## Technical Interview

This form is the take home portion of the TG Hawaii-CIS technical interview. Over the next 24 hours, review the following coding and SQL questions and answer them to the best of your ability. Before your interview (or once complete), send your answers to: John Tomoso – [jtomoso@tghawaii.com](mailto:jtomoso@tghawaii.com).

Good luck!

## Coding Question

0 1 2 3 4 5 6 7 8 9 10

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | X |  |  |  |  |  |  |  |  |  |  |
| 1 |  |  | X | X |  |  |  |  |  | X |  |
| 2 |  |  |  |  |  |  |  |  | X |  |  |
| 3 |  |  |  |  |  |  |  | X |  |  |  |
| 4 |  |  |  |  |  |  | X |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  | X |  |  |  |  |  |  |
| 7 |  |  |  | X | X | X |  |  |  |  | X |
| 8 |  |  |  | X | X |  |  |  |  |  |  |
| 9 |  |  | X |  |  |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  | X |  |  |  |  |
| 11 |  |  |  |  |  |  |  |  |  |  |  |
| 12 |  |  |  |  |  |  | X |  |  |  |  |
| 13 |  |  |  |  |  |  | X |  |  |  |  |

* This 11x14 grid is the ocean.
* There are islands in the ocean. Each island is denoted by an “X”.
* Each island has a size determined by the number of contiguous “X”s in it.

Your task is to write a program that meets the following requirements. The program doesn’t necessarily need to compile and work. Once complete, we will review the code with you and talk about your solution: why you went the way you did, what other solutions you considered, and bugs/errors that were found.

* Program requirements:
  + Count the number of islands.
    - Each island discovered should have an ID assigned. The ID can be anything you choose.
  + Determine the size of each island found.
  + Report the results, in comma delimited format, ordered by island size from largest to smallest.
    - The output file must include a header row describing the data columns.
    - The required output columns are: Island ID and Island Size

## SQL Question

The three tables below define some islands, where they are located, and information about who lives on them. Your task is to write SQL queries to answer the following questions.

**Islands**

|  |  |
| --- | --- |
| **IslandId** | **IslandName** |
| 1 | Tahiti |
| 2 | Oahu |
| 3 | Easter |
| 4 | Wake |

**IslandLandMasses (each record makes up part of the island)**

|  |  |  |  |
| --- | --- | --- | --- |
| **LandMassId** | **IslandId** | **XCoordinate** | **YCoordinate** |
| 1 | 1 | 2 | 2 |
| 2 | 1 | 2 | 3 |
| 3 | 1 | 3 | 3 |
| 4 | 2 | 7 | 8 |
| 5 | 2 | 8 | 8 |
| 6 | 3 | 5 | 5 |
| 7 | 3 | 5 | 6 |
| 8 | 4 | 3 | 9 |

**LandMassResidents**

|  |  |  |  |
| --- | --- | --- | --- |
| **ResidentId** | **LandMassId** | **ResidentName** | **Age** |
| 1 | 1 | John | 32 |
| 2 | 2 | Jeff | 67 |
| 3 | 3 | Jill | 19 |
| 4 | 3 | Jane | 55 |
| 5 | 4 | Steve | 9 |
| 6 | 5 | Amos | 10 |
| 7 | 8 | Henry | 33 |
| 8 | 8 | Bill | 25 |
| 9 | 8 | Amy | 41 |

1. 1 2 3 4 5 6 7 8 9
2. 1 x x x x x x x x x
3. 2 x T T x x x x x x
4. 3 x x T x x x x x W
5. 4 x x x x x x x x x
6. 5 x x x x E E x x x
7. 6 x x x x x x x x x
8. 7 x x x x x x x O x
9. 8 x x x x x x x O x
10. 9 x x x x x x x x x
11. Write a query to return the list of island names and their total land masses ordered by largest to smallest.

SELECT I.IslandName 'Island Name', COUNT(ILM.ISLANDID) 'Total Land Mass'

FROM DBO.IslandLandMasses$ ILM

INNER JOIN DBO.Islands$ I ON I.IslandId = ILM.IslandId

GROUP BY I.IslandName

ORDER BY COUNT(ILM.ISLANDID) DESC

Island Name Total Land Mass

Tahiti 3

Easter 2

Oahu 2

Wake 1

1. Write a query to return the list of residents that are older than 30. Include their age and the name of the island they live on and order the results, by age, from youngest to oldest.

SELECT LMR.ResidentName 'Name', LMR.Age, I.IslandName 'Island Name'

FROM DBO.LandMassResidents$ LMR

INNER JOIN DBO.IslandLandMasses$ ILM ON ILM.LandMassId = LMR.LandMassId

INNER JOIN DBO.Islands$ I ON I.IslandId = ILM.IslandId

WHERE LMR.Age > 30

ORDER BY LMR.Age ASC

Name Age Island Name

John 32 Tahiti

Henry 33 Wake

Jane 55 Tahiti

Jeff 67 Tahiti

1. Write a SQL statement to update the age of all residents that live on Wake Island to 21.

UPDATE LMR

SET LMR.Age = 21

FROM DBO.LandMassResidents$ LMR

INNER JOIN DBO.IslandLandMasses$ ILM ON ILM.LandMassId = LMR.LandMassId

INNER JOIN DBO.Islands$ I ON I.IslandId = ILM.IslandId

WHERE I.IslandName = 'Wake'

Name Age Island Name

John 32 Tahiti

Jeff 67 Tahiti

Jill 19 Tahiti

Jane 55 Tahiti

Steve 9 Oahu

Amos 10 Oahu

Henry 21 Wake

Bill 21 Wake

Amy 21 Wake