Midterm Exam

Description

First, answer the <u>database concept questions</u>. You shouldn't need anything else to answer these questions.

Then, take some time to examine the <u>table design</u>. Draw a physical schema diagram if helpful for reference.

Finally, use the table design to answer the <u>physical design questions</u> and the <u>data analysis questions</u>.

Good Luck!

Submission Instructions

Hand-in your exam booklet to an instructor when finished.

Evaluation Criteria

exam_section	section_weight	comments
Database Concepts	(40% weight)	See individual question weights for a break-down.
Physical Database Design	(30% weight)	See individual question weights for a break-down.
Data Analysis	(30% weight)	See individual question weights for a break-down.

After being evaluated, each student's submission will be ranked. These rankings may positively impact final grades.

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Database Concept Questions (40% weight)

Answer each question in English in the space provided.

1. What is the definition and purpose of a primary key? (40% * 40% weight)

2. What quantifiable benefits do businesses receive from adding indices to their physical database design? (40% * 30% weight)

3. What quantifiable benefits do businesses receive from assigning the proper datatypes in their physical database design? (40% * 30% weight)

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Table Design

songs

id	title	artist_name	duration_milliseconds	year_recorded
1	Gravedigger	The Dave Matthews Band	280000	2003
2	Marvin's Room	Drake	560000	2011
3	Ants Marching (Live)	Dave Matthews and Tim Reynolds	700000	2005
4	Blank Space	Taylor Swift	231000	2014
5	Baby	Justin Bieber	201000	2010
6	Where Are U Now	Justin Bieber ft. Skrillex & Diplo	290000	2015
7	Nina	Ed Sheeran	220000	2014
8	P.Y.T. (Pretty Young Thing)	Michael Jackson	238000	1982
9	Bad Blood	Taylor Swift	197000	2014

plays

id	song_id	listener_id	started_playing_at	radio_station_id
1	9	1	2015-01-01 10:01:58	80
2	9	4	2015-02-09 08:02:23	
3	3	1	2015-03-25 10:05:58	59
4	3	4	2015-04-14 10:01:30	3
5	2	5	2015-05-09 05:01:52	
6	8	6	2015-06-07 10:01:45	10009
7	9	6	2015-07-30 02:01:58	7
8	9	4	2015-08-23 10:01:33	

thumbs

id	play_id	thumb_type	thumb_pressed_at
1	1	thumbs-up	2015-01-01 10:02:23
2	3	thumbs-down	2015-03-25 10:06:03
3	5	thumbs-down	2015-05-09 05:01:58
4	8	thumbs-up	2015-08-23 10:01:53

skips

id	play_id	skipped_at
1	2	2015-02-09 08:02:28
2	6	2015-06-07 10:01:55

listeners

id	full_name	email_address
1	Alyce Howe	alyce.howe@gmail.com
2	Curt Kshlerin	curt_kshlerin@hotmail.com
3	Carley Block	block.carley@hotmail.com
4	Mozelle Aufderhar	aufderhar_mozelle@yahoo.com
5	Lily Marie	lily.stiedemann@gwu.edu
6	Felix Luettgen	elijah.luettgen@gwu.edu
7	Andres the Mighty	andres.beahan@yahoo.com
8	Rashad J	rash111@yahoo.com

listener_accounts

listener_id	cc_holder_name	cc_number	cc_exp_month	cc_exp_year	cc_zipcode	invoice_usd_per_day
1	Alyce Howe	111122222233333	01	2016	06405	0.00
2	Curt Kshlerin	111122222233334	12	2020	20052	0.40
3	Carley Block	88822222233335	11	2017	20037	0.40
4	Mozelle Aufderhar	111122222233336	10	2018	20001	0.00
5	Lily M Stiedemann	88822222233337	08	2015	20052	0.40
6	Elijah Luettgen	111122222233338	03	2016	20037	0.00
7	Andres Beahan	88822222233339	01	2015	20001	0.20
8	Rashad Jones	111122222233340	07	2016	20052	0.20

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Physical Database Design Questions (30% weight)

Answer each question in English in the space provided below.

Reference the provided database table design. Each table has a primary key. Not every table has a foreign key. Some tables have more than one foreign key.
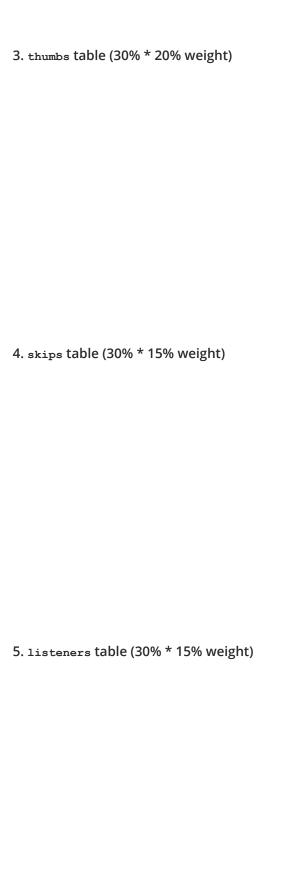
For each table:

- Identify the set of one or more attributes which is likely to be a **primary key**.
- If there are any sets of one or more attributes which are likely to be a **foreign key**, identify each and indicate which related table it is most likely to reference.

State assumptions as necessary to justify answers.

1. `songs` table (30% * 15% weight)

2. `plays` table (30% * 20% weight)

3. `thumbs` table (30% * 20% weight)

4. `skips` table (30% * 15% weight)

5. `listeners` table (30% * 15% weight)

6. `listener_accounts` table (30% * 15% weight)

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Data Analysis Questions (30% weight)

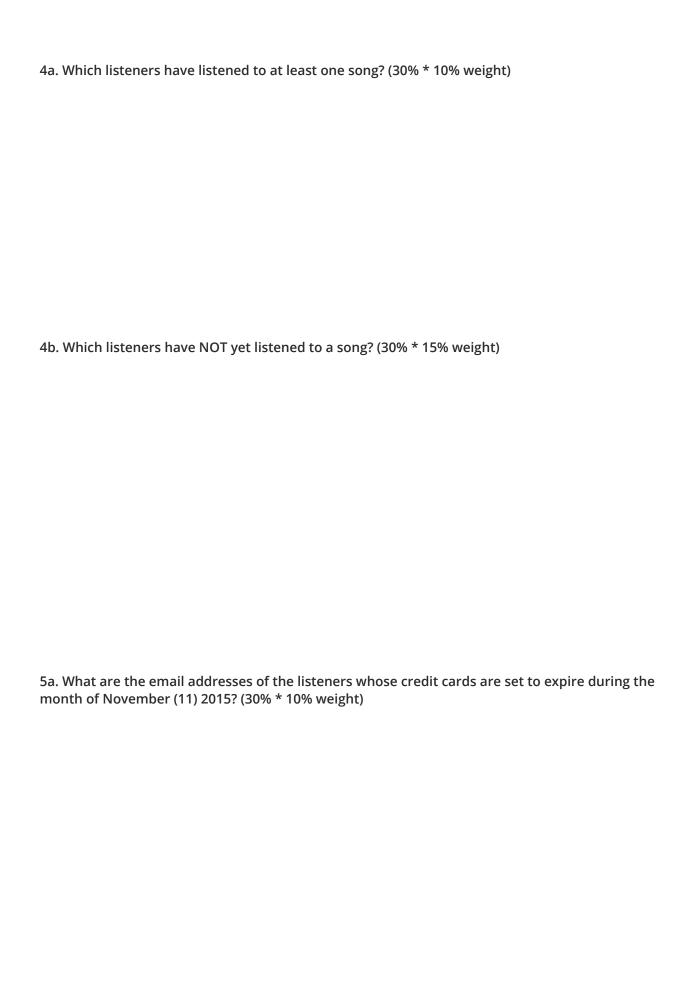Answer each question using a single query. Write the `SQL` in the space provided.

To represent an opportunity for bonus points, the questions below collectively represent a weight greater than (30% weight). Any score over (30% weight) will be rounded down to (30% weight).

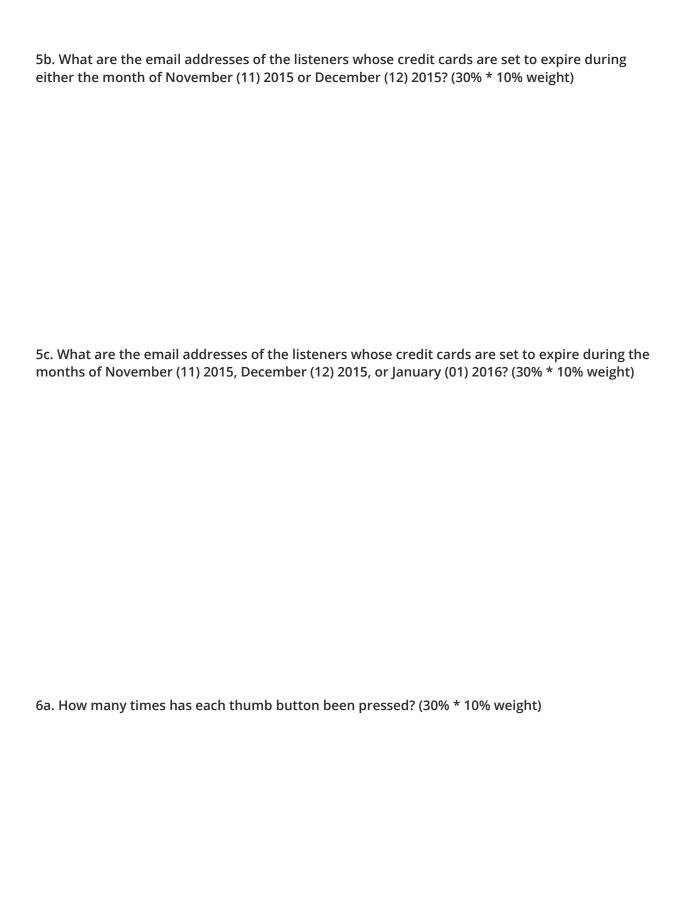**1a. Which listener has the email address, 'musicfan101@gmail.com'? (30% * 10% weight)**

1b. Which listeners have an email address that contains the text, '@gwu.edu'? (30% * 10% weight)

2a. How long is the longest song? (30% * 5% weight)

2b. How long is the shortest song? (30% * 5% weight)

3a. How many songs have been played? (30% * 10% weight)

3b. How many songs have NOT been played? (30% * 15% weight)

4a. Which listeners have listened to at least one song? (30% * 10% weight)

4b. Which listeners have NOT yet listened to a song? (30% * 15% weight)

5a. What are the email addresses of the listeners whose credit cards are set to expire during the month of November (11) 2015? (30% * 10% weight)

5b. What are the email addresses of the listeners whose credit cards are set to expire during either the month of November (11) 2015 or December (12) 2015? (30% * 10% weight)

5c. What are the email addresses of the listeners whose credit cards are set to expire during the months of November (11) 2015, December (12) 2015, or January (01) 2016? (30% * 10% weight)

6a. How many times has each thumb button been pressed? (30% * 10% weight)

6b. Which thumb button gets pressed most often? (30% * 10% weight)

6c. Which thumb button was pressed most often between '2015-01-01' and '2015-03-15'? (30% * 10% weight)

7a. How many songs have been skipped? (30% * 10% weight)

7b. How many songs have NOT been skipped? (30% * 10% weight)

7c. Which 100 songs have been skipped the most? (30% * 10% weight)