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School of Computer Science and Engineering

Model Questions on Basic Python

Course Code	:	CSE3041 – Programming for Data Science (MIA)	Date	:	
Lab Experiment	:	Model Questions on Python Language	Slots	:	L49+L50+L51 L58+L59+L60
Instructors	:	Prof. Ramesh Ragala			

Objective: Model Questions

1. **We have two monkeys, a and b, and the parameters a_smile and b_smile indicate if each is smiling. We are in trouble if they are both smiling or if neither of them is smiling. Return True if we are in trouble.**
2. **We have a loud talking parrot. The "hour" parameter is the current hour time in the range 0..23. We are in trouble if the parrot is talking and the hour is before 7 or after 20. Return True if we are in trouble.**
3. **Given 2 strings, a and b, return the number of the positions where they contain the same length 2 substring. So "xxcaazz" and "xxbaaz" yields 3, since the "xx", "aa", and "az" substrings appear in the same place in both strings.**
4. **Write a program that prints the numbers from 1 to 100. But for multiples of three print "Fizz" instead of the number and for the multiples of five print "Buzz". For numbers which are multiples of both three and five print "FizzBuzz".**
5. **Write a program to check if input number is a prime number.**
6. **Make a two-player Rock-Paper-Scissors game. (Hint: Ask for player plays (using input), compare them, print out a message of congratulations to the winner, and ask if the players want to start a new game). Remember the rules: (a). Rock beats scissors (b). Scissors beats paper (c). Paper beats rock**

7. **Write a program that asks the user how many Fibonnaci numbers to generate and then generates them. Take this opportunity to think about how you can use functions. Make sure to ask the user to enter the number of numbers in the sequence to generate.(Hint: The Fibonnaci seqence is a sequence of numbers where the next number in the sequence is the sum of the previous two numbers in the sequence. The sequence looks like this: 1, 1, 2, 3, 5, 8, 13, …)**
8. **Write a program (using functions!) that asks the user for a long string containing multiple words. Print back to the user the same string, except with the words in backwards order. For example, say I type the string: My name is Michele, Then I would see the string: Michele is name My.**
9. **Write a program (function!) that takes a list and returns a new list that contains all the elements of the first list minus all the duplicates.**
10. **Write a function for checking the speed of drivers. This function should have one parameter: speed.**
    (A). If speed is less than 70, it should print "Ok".
    (B). Otherwise, for every 5km above the speed limit (70), it should give the driver one demerit point and print the total number of demerit points. For example, if the speed is 80, it should print: "Points: 2".
    (C). If the driver gets more than 12 points, the function should print: "License suspended"
11. **Write a function called showNumbers that takes a parameter called limit. It should print all the numbers between 0 and limit with a label to identify the even and odd numbers. For example, if the limit is 3, it should print: 0 EVEN, 1 ODD, 2 EVEN and 3 ODD**
12. **Write a function that returns the sum of multiples of 3 and 5 between 0 and limit (parameter). For example, if limit is 20, it should return the sum of 3, 5, 6, 9, 10, 12, 15, 18, 20.**
13. **Given three integers, determine how many of them are equal to each other. The program must print one of these numbers: 3 (if all are the same), 2 (if two of them are equal to each other and the third is different) or 0 (if all numbers are different).**
14. **Chocolate bar has the form of a rectangle divided into n×m portions. Chocolate bar can be split into two rectangular parts by breaking it along a selected straight line on its pattern. Determine whether it is possible to**

split it so that one of the parts will have exactly k squares. Hint: The program reads three integers: n, m, and k. It should print YES or NO.

15. **Given the year number. You need to check if this year is a leap year. If it is, print LEAP, otherwise print COMMON. The rules in Gregorian calendar are as follows:**
    (A) a year is a leap year if its number is exactly divisible by 4 and is not exactly divisible by 100.
    (B). a year is always a leap year if its number is exactly divisible by 400. Warning. The words LEAP and COMMON should be printed all caps.
16. **A car can cover distance of N kilometers per day. How many days will it take to cover a route of length M kilometers? The program gets two numbers: N and M.**
17. **Given the integer N - the number of minutes that is passed since midnight - how many hours and minutes are displayed on the 24h digital clock? The program should print two numbers: the number of hours (between 0 and 23) and the number of minutes (between 0 and 59). For example, if N = 150, then 150 minutes have passed since midnight - i.e. now is 2:30 am. So the program should print 2 30.**
18. **H hours, M minutes and S seconds are passed since the midnight ($0 \leqslant H < 12$, $0 \leqslant M < 60$, $0 \leqslant S < 60$). Determine the angle (in degrees) of the hour hand on the clock face right now.**
19. **In mathematics, the factorial of an integer n, denoted by n! is the following product: $n!=1\times2\times\ldots\times n$. For the given integer n calculate the value n!. Don't use math module in this exercise.**
20. **Given N numbers: the first number in the input is N, after that N integers are given. Count the number of zeros among the given integers and print it. You need to count the number of numbers that are equal to zero, not the number of zero digits.**
21. **Given an integer n, print the sum 1!+2!+3!+...+n!. This problem has a solution with only one loop, so try to discover it. And don't use the math library.**
22. **Given a list of numbers, swap adjacent items in pairs (A[0] with A[1], A[2] with A[3], etc.). Print the resulting list. If a list has an odd number of elements, leave the last element in place.**

23. **In bowling, the player starts wtih 10 pins at the far end of a lane. The object is to knock all the pins down. For this exercise, the number of pins and balls will vary. Given the number of pins N and then the number of balls K to be rolled, followed by K pairs of numbers (one for each ball rolled), determine which pins remain standing after all the balls have been rolled. The balls are numbered from 1 to N (inclusive) for this situation. The subsequent number pairs, one for each K represent the start to stop (inclusive) positions of the pins that were knocked down with each role. Print a sequence of N characters, where "I" represents a pin left standing and "." represents a pin knocked down.**
24. **Given two integers representing the rows and columns (m×n), and subsequent m rows of n elements, find the index position of the maximum element and print two numbers representing the index (i×j) or the row number and the column number. If there exist multiple such elements in different rows, print the one with smaller row number. If there multiple such elements occur on the same row, output the smallest column number.**
25. **Given an integer n, produce a two-dimensional array of size (n×n) and complete it according to the following rules, and print with a single space between characters:**
    On the main diagonal write 0 .
    On the diagonals adjacent to the main, write 1 .
    On the next adjacent diagonals write 2 and so forth.
    Print the elements of the resulting array.
26. **Given an integer n, create a two-dimensional array of size (n×n) and populate it as follows, with spaces between each character:**
    The positions on the minor diagonal (from the upper right to the lower left corner) receive 1 .
    The positions above this diagonal recieve 0 .
    The positions below the diagonal receive 2 .
    Print the elements of the resulting array.
27. **Given two positive integers m and n, m lines of n elements, giving an m×n matrix A, followed by two non-negative integers i and j less than n, swap columns i and j of A and print the result. Write a function swap_columns(a, i, j) and call it to exchange the columns.**

28. **Given two positive integers m and n, m lines of n elements, giving an m×n matrix A, followed by one integer c, multiply every entry of the matrix by c and print the result.**
29. **Alice and Bob like to play with colored cubes. Each child has its own set of cubes and each cube has a distinct color, but they want to know how many unique colors exist if they combine their block sets. To determine this, the kids enumerated each distinct color with a random number from 0 to 108. At this point their enthusiasm dried up, and you are invited to help them finish the task.**
30. **Given two integers that indicate the number of blocks in Alice's and then Bob's sets N and M. The following N lines contain the numerical color value for each cube in Alice's set. Then the last M rows contain the numberical color value for each cube in Bob's set. Find three sets: the numerical colors of cubes in both sets, the numerical colors of cubes only in Alice's set, and the numerical colors of cubes only in Bob's set. For each set, print the number of elements in the set, followed by the numerical color elements, sorted in ascending order.**
31. **Given a number n, followed by n lines of text, print the number of distinct words that appear in the text.For this, we define a word to be a sequence of non-whitespace characters, seperated by one or more whitespace or newline characters. Punctuation marks are part of a word, in this definition.**
32. **Each student at a certain school speaks a number of languages. We need to determine which languges are spoken by all the students, which languages are spoken by at least one student. Given, the number of students, and then for each student given the number of languages they speak followed by the name of each language spoken, find and print the number of languages spoken by all the students, followed by a list the languages by name, then print the number of languages spoken by at least one student, followed by the list of the languages by name. Print the languages in alphabetical order.**
33. **As you know, the president of USA is elected not by direct vote, but through a two-step voting. First elections are held in each state and determine the winner of elections in that state. Thereafter, the state election is going: in this election, every state has a certain the number of**

votes — the number of electors from that state. In practice, all the electors from the state of voted in accordance with the results of the vote within a state.The first line contains the number of records. After that, each entry contains the name of the candidate and the number of votes they got in one of the states. Count the total results of the elections: sum the number of votes for each candidate. Print candidates in the alphabetical order.

34. **Given the text: the first line contains the number of lines, then given the lines of words. Print the word in the text that occurs most often. If there are many such words, print the one that is less in the alphabetical order.**
35. **Given a number n, followed by n lines of text, print all words encountered in the text, one per line. The words should be sorted in descending order according to their number of occurrences in the text, and all words with the same frequency should be printed in lexicographical order.Hint. After you create a dictionary of the words and their frequencies, you would like to sort it according to the frequencies. This can be achieved if you create a list whose elements are tuples of two elements: the frequency of occurrence of a word and the word itself. For example, [(2, 'hi'), (1, 'what'), (3, 'is')]. Then the standard list sort will sort a list of tuples, with the tuples compared by the first element, and if these are equal, by the second element. This is nearly what is required in the problem.**
36. **Given an array of boxes, create a function that returns the total volume of all those boxes combined together. A box is represented by an array with three elements: length, width and height. For instance, totalVolume([2, 3, 2], [6, 6, 7], [1, 2, 1]) should return 266 since (2 x 3 x 2) + (6 x 6 x 7) + (1 x 2 x 1) = 12 + 252 + 2 = 266.**
37. **Create a function that moves all capital letters to the front of a word.**
38. **Given a total due and an array representing the amount of change in your pocket, determine whether or not you are able to pay for the item. Change will always be represented in the following order: quarters, dimes, nickels, pennies.To illustrate: changeEnough([25, 20, 5, 0], 4.25) should yield true, since having 25 quarters, 20 dimes, 5 nickels and 0 pennies gives you 6.25 + 2 + .25 + 0 = 8.50.**
39. **This Triangular Number Sequence is generated from a pattern of dots that form a triangle. The first 5 numbers of the sequence, or dots, are: 1, 3,**

6, 10, 15. This means that the first triangle has just one dot, the second one has three dots, the third one has 6 dots and so on. Write a function that gives the number of dots with its corresponding triangle number of the sequence.

40. **Write a function that finds the largest even number in a list. Return -1 if not found. The use of built-in function max() is prohibited.**
41. **Given two strings comprised of + and -, return a new string which shows how the two strings interact in the following way:**
    When positives and positives interact, they remain positive.
    When negatives and negatives interact, they remain negative.
    But when negatives and positives interact, they become neutral, and are shown as the number 0.
42. **Create a function that flips a horizontal list into a vertical list, and a vertical list into a horizontal list. In other words, take an 1 x n list (1 row + n columns) and flip it into a n x 1 list (n rows and 1 column), and vice versa.**