Question Paper

Exam Date & Time: 22-Jun-2024 (02:30 PM - 05:30 PM)

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MANIPAL ACADEMY OF HIGHER EDUCATION

DATA SCIENTISTS TOOLBOX AND R PROGRAMMING [CRA 4059]

Marks: 50					Duration	: 180 mins.
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Answer all t Answer all Q	the questions. Questions				Section Duratio	n: 180 mins
1)	Identify, convey the purpose, a	and demonstrate the syntax	of five Git commands frequently uti	lized in collaborati	ve projects.	(5)
2)	Explain the use cases of the c	data types in R given below	and provide suitable examples for e	ach:		(3)
	a. Numeric					
	b. Matrix					
	c. Logical					
3)	Explain the use of the apply fa	amily of functions in R. How	do these functions simplify the proc	ess of applying a f	function to elements of a data structure?	(2)
4) Iterate th	hrough the code snippet given in Fi	igure 2A and write the final a	and complete output.			(5)
matr outp for	rix_data <- matr put_list <- list (i in 1:nrow(ma	rix(1:9, nrow () ntrix_data))	{ {			
fc } }	or (j in 1:ncol(output_list[[pa	(matrix_data) uste("Element) { ", i, j, sep = "	'_")]] <-	matrix_data[i, j] ′	`2
prir	nt(output list)					
Figure 2	- <u> </u>					
5)	What does the code in Figure 2B do? Demonstrate the logic and write the output.					(3)
	<pre>vec <- c(1, 2 for (i in vec</pre>	, 3, 4, 5)) { == 0) {				
	Figure 2B					
6)	What is the role of the traceba	ack() function in R and how	it helps in debugging.			(2)
7)	You have a dataset containing and "score". Your task is to ca any assignments with missing	g student grades for differen alculate the average score a g scores. Write R code to	t assignments in a course, including chieved by each student across all a	y variables such as assignments in the	"student_id", "course_id", "assignment_id", e course. However, you also need to exclude	(5)
	a. Initialize a dataset in R base	ed on the provided table in	Figure 3A representing student grad	les.		
	b. Calculate the average score achieved by each student across all assignments while excluding assignments with missing scores.					
	c. Display the average score for each student.					
	student_id	course_id	assignment_id	score		
	1	Math101	1	85		
	2	Math101	1	70		
	3	Math101	1	92	l	
	4	Math101	1	78	l	
	5	Math101	1	88	I	
	1	Math101	2	90	I	

	3 Math101 2 85 4 Math101 2 82 5 Math101 2 95					
8)	Compare and contrast the outputs of merge() and join() functions in R. Illustrate the difference with an example.	(3)				
9)	Comment on the use of the following lubridate functions in R. a. ymd() b. wday()					
10)	 For the R code vector given below, employ appropriate R functions among grep(), grepl(),strsplit(),sub() and gsub() to obtain the following outputs. text < - c("apple123", "banana456", "grape789", "orange234","appleapple","bananaapple", "343app567") a. Find indices of elements containing 'apple' or 'banana'. b. Check if elements contain 'apple' or 'banana'. c. Replace 'apple' with 'fruit' in the given character vector. d. Replace all digits with '*'. e. Split elements based on digits. 					
11)	 Analyse the outputs provided by the following R numeric functions with appropriate syntax and examples. a. round() b. signif() c. ceiling() and floor() 	(3)				
12)	Contrast the application of cut and cut2 functions in R with appropriate syntax and examples.					
13) 14)	With appropriate syntax examine, how the following R functions can be employed to create tidy data? a. gather() b. separate() c. spread() d. extract_numeric() e. unique() Employ various combinations of R regular expressions on the string provided "My roll number is 1006781" to generate the appropriate pattern-matching expression that matches: a. any word that starts with "M" or "m" b. any word that starts with "r" or "R" followed by zero or one occurrence of "o" c. any sequence of digits between "is " and the end of the line. 	(5)				
	 any word that contains "num" followed by zero or more occurrences of "ber". any sequence of digits followed by "78". 					
	f. any word that starts with "i" or "I" followed by zero or more occurrences of "s".					
15)	What are literals in R programming? Explain with examples.	(2)				

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