

Exercises

Exercise 1. Define a predicate $last(X, L)$ which is true if X is the last element of list L . Do it in the following two ways:

- (a) recursively;
- (b) using $append/3$, which we described in the class.

Exercise 2. Define a predicate $lshift(L1, L2)$ which is true if $L2$ is a list which results from circularly shifting list $L1$ one position to the left. E.g. $lshift([a, b, c, d], [b, c, d, a])$ is true. Do it in the following two ways:

- (a) recursively;
- (b) using $append/3$, which we described in the class.

Exercise 3. Define a predicate $every2nd(L1, L2)$ which is true if $L2$ is a list obtained by taking every second element of $L1$. E.g. $every2nd([a, b, c], [b])$ and $every2nd([a, b, c, d], [b, d])$ are true.

Solutions are on the next page

Solutions

Exercise 1

(a)

$$\begin{aligned} &last(X, [X]). \\ &last(X, [H|T]) :- last(X, T). \end{aligned}$$

(b)

$$last(X, L) :- append(Y, [X], L).$$

Exercise 2

(a)

$$\begin{aligned} &lshift([], []). \\ &lshift([X], [X]). \\ &lshift([X, Y|T], [Y|T2]) :- lshift([X|T], T2). \end{aligned}$$

(b)

$$\begin{aligned} &lshift([], []). \\ &lshift([H|T], L) :- append(T, [H], L). \end{aligned}$$

Exercise 3

$$\begin{aligned} &every2nd([], []). \\ &every2nd([X], []). \\ &every2nd([X, Y|T], [Y|T2]) :- every2nd(T, T2). \end{aligned}$$