Question - 1
DPI Software Protocols Report

SCORE: **50 points**

Easy   SQL   Interviewer Guidelines   Database

As part of HackerSniff's DPI (Deep Packet Inspection) software analytics, a team needs a list of all the protocols for which incoming traffic is higher than outgoing.

The result should be in the following format: *protocol, traffic_in, traffic_out.*
- Results should be sorted ascending by *protocol.*

▼ Schema

There is 1 table:

traffic		
name	**type**	**description**
client	VARCHAR(17)	Client MAC address
protocol	VARCHAR(64)	Protocol name
traffic_in	INT	Traffic in
traffic_out	INT	Traffic out

▼ Sample Data Tables

For the sample data in table:

traffic			
client	**protocol**	**traffic_in**	**traffic_out**
02-E1-80-76-EC-4B	BGP	0	234737
43-15-AA-26-0F-A4	BGP	402860	606565
90-E7-B0-14-7E-8C	BGP	840772	988197
FB-60-23-C1-5E-D6	DNS	341155	356569
4D-6D-7F-62-F4-00	FTP	8346	413322
09-89-26-46-C4-21	FTP	210656	470568

1/10

B1-6A-35-2F-1A-C2	FTP	897097	161083
0C-CA-68-2D-4B-F5	HTTP	918793	550403
A4-C6-52-10-2E-9C	HTTPS	520856	185387
95-B8-7D-78-06-42	POP	150880	423073
B9-C1-1B-32-55-95	POP	862946	979544
14-FD-21-F6-5E-67	SMTP	139389	280646
70-E1-2D-B1-B2-9B	SMTP	163986	450401
C6-F1-59-FF-5D-BE	SMTP	271295	878246
62-01-CF-AD-32-A7	SMTP	388933	81625
41-80-FB-86-D1-93	SMTP	752842	253981
93-3F-01-57-5F-4A	SSH	496717	599280
52-F2-BF-45-84-74	SSH	632534	128765
87-66-B5-A5-2F-7B	SSH	835441	354950
CE-FC-80-F3-95-58	UDP	903443	120298

the expected output is:

protocol ▲	traffic_in	traffic_out
FTP	1116099	1044973
HTTP	918793	550403
HTTPS	520856	185387
SSH	1964692	1082995
UDP	903443	120298

Question - 2
SQL: Antivirus Consolidated Threat Detection Report

SCORE: 75 points

Database   Medium   SQL   Complex Joins   Sub-Queries

Two antivirus products, "QuantumSafe" and "WebGuardian", have separate tables to record suspicious files. A company wants to create a consolidated report of these detections, distinguishing threats based on product source and file type. The database contains information from June through August, 2023.

The result should have the following columns: *extension | quantumsafe_total_detections | webguardian_total_detections*.
- *extension* - the file extension (e.g., *.txt, *.doc)
- *quantumsafe_total_detections* - the total number of detections from the "QuantumSafe" database
- *webguardian_total_detections* - the total number of detections from the "WebGuardian" database

The result should be sorted in ascending order by *extension*.

Note:

- Only detections in July, 2023 should be included in the report.

file_types

name	type	constraint	description
id	INT	PRIMARY KEY	File type ID
extension	VARCHAR(255)	UNIQUE	File extension (e.g., *.txt, *.doc)

quantumsafe_detections

name	type	constraint	description
filetype_id	INT	FOREIGN KEY(filetype_id => file_types.id)	File type ID reference
dt	VARCHAR(19)		Detection datetime

webguardian_detections

name	type	constraint	description
filetype_id	INT	FOREIGN KEY(filetype_id => file_types.id)	File type ID reference
dt	VARCHAR(19)		Detection datetime

▼ Sample Data Tables

file_types

id	extension
1	*.txt
2	*.doc
3	*.pdf

quantumsafe_detections

filetype_id	dt
1	2023-06-26 01:17:50
1	2023-06-27 02:17:16

3	2023-06-29 02:20:45
1	2023-07-14 23:55:15
1	2023-07-19 15:42:24
1	2023-07-21 23:09:52
1	2023-07-13 22:02:16
1	2023-07-24 20:48:17
2	2023-07-12 23:24:37
2	2023-07-30 06:51:58
2	2023-07-20 05:44:05
3	2023-07-27 20:33:29
3	2023-07-04 07:02:14
3	2023-07-11 23:41:55
1	2023-08-04 04:45:24
1	2023-08-01 22:43:07
1	2023-08-04 17:12:03
2	2023-08-02 23:47:40
3	2023-08-04 09:24:51
3	2023-08-04 01:12:32

webguardian_detections	
filetype_id	dt
2	2023-06-27 05:47:41
3	2023-06-27 21:33:48
1	2023-07-08 15:20:00
1	2023-07-12 12:34:59
1	2023-07-08 15:11:47
1	2023-07-24 16:34:24
1	2023-07-23 17:45:16
2	2023-07-09 11:35:14
2	2023-07-29 13:12:22
2	2023-07-29 22:50:15

3	2023-07-16 16:44:23
3	2023-07-09 07:09:54
3	2023-07-21 13:40:45
3	2023-07-14 09:26:13
3	2023-07-02 04:25:56
3	2023-07-29 10:22:25
2	2023-08-03 03:23:29
2	2023-08-02 15:35:55
2	2023-08-03 15:29:04
3	2023-08-03 09:16:56

▼ Expected Output

extension	quantumsafe_total_detections	webguardian_total_detections
*.doc	3	3
*.pdf	3	6
*.txt	5	5

Question - 3
Website Traffic

SQL	Aggregation	Medium	Simple Joins	Interviewer Guidelines	Sub-Queries	Database

There is a database that contains a website's traffic data over a period of *30* days. The first table contains users' information including the user type *(user, crawler, admin)*. The second table consists of the time of each visit to the website, the id of the visitor, time spent on the website in seconds. Write an SQL query to show the 3 day moving average of time spent on the website for *users.user_type = 'user'*.
Note: avg time spent must have 4 decimal digits and rounded off (example: *5/3 = 1.6667, 5/2 = 2.5000 and 1/3 = 0.3333)*

▼ Schema

There are 2 tables: `users` , `traffic`

users		
Name	Type	Description
id	INTEGER	The user's unique id. It is the primary key.
name	VARCHAR	This is the second column and the name of the user.
user_type	VARCHAR	Type of the user

traffic		
Name	Type	Description
user_id	INTEGER	id of the user from the users table.
visited_on	DATE	date on which the user visited the website
time_spent	INTEGER	time spent on website in seconds

▼ Sample Data Tables

users		
id	name	user_type
1	Matt	user
2	John	user
3	Louis	admin

traffic		
user_id	visited_on	time_spent
1	2019-05-01	15
2	2019-05-02	20
2	2019-05-03	10

Output
visited_on avg_time_spent
2019-05-01 15.0000
2019-05-02 17.5000
2019-05-03 15.0000

Explanation
Row 1 : 15/1 = 15.0000
Row 2 : (15+20)/2 = 17.5000
Row 3 : (15+20+10)/3 = 15.0000

Question - 4
Orders Query
SCORE: 75 points

Medium · Language Proficiency · SQL · Simple Joins · Interviewer Guidelines · Database

Company X has a record of its customers and their orders. Find the customer(s) with the highest order price for orders placed within 10 years of the first order (earliest order_date) in the database. Print the customer name and order price. If multiple records are returned, they can be in any order.

▼ Schema

There are 2 tables: *CUSTOMERS, ORDERS.*

CUSTOMERS

Name	Type	Description
ID	STRING	ID of the customer. This is the primary key.
NAME	STRING	Name of the customer.
ORDER_ID	STRING	ID of the customer's order.

ORDERS		
Name	Type	Description
ID	STRING	ID of the order.
PRICE	INTEGER	Price of the order.
ORDER_DATE	DATE	Date of the order.

▼ Sample Data Tables

Sample Input

CUSTOMERS		
ID	NAME	ORDER_ID
0a66e2bba8d5401b8d707ad9fc35394a	Jennifer Palmer	3223c7dfda384470aed77b1db46fe29b
57bc0e2554ea4dd1910b11ee1131f4cb	Susan Gonzalez	eb173d2bc0214cfc8727c00fe62ac96d
d880a48bf4844c99a3bafac53612119e	Judith Smith	65b36940385a40fcaa13ecb9c8394150

ORDERS		
ID	PRICE	ORDER_DATE
3223c7dfda384470aed77b1db46fe29b	100	1987-10-02
65b36940385a40fcaa13ecb9c8394150	5	1987-08-01

eb173d2bc0214cfc8727c00fe62ac96d	500	1998-08-01

Sample Output

```
Jennifer Palmer 100
```

Question - 5
SQL: Credentials Manager Fingerprint Phrase Reverse Password

MySQL   Database   Medium

A credential management platform that is in development requires a query that creates a short version of a password recovery phrase ("password phrase") from a long version that is easier to remember.

The long version of the password recovery phrase is a series of words separated by a hyphen, while its short version is a combination of the very first letters of each word in the long version.

The encryption is versioned using the creation date and time, so only the most recent encryption is relevant.

The result should have the following columns: *mac* | *dt* | *phrase* | *password_phrase*.
- *mac* - account MAC address
- *dt* - date and time of the most recent encryption version
- *phrase* - the original long version of the password phrase
- *password_phrase* - generated short version of the password phrase

The result should be sorted in ascending order by *mac*.

Note:
- Only the latest encryption version should be used to generate the password recovery phrase.

▼ Schema

accounts			
name	type	constraint	description
id	INT	PRIMARY KEY	Account ID
mac	VARCHAR(255)		MAC address

encryptions			
name	type	constraint	description
account_id	INT	FOREIGN KEY (account_id => accounts.id)	Account ID
dt	VARCHAR(19)		Datetime
phrase	VARCHAR(255)		Password phrase
password	VARCHAR(255)		Password

▼ Sample Data Tables

accounts

id	mac
1	11-9C-11-26-19-15
2	A7-8A-8E-91-A6-01
3	B2-9D-90-EE-A2-25

encryptions

account_id	dt	phrase	
1	2022-06-11 23:30:57	metus-arcu-adipiscing-molestie-hendrerit-at-vulputate-vitae-nisl-aenean	df0
1	2022-06-24 08:33:54	purus-aliquet-at-feugiat-non-pretium-quis-lectus-suspendisse-potenti-in-eleifend	878
1	2022-06-30 20:49:25	duis-consequat-dui-nec-nisi-volutpat-eleifend-donec-ut-dolor-morbi	bc9
1	2022-07-18 19:10:53	eget-eros-elementum-pellentesque-quisque-porta-volutpat-erat-quisque-erat	499
1	2022-10-03 15:06:02	nisl-venenatis-lacinia-aenean-sit-amet-justo-morbi-ut-odio	cec
1	2022-12-13 21:57:51	a-libero-nam-dui-proin-leo-odio-porttitor-id-consequat-in	752
1	2023-01-25 23:25:32	habitasse-platea-dictumst-aliquam-augue-quam-sollicitudin-vitae	35a
1	2023-02-02 09:22:23	diam-id-ornare-imperdiet-sapien-urna-pretium-nisl	c22
1	2023-02-12 06:02:05	phasellus-in-felis-donec-semper-sapien-a-libero-nam-dui-proin-leo	65b
1	2023-03-25 06:37:22	ipsum-primis-in-faucibus-orci-luctus-et-ultrices	1c3
2	2022-05-03 12:49:16	dapibus-dolor-vel-est-donec-odio-justo-sollicitudin-ut	ad
2	2022-08-19 08:08:53	mauris-eget-massa-tempor-convallis-nulla-neque-libero-convallis-eget-eleifend-luctus	db7
2	2022-09-07 08:29:54	pellentesque-eget-nunc-donec-quis-orci-eget-orci	a1
2	2022-12-08 07:41:10	dapibus-nulla-suscipit-ligula-in-lacus-curabitur-at-ipsum	e6
2	2023-02-09 09:08:03	dapibus-augue-vel-accumsan-tellus-nisi-eu-orci	5d4
3	2022-05-18 20:41:18	rutrum-nulla-nunc-purus-phasellus-in-felis-donec-semper-sapien-a-libero	b7d
3	2022-10-21 04:46:37	justo-pellentesque-viverra-pede-ac-diam-cras-pellentesque-volutpat-dui-maecenas-tristique	cd
3	2023-01-03 05:43:49	nulla-neque-libero-convallis-eget-eleifend-luctus-ultricies-eu-nibh	cfa
3	2023-04-13 20:15:02	in-leo-maecenas-pulvinar-lobortis-est-phasellus-sit-amet-erat-nulla	256
3	2023-04-19 19:11:55	imperdiet-et-commodo-vulputate-justo-in-blandit-ultrices-enim-lorem-ipsum-dolor	bc

mac	dt	phrase	password_phrase
11-9C-11-26-19-15	2023-03-25 06:37:22	ipsum-primis-in-faucibus-orci-luctus-et-ultrices	ipifoleu
A7-8A-8E-91-A6-01	2023-02-09 09:08:03	dapibus-augue-vel-accumsan-tellus-nisi-eu-orci	davatneo
B2-9D-90-EE-A2-25	2023-04-19 19:11:55	imperdiet-et-commodo-vulputate-justo-in-blandit-ultrices-enim-lorem-ipsum-dolor	iecvjibuelid