

P1: Lists in Prolog (1)

1.

- a. Write a predicate to determine the lowest common multiple of a list formed from integer numbers.
- b. Write a predicate to add a value v after 1-st, 2-nd, 4-th, 8-th, ... element in a list.

2.

- a. Write a predicate to remove all occurrences of a certain atom from a list.
- b. Define a predicate to produce a list of pairs (atom n) from an initial list of atoms. In this initial list atom has n occurrences.

Eg.: `numberatom([1, 2, 1, 2, 1, 3, 1], X) => X = [[1, 4], [2, 2], [3, 1]]`.

3.

- a. Define a predicate to remove from a list all repetitive elements.
Eg.: `l=[1,2,1,4,1,3,4] => l=[2,3]`
- b. Remove all occurrence of a maximum value from a list on integer numbers.

4.

- a. Write a predicate to determine the difference of two sets.
- b. Write a predicate to add value 1 after every even element from a list.

5.

- a. Write a predicate to compute the union of two sets.
- b. Write a predicate to determine the set of all the pairs of elements in a list.
Eg.: `L = [a b c d] => [[a b] [a c] [a d] [b c] [b d] [c d]]`.

6.

- a. Write a predicate to test if a list is a set.
- b. Write a predicate to remove the first three occurrences of an element in a list. If the element occurs less than three times, all occurrences will be removed.

7.

- a. Write a predicate to compute the intersection of two sets.
- b. Write a predicate to create a list (m, \dots, n) of all integer numbers from the interval $[m, n]$.

8.

- a. Write a predicate to determine if a list has even numbers of elements without counting the elements from the list.
- b. Write a predicate to delete first occurrence of the minimum number from a list.

9.

- a. Insert an element on the position n in a list.
- b. Define a predicate to determine the greatest common divisor of all numbers from a list.

10.

- a. Define a predicate to test if a list of an integer elements has a "valley" aspect (a set has a "valley" aspect if elements decreases up to a certain point, and then increases.
eg: 10 8 6 9 11 13 – has a "valley" aspect
- b. Calculate the alternate sum of list's elements $(l_1 - l_2 + l_3 \dots)$.

11.

- a. Write a predicate to substitute an element from a list with another element in the list.
- b. Write a predicate to create the sublist (l_m, \dots, l_n) from the list (l_1, \dots, l_k) .

12.

- a. Write a predicate to substitute in a list a value with all the elements of another list.
- b. Remove the n -th element of a list.

13.

- a. Transform a list in a set, in the order of the last occurrences of elements. Eg.: $[1,2,3,1,2]$ is transformed in $[3,1,2]$.
- b. Define a predicate to determine the greatest common divisor of all numbers in a list.

14.

- a. Write a predicate to test equality of two sets without using the set difference.
- b. Write a predicate to select the n -th element of a given list.

15.

- a. Write a predicate to transform a list in a set, considering the first occurrence.
Eg: $[1,2,3,1,2]$ is transform in $[1,2,3]$.
- b. Write a predicate to decompose a list in a list respecting the following: [list of even numbers list of odd numbers] and also return the number of even numbers and the numbers of odd numbers.