

Logic Programming – Laboratory 2

Recursion

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1 Exercises

1. Write a predicate which returns the length of a list.

Examples:

? – *length_list*([a, 2, b, 4, 5], L).

will return $L = 5$

? – *length_list*([], L). will return $L = 0$.

2. Write a predicate which returns the reverse of a list.

Examples:

? – *reverse_list*([1, 2, 3, 4, 5], R).

will return $R = [5, 4, 3, 2, 1]$

? – *reverse_list*([], R). will return $R = []$.

3. Write a predicate which returns the sum of the elements from a list.

Examples:

? – *sum_elem_list*([1, 2, 3, 4, 5], S).

will return $S = 15$

? – *sum_elem_list*([], S). will return $S = 0$.

4. Write a program in Prolog which calculates:

$$f(X) = (X^{45} - 3 * X^2) + 5$$

5. Write a program in Prolog which calculates:

$$f(X, Y, Z) = (X^{100} - 3 * Y) + (5 * Z + X * Y)$$

6. Write a program which will return the list of elements on the odd positions from a list of integers.

Examples:

? – *odd_elem_list*([1, 3, 4, 2, 3, 5], *OddElem*).

The result will be $OddElem = [1, 4, 3]$.

? – *odd_elem_list*([1], *OddElem*).

The result will be $L = [1]$.

7. Write a program which will return the list of elements on the even positions from a list of integers.

Examples:

? - *even_elem_list*([1, 3, 4, 2, 3, 5], *EvenElem*).

The result will be *EvenElem* = [3, 2, 5].

? - *even_elem_list*([3], *EvenElem*).

The result will be *EvenElem* = [].

8. Write a program which will return the list of odd elements from a list of integers.

Examples:

? - *odd_list*([1, 3, 4, 2, 7, 5], *X*).

The result will be *X* = [1, 3, 7, 5].

? - *odd_list*([4], *X*).

The result will be *X* = [].

9. Write a program which will return the list of even elements from a list of integers.

Examples:

? - *even_list*([1, 3, 4, 2, 7, 5], *X*).

The result will be *X* = [4, 2].

? - *even_list*([3], *X*).

The result will be *X* = [].

10. Write a program which calculates the factorial of a natural number.

Examples:

?- factorial(5,X).

X= 120