**S.V.NATIONAL INSTITUTE OF TECHNOLOGY**
**Department of Computer Science and Engineering**
**B.Tech. III - Semester - VI - Mid Semester Examination**
**12th March – 2022 Principles of Programming Languages(CS302)**

**[Time: 15 Min.]** **Part-1** **[Total Marks: 12]**

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| **1.** | Answer the following questions(With **justification/s** for your answer, No credits for answer without justification/s):<br><br>**(i)** What does the query ***rpg([1,2],R)*** return(if possible) for the following Prolog program?<br>***rpg([],[]).***<br>***rpg([X\|T], [X,X,X\|T1]):- rpg(T, T1).***<br><br>**(ii)** What does the query ***prg([1, 2, 3, 4, 5], R)*** return(if possible) for the following Prolog program?<br>***prg([],[]).***<br>***prg([X],[X]).***<br>***prg([F,_\|T], [F\|T1]):- prg(T, T1).***<br><br>**(iii)** For below Prolog program, the query ***rec([1,2],[3,4],R)*** produces ___solutions.(Mention Number of solution/s (if any))<br>***rec([],L2,L2).***<br>***rec(L1,[],L1) :- L1 = [_\|_].***<br>***rec([H1\|T1],[H2\|T2],[H1\|T3]) :- rec(T1,[H2\|T2],T3).***<br>***rec([H1\|T1],[H2\|T2],[H2\|T3]) :- rec([H1\|T1],T2,T3).***<br><br>**(iv)** What does the query ***nit([a, b, c, d], 2, R)*** return(if possible) for the following Prolog program?<br><br>***nit([X\|Xs], 1, Xs).***<br>***nit([Y\|Xs], K,[Y\|Ys]) :-***<br>***K > 1,***<br>***K1 = K - 1,***<br>***nit(Xs, K1, Ys).*** | 04 |
| **2.** | Write Prolog program to shift the elements of a list rotationally to the left or right as specified in the argument: ***rotate(list, rot_dir)*** | 02 |
| **3.** | Let L be any list of terms. Write Prolog program for the following: ***evnpo(L)*** which prints out the elements of L at positions 2,4,6... up to the end of the list. | 02 |
| **4.** | Write Prolog program to print the members of the Euclidean series given the first two initial elements e.g. given 44 and 28 it generates 44 38 16 12 4 0. | 02 |
| **5.** | Write Prolog program to have a predicate named ***group*** that has three arguments: a first list, a second list, and a third argument. The predicate returns in the third argument a list of all the possible groups of elements from the two given lists.<br>e.g. Query given as ***group([1, 3],[a, b],G) will produce*** **G = [[1, a], [1, b], [3, a], [3, b]]** | 02 |

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| | Given the following calling sequences and assuming that dynamic scoping is used, what variables are visible during execution of the last function called? Include with each visible variable the name of the function in which it was defined.<br>***a. main calls fun1; fun1 calls fun2; fun2 calls fun3.***<br>***b. main calls fun1; fun1 calls fun3.***<br>***c. main calls fun2; fun2 calls fun3; fun3 calls fun1.***<br>***d. main calls fun3; fun3 calls fun1.***<br>***e. main calls fun1; fun1 calls fun3; fun3 calls fun2.***<br>f. ***main calls fun3; fun3 calls fun2; fun2 calls fun1.*** | |
| **5.** | Write a C++ program that produces the sum of all the whitespace-separated integers in a text file. For example, "bears: 17 elephants 9 end" should output 26. Also take two files containing sorted whitespace-separated words and merge them, preserving order. | 03 |
| **6.** | You sell the book C++ for Fools. Write a program that has you enter a year's worth of monthly sales (in terms of number of books, not of money). The program should use a loop to prompt you by month, using an array of char * (or an array of string objects, if you prefer) initialized to the month strings and storing the input data in an array of int. Then, the program should find the sum of the array contents and report the total sales for the year | 03 |
| **7.** | You've seen how to create mutual class friends. Can you create a more restricted form of friendship in which only some members of Class B are friends to Class A and some members of A are friends to B? Explain with example | 02 |