	Black and orange glass wi...
7	Abbottstown	No Sales
8	Abbyville	No Sales
9	Abell	No Sales
10	Abercrombie	No Sales
11	Aberdeen	No Sales
12	Aberfoil	No Sales
13	Abernant	No Sales
14	Abernathy	No Sales
15	Aberona	No Sales

15. List any orders that had more than one delivery attempt (located in invoice table).

Results Messages	
	OrderID
1	20
2	28
3	32
4	35
5	40
6	42
7	64
8	73
9	78
10	92
11	101
12	124
13	125
14	127
15	128

16. List all stock items that are manufactured in China. (Country of Manufacture)

Results Messages		
	StockItemID ▾	StockItemName ▾
1	1	USB missile launcher (Gre...
2	2	USB rocket launcher (Gray)
3	3	Office cube periscope (Bl...
4	16	DBA joke mug - mind if I ...
5	17	DBA joke mug - mind if I ...
6	18	DBA joke mug - daaaaaa-ta...
7	19	DBA joke mug - daaaaaa-ta...
8	20	DBA joke mug - you might ...
9	21	DBA joke mug - you might ...
10	22	DBA joke mug - it depends...
11	23	DBA joke mug - it depends...
12	24	DBA joke mug - I will get...
13	25	DBA joke mug - I will get...
14	26	DBA joke mug - SELECT caf...
15	27	DBA joke mug - SELECT caf...

17. Total quantity of stock items sold in 2015, group by country of manufacturing.

Results Messages		
	manufacture ▾	quantity ▾
1	China	2850885
2	Japan	22365

18. Create a view that shows the total quantity of stock items of each stock group sold (in orders) by year 2013-2017. [Stock Group Name, 2013, 2014, 2015, 2016, 2017]

Results		Messages					
	stockgroupname	2013	2014	2015	2016	2017	
1	T-Shirts	486924	528096	558144	226908	NULL	
2	USB Novelties	21328	23685	26048	9996	NULL	
3	Packaging Materials	1572415	1694778	1826433	744417	NULL	
4	Clothing	767341	831573	889178	354826	NULL	
5	Novelty Items	276609	306077	328677	256913	NULL	
6	Furry Footwear	107839	112845	125924	49241	NULL	
7	Mugs	65713	70384	77268	30645	NULL	
8	Computing Novelties	588555	639315	677480	275949	NULL	
9	Toys	32266	35403	38303	15388	NULL	

19. Create a view that shows the total quantity of stock items of each stock group sold (in orders) by year 2013-2017. [Year, Stock Group Name1, Stock Group Name2, Stock Group Name3, ... , Stock Group Name10]

Results		Messages								
	year	Air...	Clo...	Com...	Fur...	Mugs	Novelty I...	Packaging...	Toys	
1	2013	NULL	767341	588555	107839	65713	276609	NULL	32266	
2	2016	NULL	354826	275949	49241	30645	256913	NULL	15388	
3	2014	NULL	831573	639315	112845	70384	306077	NULL	35403	
4	2015	NULL	889178	677480	125924	77268	328677	NULL	38303	

20. Create a function, input: order id; return: total of that order. List invoices and use that function to attach the order total to the other fields of invoices.

Results	Messages
	total ▼
1	5290.00

21. Create a new table called ods.Orders. Create a stored procedure, with proper error handling and transactions, that input is a date; when executed, it would find orders of that day, calculate order total, and save the information (order id, order date, order total, customer id) into the new table. If a given date is already existing in the new table, throw an error and roll back. Execute the stored procedure 5 times using different dates.

22. Create a new table called ods.StockItem. It has following columns: [StockItemID], [StockItemName] ,[SupplierID] , [ColorID] ,[UnitPackageID] ,[OuterPackageID] ,[Brand] ,[Size] ,[LeadTimeDays] ,[QuantityPerOuter] ,[IsChillerStock] , [Barcode] ,[TaxRate] ,[UnitPrice],[RecommendedRetailPrice] , [TypicalWeightPerUnit] ,[MarketingComments] ,[InternalComments], [CountryOfManufacture], [Range], [Shelflife]. Migrate all the data in the original stock item table.

Results		Messages				
	StockItemID	StockItemName	SupplierID	ColorID	UnitPackageID	OuterPackageID
1	1	USB missile launcher (Gre...	12	NULL	7	7
2	2	USB rocket launcher (Gray)	12	12	7	7
3	3	Office cube periscope (Bl...	12	3	7	6
4	4	USB food flash drive - su...	12	NULL	7	7
5	5	USB food flash drive - ha...	12	NULL	7	7
6	6	USB food flash drive - ho...	12	NULL	7	7
7	7	USB food flash drive - pi...	12	NULL	7	7
8	8	USB food flash drive - di...	12	NULL	9	9
9	9	USB food flash drive - ba...	12	NULL	7	7
10	10	USB food flash drive - ch...	12	NULL	7	7
11	11	USB food flash drive - co...	12	NULL	7	7
12	12	USB food flash drive - do...	12	NULL	7	7
13	13	USB food flash drive - sh...	12	NULL	7	7
14	14	USB food flash drive - fo...	12	NULL	7	7
15	15	USB food flash drive - de...	12	NULL	9	9

23. Rewrite your stored procedure in (21). Now with a given date, it should wipe out all the order data prior to the input date and load the order data that was placed in the next 7 days following the input date.
24. Looks like that it is our missed purchase orders. Migrate these data into Stock Item, Purchase Order and Purchase Order Lines tables. Of course, save the script.
25. Revisit your answer in (19). Convert the result in JSON string and save it to the server using TSQL FOR JSON PATH.

Results		Messages
	JSON_F52E2B61-18A1-11d1-B105-00805F49916B	▼
1	[{"year":2013,"Clothing":767341,"Computing_...	

26. Revisit your answer in (19). Convert the result into an XML string and save it to the server using TSQL FOR XML PATH.

Results		Messages
	XML_F52E2B61-18A1-11d1-B105-00805F49916B	▼
1	<dbo.question19><year>2013</year><Clothing...	

27. Create a new table called ods.ConfirmedDeviveryJson with 3 columns (id, date, value) . Create a stored procedure, input is a date. The logic would load invoice information (all columns) as

well as invoice line information (all columns) and forge them into a JSON string and then insert into the new table just created. Then write a query to run the stored procedure for each DATE that customer id 1 got something delivered to him.

28. Write a short essay talking about your understanding of transactions, locks and isolation levels.

Transaction is the logical work unit that performs one or more activities, it is like SQL's save or undo button. It needs to follow 4 principles: Atomicity, Consistency, Isolation, and Durability. Also, transaction can have two outcomes which are committed and rolled back. The committed means it got saved permanently and rolled back means it can be rolled back to the beginning of the transaction or a savepoint in the transaction. There are different types of transactions such as autocommit transaction, implicit transaction, explicit transaction, and batch-scoped transaction.

Locks object in Microsoft SQL Server provides information about SQL Server locks on individual resource types. Locks are held on SQL Server resources, such as rows read or modified during a transaction, to prevent concurrent use of resources by different transactions. For example, if an exclusive (X) lock is held on a row within a table by a transaction, no other transaction can modify that row until the lock is released. Minimizing locks increases concurrency, which can improve performance. Multiple instances of the Locks object can be monitored at the same time, with each instance representing a lock on a resource type.

Isolation levels are specified by transactions. An isolation level defines how one transaction is isolated from other transactions. Isolation is the separation of resource or data modifications made by different transactions. Isolation levels are described for which concurrency side effects are allowed, such as dirty reads or phantom reads. There are five types of isolation levels which are read uncommitted, read committed, repeatable table, serializable, and snapshot. In these five types, only snapshot follows the optimistic model of concurrency, while others are all pessimistic ones.

29. Write a short essay, plus screenshots talking about performance tuning in SQL Server. Must include Tuning Advisor, Extended Events, DMV, Logs and Execution Plan.

SQL Server performance tuning encompasses a set of processes and procedures designed to optimize relational database queries, so they can run as

efficiently as possible. SQL tuning involves several elements, including identifying which queries are experiencing slowdowns and optimizing them for maximum efficiency. Numerous relational databases will benefit from SQL tuning.

The tuning advisor analyzes databases and gives some recommendations. It helps with:

- Troubleshoot the performance of a specific problem query;
- Tune a large set of queries across one or more databases;
- Perform an exploratory what-if analysis of potential physical design changes;
- Manage storage space.

Extended Events is a lightweight performance monitoring system that enables users to collect data needed to monitor and troubleshoot problems in SQL Server.

Dynamic management views and functions return server state information that can be used to monitor the health of a server instance, diagnose problems, and tune performance.

An execution plan in SQL Server Management Studio is a graphical representation of the various steps that are involved in fetching results from the database tables. Once a query is executed, the query processing engine quickly generates multiple execution plans and selects the one which returns the results with the best performance.

31. Database Design: OLTP db design request for EMS business: when people call 911 for medical emergency, 911 will dispatch UNITS to the given address. A UNIT means a crew on an apparatus (Fire Engine, Ambulance, Medic Ambulance, Helicopter, EMS supervisor). A crew member would have a medical level (EMR, EMT, A-EMT, Medic). All the treatments provided on scene are free. If the patient needs to be transported, that's where the bill comes in. A bill consists of Units dispatched (Fire Engine and EMS Supervisor are free), crew members provided care (EMRs and EMTs are free), Transported miles from the scene to the hospital (Helicopters have a much higher rate, as you can image) and tax (Tax rate is 6%). Bill should be sent to the patient insurance company first. If there is a deductible, we send the unpaid bill to the patient only. Don't forget about patient information, medical nature and bill

paying status.

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