S&M Scholarly Solutions

Zero Hour Set

1) Your function should write the numbers from 1 to N with a twist; instead of any multiplier of 3, you output S, instead of multiples of 5 you output M, and if they happen at the same time, you should use S&M. The output of your function should be a mixed array of numbers and strings.
2) Determine if a number is prime or not. Simple, eh? Be careful about the time limit.
3) You receive a number between zero and one million (exclusive), and you should return the English version of it. No need to use and, but the output is case sensitive.
4) A snake is crawling down on one side of a pyramid while eating eggs on each step. There is one egg on the top step of the pyramid, two eggs on the next step, three on the next and so on. The snake can only eat one egg on each step, and it can only move one egg to the left or one to the right at each step. Given a 2-D array of positive weights for each egg, return the maximum weight of eggs the snake can eat. As an example:

   {

   [9*]

   [9*,1]

   [9*,2,1]

   [1,6*,1,9]

   The maximum weight is achieved by eating the starred eggs: 33 = 9 + 9 + 9 + 6.

5) Given two sorted arrays, merge them into a single sorted array. Please do not use the built-in sort functions.
6) A frog can either hop 5 cm or jump 10 cm forward. Calculate how many different ways there are for the frog to move forward by a given distance. For example, the frog can move forward 15 cm in 3 different ways: "hop->hop->hop", "jump->hop", and "hop->jump". The maximum distance is 4 meters.
7) Given an array of integers, find what the highest sum of numbers in a non-empty contiguous subarray is. For example, [-1, -2, -3] has [-1] which sums up to -1, and [1, -10, 2, 4, -5, 5] has [2, 4] that amounts to 6.
8) The look-and-say sequence is the sequence of numbers generated by describing each number to produce the next. The first few numbers are 1, 11, 21, 1211, and 111221. The next number in the sequence is 312211 because the last one has "Three 1s, two 2s, and one 1". Given n, produce the n-th number in the sequence. The output will not be longer than 200 characters.

9) Calculate the minimum number of coins needed to change a given amount of money. For the purpose of this problem, the coin nominations are 1, 2, 5, 10, and 25 coins.
10) We have a list of non-negative numbers and would like to stick them together to create the smallest number possible. All numbers should be used, and no other operation is allowed except concatenating the numbers. For example, we can use [12, 1, 2, 21] to create 112212. Given the list of numbers, calculate the string representing the smallest possible number.
11) We would like to calculate which team wins in a soccer penalty shootout. Teams each have 5 kicks initially, and they will start taking kicks alternatively. A successful penalty kick has 1 point. Teams will continue until it is apparent one of them will eventually win. For example, if the score is 3-2 after each team has had 4 kicks, and the first team scores its last kick, the game immediately ends 4-2, because the last kick of the other team will not change the winner. If after the 10 initial kicks (5 each) there is no winner, teams will have 1 extra kick each. After extra kicks, if there is still no winner, they get 1 extra kick each again. This continues until one of them wins. The input to your function will be the sequence of penalty kick outcomes. An X indicates a missed kick, whereas an O shows a successful one. There is only one sequence for both teams, and they apply one at a time to the team that is taking the kick. The game may end even if there are more characters remaining in the sequence. Your function should return an array like [X, Y], where X is the final score of the first team, and Y is that of the second team Sample Input: penalty("OOXOOOOOXO"); Output : [3,4]
12) We have a string of brackets, and we would like to make sure each bracket is properly opened and closed. The string has any number of (,), [,], {, and }. A valid string follows the common-sense rules of opening and closing brackets, so in other words, the formal rules are: There is an equal number of opening and closing brackets of each type Each bracket is opened first, and later closed using the same type of bracket While a specific bracket is open, every other enclosed pair of brackets that are opened should be closed before the encompassing bracket closes.For example, {[()[]]()}() is valid, but [(]) is not. Given a string, your function should determine if it is valid.
13) Given a sorted array of numbers, we would like to search for a specific number. Implement a function that returns the index of that number, or if it is not in the array, the index where it would be.For example, for [1, 3, 5, 16], 3 should return 1, 10 should return 3, and 18 should return 4.For simplicity, assume if the number exists in the array, there will only be one instance of it.
14) A newly-discovered planet has a few continents with one or more countries on each continent. Countries within a continent have land borders with at least another country on the same continent, and no two countries from different continents have a land border. Given a matrix of land borders between countries, we would like to calculate how many continents there are. The borders data for n countries is an n X n matrix, where a value of 1 at i-th row

and j-th column means a direct land border between i-th and j-th countries, and 0 means no border. The matrix is symmetric, and no country has a border with itself. Given the borders matrix, return the number of continents

15) Members of a club have participated in a poll to elect the next president. We know the winner has the majority of the votes (strictly more votes than other candidates combined). Given an array of the votes, determine who the next president is. Input: president([3,2,1,3,2,2,1,2,2]); Output: Winner is 2
16) A rabbit is standing at the top-left corner of an m X n grid (at the [0, 0] cell). There is a carrot at the bottom-right corner (at the [m - 1, n - 1] cell). The rabbit can move to any of these 3 cells in each step if he is not restricted: the adjacent cell to the right, to the bottom, or diagonally to the bottom-right. The rabbit is restricted to the grid boundaries (cannot exit), and he cannot use the cells marked as blocked. Given the size of the grid and a list of blocked cells, calculate how many different ways there are by which he can reach the carrot. For example, on a 2 X 2 grid, the rabbit can reach the carrot in 3 different ways: right->down, down->right, and diagonal. If the [0, 1] cell is blocked, there are only 2 ways: down->right and diagonal. The answer will have 12 or fewer digits. The top-left and bottom-right cells are not blocked. If there is no way to reach the carrot, simply return 0. Example : Input CarrotWays(3, 3,[[2,1], [1,0]]); OutPut : 6
17) For a given date in the 1900s century (19XX years), calculate which day of the week it was. Information you may need: January 1, 1900, was a Monday.Months of a year have 31, "28 or 29"*, 31, 30, 31, 30, 31, 31, 30, 31, 30, and 31 days in order.The second month (February) has 28 days in normal years and 29 days in leap years. A year is a leap year if its number is divisible by 4 unless it is divisible by 100 too. Years divisible by 400 exceptionally leap years. Do not use built-in date functions, and avoid pre-computing anything in your solution.
18) Given a string, we would like to reverse the letters in each word while maintaining the original order of words, spaces and punctuation. Words are separated by spaces and punctuation marks, and there are no numbers. The words consist of lower or upper case letters (so no hyphens), and the case of letters should be preserved in the final answer. For example, This “IS a word-teSt,yeah!” should turn into “sihT SI a dorw-tSet,haey!”. Avoid using tokenizers (e.g. split in JavaScript strings).
19) We define palindromes as phrases that are read the same forward and backwards. For example, both A lad named E. Mandala and Are Mac 'n' Oliver ever evil on camera? are palindromes, because their letters (and not spaces, punctuation marks, or hyphens), regardless of their case, appear in the same order forward and backwards. Given a string, verify if it is a palindrome.
20) We are going to implement a very simple string-based, key-value database, whose only interface is string commands. There are only two commands: SET and GET.SET <key> <value>: It sets the value of a record. key is a

case-sensitive, alphanumeric (no spaces or special letters) string. value is the rest of the string after key and can include any characters, or even be an empty string. The output of this command is CREATED if that key did not exist in the database, UNCHANGED if the key existed but contained the same value, or UPDATED if it had a different value.GET <key>: This command returns the value stored in the database in the format of VALUE=<value>, or simply outputs NOT FOUND if the key does not exist. If an invalid key is used, or the command does not exist, the output should be ERROR. Example Input: run(["invalid command", "set key1 val1", "SET key_1 val1","SET key1 val1", "GET key1 extra_stuff","SET key1 val2","SET key1 val2","GET key1", "GET key2","SET key2 val1 val2_=_val3","GET key2","GET key1"]); Output:["ERROR","ERROR","ERROR","CREATED","ERROR","UPDATED","UNCHA NGED","VALUE=val2","NOT FOUND","CREATED","VALUE=val1 val2_=_val3","VALUE=val2"]

21) Given two strings composed of spaces, punctuation marks and letters, determine if they are anagrams. Two strings are anagrams if ignoring non-letters and in the case of letters, they consist of exactly the same number of letters. For example, Dormitory and Dirty Room are anagrams, whereas bar and barb are not.
22) Add two binary numbers. The input numbers are in string format, and the output should be a string as well. For example, "10" and "1011" should return "1101". Binary numbers do not have leading zeros.
23) We have an unsorted list of integers and need to know if all numbers in the list are unique. Without sorting the given array, return true if there are no two repeating numbers, or false otherwise. Example Input:isUnique([6,2,44,12,96,0,-12,66]);Output:true
24) We have a large directory of first names and would like to search for quite a few names in it. The outcome of every search is one of the following: NOT FOUND, FOUND, or STARTS WITH. The first two are obvious. STARTS WITH means that there is at least one name on the directory that starts with the searched name.For example, if the directory is ["jack", "jill", "annemarie"], the answers to the queries of ["joe", "jill", "anne"] will be ["NOT FOUND", "FOUND", "STARTS WITH"].Try solving the problem without searching the whole directory for every query. All the names consist of lower-case letters only.
25) Given a positive integer and a non-empty list of prime numbers, determine if the number only consists of those prime factors. For example, if the list of prime numbers is [2, 3, 5, 7], the number140= 2^2 * 5 * 7 has the right prime factors, while 26 = 2 * 13 does not.