UNIVERSITY OF TORONTO SCARBOROUGH

WINTER 2016 EXAMINATIONS

CSC B20H3
Duration — 3 hours

No Aids Allowed

Student Number: |_|_|_|_|_|_|_|_|_|_|

Last Name: _____

First Name: _____

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*Do **not** turn this page until you have received the signal to start.*
(In the meantime, please fill out the identification section above, and read the instructions below *carefully*.)

This final examination consists of 3 questions on 11 pages (including this one). When you receive the signal to start, please make sure that your copy of the examination is complete. Answer each question directly on the examination paper, in the space provided. (If you need more space for one of your solutions, use the blank page and indicate **clearly** which part of your work should be marked.)

Be aware that concise, well thought-out answers will be rewarded over long rambling ones. Also, unreadable answers will be given zero (0) so write legibly.

In the programming questions, assume all input is valid. Make sure to indent your code properly. Your code will be marked based on correctness and style.

1: _____/ 30

2: _____/ 25

3: _____/ 45

TOTAL: _____/100

Good Luck!

Question 1. [30 MARKS]

Consider the following set of relations for a music database. The database stores an artist (or band) `id` and `name`, `album id` and `title`, a relation to tie artists to albums as well as a relation to list the tracks associated with each album. Answer each subquestion. You may create VIEWS if that simplifies your answer. If there is no possible solution, write "NOT POSSIBLE".

Database relations:

artist(id, name)

album(id, title)

artist_album(artist_id, album_id)

track(track_title, album_id, num)

Part (a) [2 MARKS]

Underline the primary keys.

Part (b) [2 MARKS]

Find all the album `id`s for albums having the `title` "*Greatest Hits*".

Part (c) [3 MARKS]

Find the artist `id` of the artists who have an album entitled "*Greatest Hits*".

Part (d) [3 MARKS]

Find the names of the artist's that have an album title containing the word "Unplugged".

Part (e) [4 MARKS]

Return for each artist the average number of tracks on their albums.

Question 1. (CONTINUED)

Database relations:

artist(id, name)

album(id, title)

artist_album(artist_id, album_id)

track(track_title, album_id, num)

Part (f) [4 MARKS]

Return all the tracks from the '*Greatest Hits*' album by the artist *Queen* sorted by increasing track number. Create a `VIEW` called CDs containing artist `name`, album `title` and `album_id` to simplify your solution.

Part (g) [4 MARKS]

Find all artist names who have produced more than 5 albums. You may use the `VIEW CDs` even if you were unable to write it. You may assume no two artists have the same name.

Part (h) [4 MARKS]

Find those album titles with more than 15 tracks on them. Do not use the `HAVING` clause.

Part (i) [4 MARKS]

Sometimes different albums by the same artist have tracks in common (same title). Find all `artist_ids` and their `track_titles` that belong to more than one album.

Question 2. [25 MARKS]

Short answer questions.

Part (a) [3 MARKS]

Explain the three different levels of data abstraction of a database.

Part (b) [4 MARKS]

List two SQL operations which do not exist in MySQL. Choose one of them and explain how you would implement the operation in MySQL.

Part (c) [4 MARKS]

List two advantages, and two disadvantages of client-side scripting.

Part (d) [2 MARKS]

List two advantages associated with use of the jQuery library, compared with use of plain JavaScript.

Part (e) [6 MARKS]

Write a comment for each of the following PHP code snippits:

```
foreach ($y as $z) {
      $s = explode(",", $z);
      $m = $s[0];
      $n = $s[1];
 }
/*




*/

$w = file('x.txt');
/*




*/

$p = glob($q . "/r*.txt");
/*



*/

$p is assigned a list of the file names in directory $q that match pattern
r*.txt (the name ?r? followed by any sequence of characters and then ?.txt?  */

read contents of file 'x.txt' into array $w with one line in x.txt per array entry
 in $w
 */

 /* iterate over array $y, with individual elements referenced as $z, splitting
$z into an array using comma field separators, then assign the 1st element
of array $s to $m and the 2nd element to $n. */
```

Part (f) [3 MARKS]

List three benefits associated with use of an external CSS stylesheet as compared with CSS styles defined within an HTML document.

Part (g) [3 MARKS]

Describe the effect of this CSS declaration (which element(s) does it affect and how?):

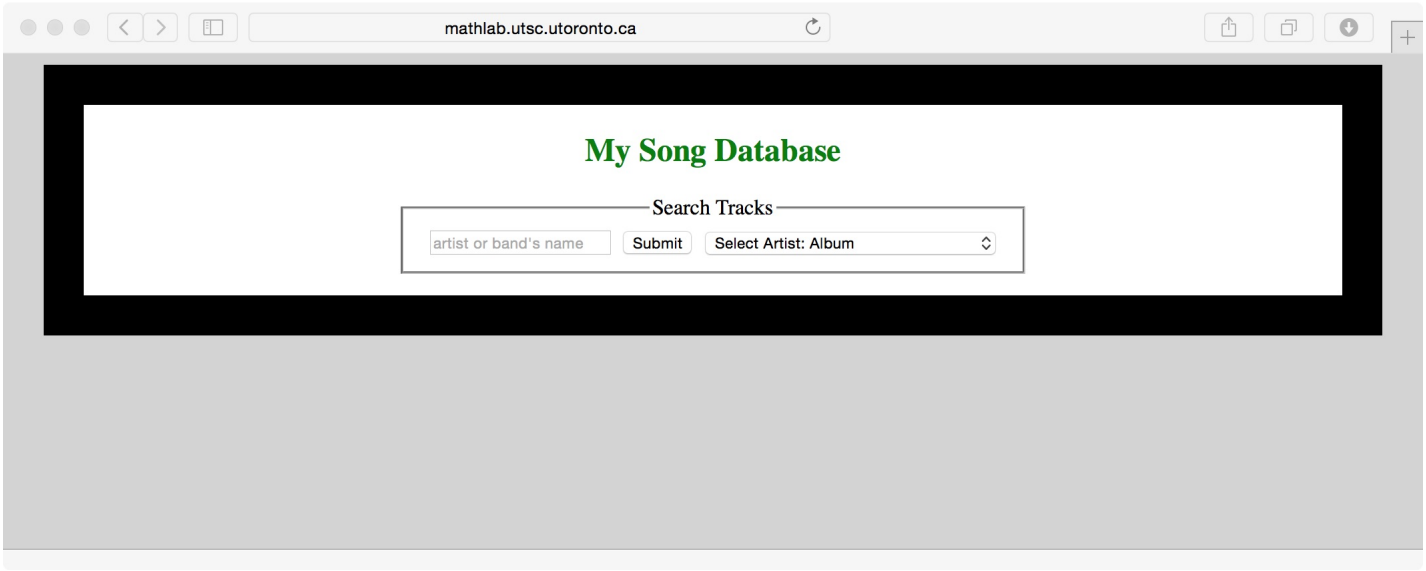
```
<style type="text/css">
  #happy  p  .day  { color: blue }
</style>
```

Question 3. [45 MARKS]

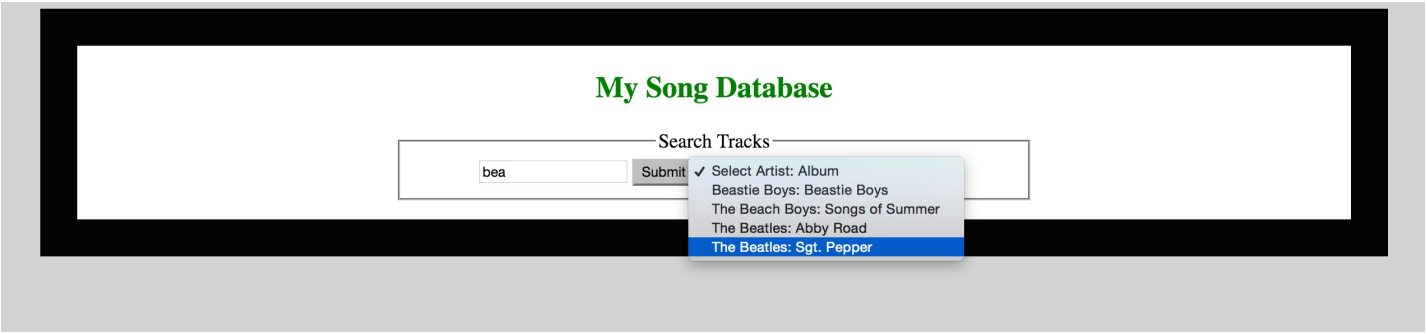
This question has multiple parts. You may complete later parts even if you could not complete the first parts.

Assume you have a music database as described in the SQL portion of the exam. We will create a web application similar to that of A3 that asks the user for a musical artist/band name or portion of a name. The user will then be provided with a drop down menu to select an album from an artist matching the supplied name. When an album is selected, a request is made to a webpage with PHP content which loads a page listing the tracks of the requested album. Here are some sample screen shots of the web application:

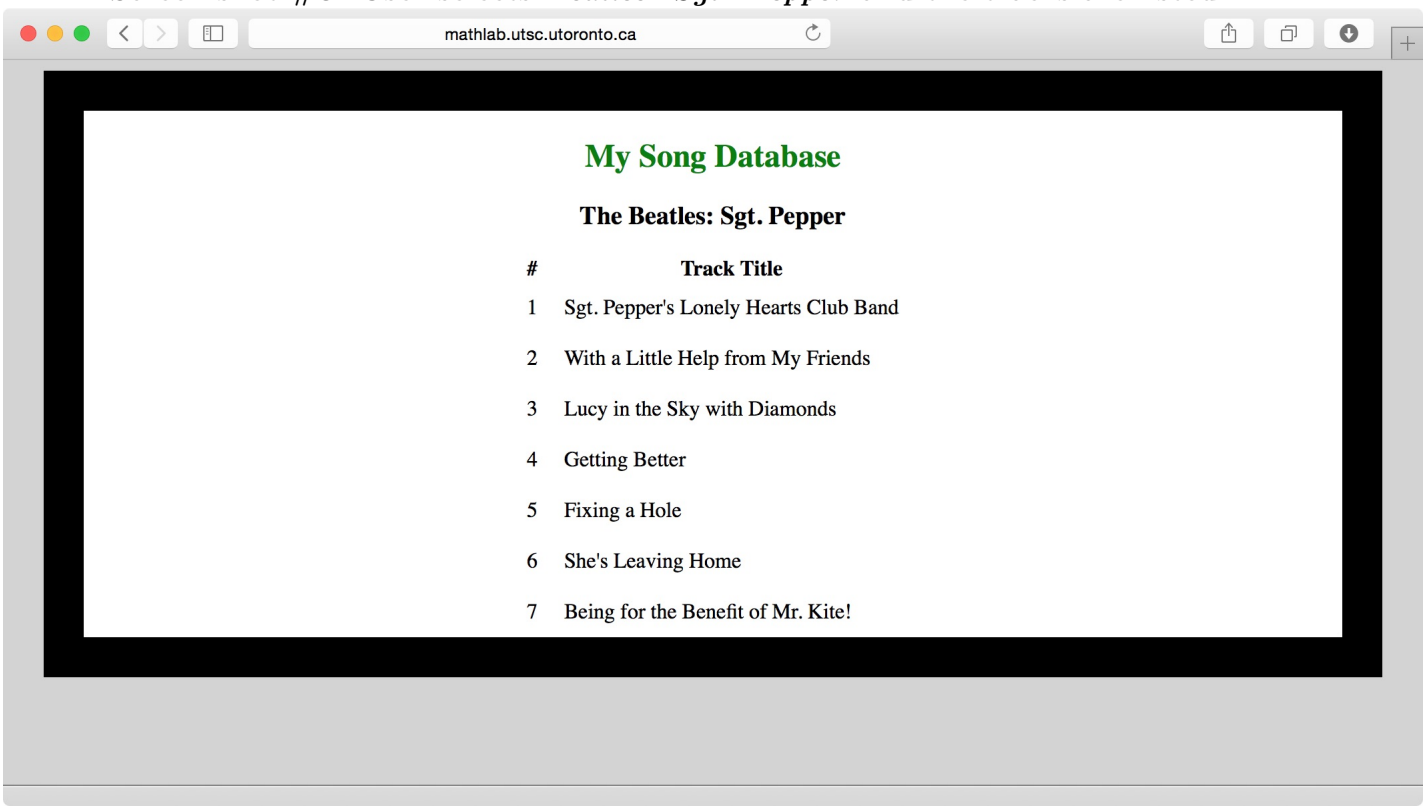
Screen shot #1: User enters artist/band name or partial name:



Screen shot #2: User enters *bea* and the matching bands are listed in alphabetical order with albums in the drop down menu:



Screen shot #3: User selects *Beatles: Sgt. Pepper* and the tracks are listed:



Part (a) [10 MARKS]

Like A3, a web service called `artists.php` is invoked to fill in the drop down menu (screenshot #2). The html code for the main page (screenshot #1) is listed here for your convenience:
Fill in the missing code for `artists.php` where indicated:

Part (b) [10 MARKS]

The file `songs.js` takes the JSON query results from `artists.php` and inserts them into the drop down selection menu. The format of the JSON data will look like this:

```
[ {"album":"Beastie Boys","artist":"Beastie Boys","id":"4"},
 {"album":"Songs of Summer","artist":"The Beach Boys","id":"3"},
 {"album":"Abby Road","artist":"The Beatles","id":"1"},
 {"album":"Sgt. Pepper","artist":"The Beatles","id":"2"}]
```

Fill in the missing code as indicated by the `<=== ADD CODE HERE` labels.

Part (c) [13 MARKS]

The final track results as shown in the third screen shot are displayed by calling `search.html` with parameters `album_id` and `band_album`.

Fill in the missing PHP for `search.html` as indicated:

Part (d) [12 MARKS]

In this question, you will write the CSS to format the output of the web application - the listing of tracks for the requested album (screenshot #3). Your CSS should result in formatting resembling that displayed in the third screen shot. Additional information is given in comments below to help you write the CSS.

```
/* file: songs.css */

/* page body is different color than content panel (#frame)
 and text is centered */
body {

                                                          <=== ADD CODE HERE

        }

/* content frame takes up 90% of the window, left and right margins should
auto adjust when window resized, background colour is white, and the
thickness of the black border is 30px */
#frame {




                                                        <=== ADD CODE HERE




}

/* h2 heading is green */
h2 {
                                                        <=== ADD CODE HERE

}

/* Table specifications: set left and right margins to auto-adjust to window size
   for centering, padding in data cells is 10px and text is left justified,
   table headers are centre aligned, bold text. */

table {

                                                         <=== ADD CODE HERE


}
```

```
td {
                                                    <=== ADD CODE HERE

}
th {
                                                    <=== ADD CODE HERE

}
```

Total Marks = 100