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PES UNIVERSITY	**PES University, Bengaluru** (Established under Karnataka Act No. 16 of 2013)	**UE20CS901**

March 2024: END SEMESTER ASSESSMENT (ESA)
M TECH DATA SCIENCE AND MACHINE LEARNING_ SEMESTER I

UE20CS901 - Python for Data Science

Time: 3 Hrs	Answer All Questions	Max Marks: 100

INSTRUCTIONS

- All questions are compulsory.
- Section A should be handwritten in the answer script provided and signed at the end of the same.
- Section B and C are coding questions which have to be answered in the system.

SECTION A – 20 MARKS

1	a)	What is type casting? Explain with respect to Python	2
	b)	What is the difference between tuples and lists in Python?.	2
	c)	What do you understand by lambda function? Create a lambda function which will print the sum of all the elements in this list [5, 8, 10, 20, 50, 100]	2
	d)	What is a string and explain slicing of string?	2
	e)	What are *args and **kwargs in Python functions?	2
2	a)	Explain the difference between pivot table and cross table.	2
	b)	How can you get a random number in python?	2
	c)	What are map and reduce functions in Python?	2
	d)	How is vstack() different from hstack() in NumPy?	2
	e)	How sorted() and sort() can be used with list in Python? Give an example.	2

SECTION B – 40 MARKS

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3	a)	James Deen is an investor specializing in the Technology Domain. James purchases stock in successful technology companies using a stockbroker and later sells them at a profit margin As part of his investment portfolio, James purchased 2000 units of stock in Google LLC worth $80,000 ($40 apiece) in the month of November, 2019. The stockbroker charged 3% commission on the total purchase value of the stocks. A month later, James sells his entire stock holding in Google LLC for $42.75 apiece. He pays a commission of 3% on this transaction as well to his stockbroker. **Write a Python program that returns the following output:** 1. The cost of purchasing the entire stock holding in Google LLC 2. The amount of money paid in commission during the purchase 3. The selling price of the entire stock holding in Google LLC 4. The amount of money paid in commission during the sale 5. The profit margin made by James in the entire transaction (purchase & sale, including commissions paid)	5
	b)	i)You need to maintain an inventory of products in the online store. Create a Python dictionary named product_inventory to store the product names as keys and their corresponding quantities as values. (2 Marks) ii)You have received a new shipment of products. Write a Python function named update_inventory that takes the current product_inventory and a dictionary representing the new shipment with product names and quantities. The function should update the inventory with the new shipment quantities. (6 Marks) iii)You want to offer discounts on certain products. Write a Python function named apply_discount that takes the current product_inventory and a dictionary representing the discounted products with their new prices. The function should update the inventory with the discounted prices. (7 Marks)	15
	c)	You are a data analyst working on a top-secret project for a government agency. Your task is to analyze a series of encrypted messages. Each encrypted message is a combination of letters and digits, but you suspect that it might contain hidden information in the form of special alphanumeric codes. Write a Python function named find_special_codes that takes an input string containing the encrypted messages and returns a list of special codes. Special codes are defined as words or combinations of letters and digits that do not contain any special characters or symbols. Refer notebook for sample input & output.	5
	d)	Write a program which can use map() and filter() to make a list whose elements are square of even number in [1,2,3,4,5,6,7,8,9,10]. (5 Marks)	5
	e)	Fibonacci Series is computed based on the following formula: f(n)=0 if n=0 f(n)=1 if n=1 f(n)=f(n-1)+f(n-2) if n>1	5

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		Write a program using list comprehension to print the Fibonacci Sequence in the comma-separated form with a given n input by user input. Refer notebook for sample input & output.	
	f	Ask the user to enter a list of 10 elements containing numbers between 1 and 15. Then replace all of the entries in the list that are greater than 10, with 10 using map() function. Refer notebook for sample input & output.	5
		SECTION C – 40 MARKS	
4	a)	Use the athletes and region datasets to answer the following questions: 1.Merge the dataset athletes and regions. (2 Marks) 2.Which sport is having the most number of Gold Medals so far? (Top 5)(2 marks) 3.Retrieve the total number of Female athletes in each summer Olympics. Support your answer with appropriate plot (4 marks) 4.How has the participation of male and female athletes changed over time in the Summer and Winter Games? Line charts showing the number of male and female athletes over the years for both Summer and Winter Games(7 marks) 5.In which year India won first Gold Medal in Summer Olympics? (3 marks) 6.Create a new column to categorize athletes as 'Tall and Heavy', 'Tall and Light', 'Short and Heavy', 'Short and Light'(Benchmark Height as 1.8 and weight as 8(5 marks) 7.Display the names of the cities where players who participated in the Winter Olympics for the sport of football between the years 1930 and 2010(5 marks) 8.Write a function takes the name of the player as input, filters the dataset to get the data related to that player, and then extracts the unique countries, sports, and Olympics attended by the player. (7 marks) 9.Output the sport with the most medals in the Summer and Winter Olympics separately. (5 marks)	40