Digital Nurture 3.0

DN 3.0-Upskilling-Practice-Assessment-Questions

Section 1: Programming Using Java

Non-Repeated Digits Count

Write a function to find the count of non-repeated digits in a given number N. The number will be passed to the function as an input parameter of type int.

Assumption: The input number will be a positive integer number >= 1 and <= 25000.

Some examples are as below -

If the given number is 292, the function should return 1 because there is only 1 non-repeated digit '9' in this number
If the given number is 1015, the function should return 2 because there are 2 non-repeated digits in this number, '0', and '5'.
If the given number is 108, the function should return 3 because there are 3 non-repeated digits in this number, '1', '0', and '8'.
If the given number is 22, the function should return 0 because there are NO non-repeated digits in this number.

Sum of Unique Digits

Write a function to find the sum of unique digits in a given number N. The number will be passed to the function as an input parameter of type **int**.

Assumption: The input number will be a positive integer >= 1 and <= 25000.

Examples:
- If the given number is 292, the function should return 9 because the unique digit '9' in this number has a sum of 9.
- If the given number is 1015, the function should return 6 because the unique digits '1', '0', and '5' in this number have a sum of 1 + 0 + 5 = 6.
- If the given number is 108, the function should return 9 because the unique digits '1', '0', and '8' in this number have a sum of 1 + 0 + 8 = 9.
- If the given number is 22, the function should return 0 because there are NO unique digits in this number.

Weight of a hill pattern

Given,
the total levels in a hill pattern (input1),
the weight of the head level (input2), and
the weight increments of each subsequent level (input3),
you are expected to find the total weight of the hill pattern.

"Total levels" represents the number of rows in the pattern.
"Head level" represents the first row.
Weight of a level represents the value of each star (asterisk) in that row.

The hill patterns will always be of the below format, starting with 1 star at head level and increasing 1 star at each level till level N.
*
**
***
****
*****
******
. . .and so on till level N

Let us see a couple of examples.

Example1 -

Given,
the total levels in the hill pattern = 5 (i.e. with 5 rows)
the weight of the head level (first row) = 10
the weight increments of each subsequent level = 2
Then, The total weight of the hill pattern will be calculated as = 10 + (12+12) + (14+14+14) + (16+16+16+16) + (18+18+18+18+18) = 10 + 24 + 42 + 64 + 90 = 230

Example2 -

Given,
the total levels in the hill pattern = 4
the weight of the head level = 1
the weight increments of each subsequent level = 5
Then, Total weight of the hill pattern will be = 1 + (6+6) + (11+11+11) + (16+16+16+16) = 1 + 12 + 33 + 64 = 110

Nth Fibonacci

Write a function to return the nth number in the fibonacci series.

The value of N will be passed to the function as input parameter.

NOTE: Fibonacci series looks like -
0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ... and so on.

i.e., Fibonacci series starts with 0 and 1, and continues generating the next number as the sum of the previous two numbers.

- first Fibonacci number is 0,
- second Fibonacci number is 1,
- third Fibonacci number is 1,
- fourth Fibonacci number is 2,
- fifth Fibonacci number is 3,
- sixth Fibonacci number is 5,
- seventh Fibonacci number is 8, and so on.

pCreate PIN using three given input numbers

"Secure Assets Private Ltd", a small company that deals with lockers has recently started manufacturing digital locks which can be locked and unlocked using PINs (passwords). You have been asked to work on the module that is expected to generate PINs using three input numbers.

Assumptions: The three given input numbers will always consist of three digits each i.e. each of them will be in the range >=100 and <=999

100 <= input1 <= 999
100 <= input2 <= 999
100 <= input3 <= 999

Below are the rules for generating the PIN -

- The PIN should be made up of 4 digits
- The unit (ones) position of the PIN should be the least of the units position of the three input numbers
- The tens position of the PIN should be the least of the tens position of the three input numbers
- The hundreds position of the PIN should be the least of the hundreds position of the three input numbers
- The thousands position of the PIN should be the maximum of all the digits in the three input numbers

Example 1 -

input1 = 123
input2 = 582
input3 = 175
then, PIN = 8122

Example 2 -

input1 = 190

input2 = 267
input3 = 853
then, PIN = 9150

Consecutive Sum

Write a function to find the sum of all possible consecutive numbers that add up to a given positive integer N. The function should return a list of lists, where each sublist represents a consecutive sequence of numbers that add up to N.

Assumption: The input number N will be a positive integer >= 1 and <= 25000.
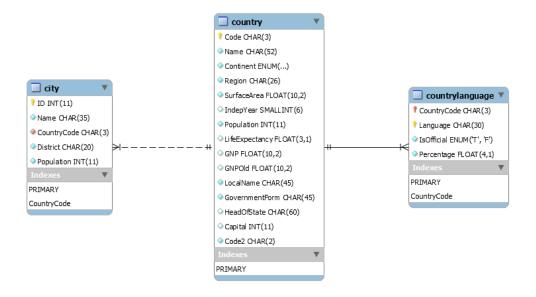
Examples:

- If N is 5, the function should return [[2, 3], [5]] because 2 + 3 = 5 and 5 = 5.

- If N is 15, the function should return [[1, 2, 3, 4, 5], [4, 5, 6], [7, 8], [15]] because 1 + 2 + 3 + 4 + 5 = 15, 4 + 5 + 6 = 15, 7 + 8 = 15, and 15 = 15.

- If N is 10, the function should return [[1, 2, 3, 4], [4, 5], [10]] because 1 + 2 + 3 + 4 = 10, 4 + 5 = 10, and 10 = 10.

Section 2: MySQL

Sample Schema

Table: country

Column	Type	Description
Code	CHAR(3)	Country code (primary key)
Name	VARCHAR(52)	Country name
Continent	ENUM	Continent name
Region	VARCHAR(26)	Region name
SurfaceArea	FLOAT	Surface area of the country
IndepYear	SMALLINT	Year of independence
Population	INT	Population of the country
LifeExpectancy	FLOAT	Life expectancy
GNP	FLOAT	Gross National Product
GNPOld	FLOAT	Old Gross National Product
LocalName	VARCHAR(45)	Local name
GovernmentForm	VARCHAR(45)	Form of government
HeadOfState	VARCHAR(60)	Head of state
Capital	INT	Capital city
Code2	CHAR(2)	Country code (2-letter)

Table: City

Column	Type	Description
ID	INT	City ID (primary key)
Name	VARCHAR(35)	City name
CountryCode	CHAR(3)	Country code (foreign key to country.Code)
District	VARCHAR(20)	District name
Population	INT	Population of the city

Table: CountryLanguage

Column	Type	Description
CountryCode	CHAR(3)	Country code (foreign key to country.Code)
Language	VARCHAR(30)	Language name
IsOfficial	ENUM	Is it an official language? ('T' or 'F')
Percentage	FLOAT	Percentage of speakers

Sample Dataset

Table: Country

Code	Name	Continent	Region	SurfaceArea	IndepYear	Population	LifeExpectancy	GNP	GNPOld	LocalName	GovernmentForm	HeadOfState	Capital	Code2
USA	United States	North America	Northern America	9372610	1776	33100265 1	78.93	211 375 18	206 118 00	United States	Federal Republic	Joe Biden	38 13	US
CHN	China	Asia	Eastern Asia	9596960	1949	1439 3237 76	76.91	141 401 63	138 948 00	Zhongguo	Communist State	Xi Jinping	18 92	CN
JPN	Japan	Asia	Eastern Asia	377975	660	1264 7646 1	84.63	506 487 3	490 900 0	Nihon	Constitutional Monarchy	Naruhito	15 34	JP

Code	Name	Continent	Region	SurfaceArea	IndepYear	Population	LifeExpectancy	GNP	GNPOld	LocalName	GovernmentForm	HeadOfState	Capital	Code2
DEU	Germany	Europe	Western Europe	357114	1955	83166711	81.33	3845630	3693200	Deutschland	Federal Republic	Frank-Walter Steinmeier	3068	DE
BRA	Brazil	South America	South America	8515767	1822	212559417	75.88	2055500	2011780	Brasil	Federal Republic	Jair Bolsonaro	2110	BR

Table: City

ID	Name	CountryCode	District	Population
3813	Washington	USA	District of Columbia	689545
1892	Beijing	CHN	Beijing	21542000
1534	Tokyo	JPN	Tokyo	13929286
3068	Berlin	DEU	Berlin	3644826
2110	Brasília	BRA	Federal District	3055149

Table: countrylanguage

CountryCode	Language	IsOfficial	Percentage
USA	English	T	82.1
USA	Spanish	F	13.5
CHN	Chinese	T	92
JPN	Japanese	T	99
DEU	German	T	95
BRA	Portuguese	T	98
BRA	Spanish	F	1

INSERT Statements

Table: Country

INSERT INTO country (Code, Name, Continent, Region, SurfaceArea, IndepYear, Population, LifeExpectancy, GNP, GNPOld, LocalName, GovernmentForm, HeadOfState, Capital, Code2)
VALUES
('USA', 'United States', 'North America', 'Northern America', 9372610, 1776, 331002651, 78.93, 21137518, 20611800, 'United States', 'Federal Republic', 'Joe Biden', 3813, 'US'),
('CHN', 'China', 'Asia', 'Eastern Asia', 9596960, 1949, 1439323776, 76.91, 14140163, 13894800, 'Zhongguo', 'Communist State', 'Xi Jinping', 1892, 'CN'),

('JPN', 'Japan', 'Asia', 'Eastern Asia', 377975, 660, 126476461, 84.63, 5064873, 4909000, 'Nihon', 'Constitutional Monarchy', 'Naruhito', 1534, 'JP'),
('DEU', 'Germany', 'Europe', 'Western Europe', 357114, 1955, 83166711, 81.33, 3845630, 3693200, 'Deutschland', 'Federal Republic', 'Frank-Walter Steinmeier', 3068, 'DE'),
('BRA', 'Brazil', 'South America', 'South America', 8515767, 1822, 212559417, 75.88, 2055500, 2011780, 'Brasil', 'Federal Republic', 'Jair Bolsonaro', 2110, 'BR');

Table: City

INSERT INTO city (ID, Name, CountryCode, District, Population)
VALUES
(3813, 'Washington', 'USA', 'District of Columbia', 689545),
(1892, 'Beijing', 'CHN', 'Beijing', 21542000),
(1534, 'Tokyo', 'JPN', 'Tokyo', 13929286),
(3068, 'Berlin', 'DEU', 'Berlin', 3644826),
(2110, 'Brasília', 'BRA', 'Federal District', 3055149);

Table: countrylanguage

INSERT INTO countrylanguage (CountryCode, Language, IsOfficial, Percentage)
VALUES
('USA', 'English', 'T', 82.1),
('USA', 'Spanish', 'F', 13.5),
('CHN', 'Chinese', 'T', 92.0),
('JPN', 'Japanese', 'T', 99.0),
('DEU', 'German', 'T', 95.0),
('BRA', 'Portuguese', 'T', 98.0),
('BRA', 'Spanish', 'F', 1.0);

Practice Questions

1) List all the countries in Asia.
2) Find the 5 most populous cities in the world.
3) Find the countries with a population greater than 100 million.
4) List the languages spoken in the country with the code 'JPN'.
5) Find the capital city of the country with the largest surface area.
6) List all cities in Japan.
7) Find the average life expectancy of countries in Europe.
8) Find the number of official languages spoken in each country.
9) List countries with a life expectancy greater than the world average.
10) Find the total population of all cities in India.
11) List the names of all capital cities along with their country's name.
12) Find the names of countries where the official language is 'Spanish'.

13) List the top 10 countries by population density (Population/SurfaceArea).
14) Find the names and populations of cities in countries with a life expectancy greater than 75 years.
15) List all countries and their corresponding languages, sorted by country name.
16) Find the countries that have a city named 'Paris'.
17) List the names of the countries that have more than 5 official languages.
18) Find the total population of each continent.
19) List the countries where the capital city's population is more than 10% of the country's total population.
20) Find the average life expectancy for each continent.
21) List the cities that are capitals of countries in South America.
22) Find the countries that do not have any cities with a population over 1 million.
23) List the countries where the sum of the populations of all cities is more than the country's population.
24) Find the country with the highest number of cities.
25) List the countries where the official language is not English but is spoken by more than 50% of the population.
26) Classify countries into population size categories: 'Small' (population < 1 million), 'Medium' (1 million <= population < 10 million), and 'Large' (population >= 10 million).
27) Determine the continent's GDP category: 'Low' (GNP < 100 billion), 'Medium' (100 billion <= GNP < 1 trillion), and 'High' (GNP >= 1 trillion).
28) Label cities as 'Small' (population < 100,000), 'Medium' (100,000 <= population < 1 million), or 'Large' (population >= 1 million).
29) Classify countries based on life expectancy: 'Low' (life expectancy < 50), 'Average' (50 <= life expectancy < 75), and 'High' (life expectancy >= 75).