

Logic Programming

Assignment 4

Due: Next Section.

Note: This task is individual task, The lab Instructor should evaluate a running program for it.

1. (5 Points) Implement predicates that compute Padovan number. The definition of the Padovan number is as follows:

Padovan:

$$\text{Pad}(0) = 1$$

$$\text{Pad}(1) = 1$$

$$\text{Pad}(2) = 1$$

$$\text{Pad}(n) = \text{Pad}(n-2) + \text{Pad}(n-3) \text{ for } n > 2$$

2. (5 Points) Given a non-negative int n , return the sum of its digits recursively. Note that mod (%) by 10 yields the rightmost digit (126 % 10 is 6), while divide (/) by 10 removes the rightmost digit (126 / 10 is 12). Implement the predicate sumDigits such that:

$$\text{sumDigits}(126) \rightarrow 9$$

$$\text{sumDigits}(49) \rightarrow 13$$

$$\text{sumDigits}(12) \rightarrow 3$$

Note: You are free to solve it recursively using any other techniques

3. (5 Points) Given a string, compute recursively a new string where all the lowercase 'x' chars have been changed to 'y' chars.

$$\text{changeXY}(\text{"codex"}) \rightarrow \text{"codey"}$$

$$\text{changeXY}(\text{"xxhixx"}) \rightarrow \text{"yyhiyy"}$$

$$\text{changeXY}(\text{"xhixhix"}) \rightarrow \text{"yhiyhiy"}$$

4. (5 Points) Given a string that contains a single pair of parenthesis, compute recursively a new string made of only of the parenthesis and their contents, so "xyz(abc)123" yields "(abc)".

$$\text{parenBit}(\text{"xyz(abc)123"}) \rightarrow \text{"(abc)"}$$

$$\text{parenBit}(\text{"x(hello)"}) \rightarrow \text{"(hello)"}$$

$$\text{parenBit}(\text{"(xy)1"}) \rightarrow \text{"(xy)"}$$