

ex 6

a) test if a list is linear.

$$\text{checklist}(l_1 \dots l_n) = \begin{cases} \text{true}; & \text{if } n = 0 \\ \text{nil}; & l_1 \neq \text{member} \\ & \text{checklist}(l_2 \dots l_n) \\ \text{otherwise} \end{cases}$$

b) replace first occurrence of E in list with O .

$$\text{repl}(l_1 \dots l_n, E, O) = \begin{cases} [O]; & \text{if } n = 0 \\ O \cup \text{repl}(l_2 \dots l_n, E, O); & \text{if } l_1 = E \\ l_1 \cup \text{repl}(l_2 \dots l_n); & \text{otherwise} \end{cases}$$

d) merge two sorted lists without keeping duplicates

$$\text{remove_doubles}(l_1 \dots l_n) = \begin{cases} \text{nil}; & \text{if } n = 0 \\ l_1; & \text{if } n = 1 \\ \text{remove_doubles}(l_2 \dots l_n); & \text{if } l_1 = l_2 \\ l_1 \cup \text{remove_doubles}(l_2 \dots l_n) \\ \text{otherwise} \end{cases}$$

$$\text{merge}(l_1 \dots l_n | L_1 \dots L_m) = \begin{cases} \text{remove.doubles}(l_1 \dots l_n); \text{if } n=0 \\ \text{remove.doubles}(L_1 \dots L_m); \text{if } m=0 \\ l_1 \cup \text{merge}_1(l_2 \dots l_n, L_1 \dots L_m); \text{if } l_1 < L_1 \\ L_1 \cup \text{merge}_1(l_1 \dots l_n, L_2 \dots L_m); \text{if } l_1 > L_1 \\ l_1 \cup (l_2 \dots l_n, L_2 \dots L_m); \text{if } l_1 = L_1 \end{cases}$$

c) replace each sublist of a list with it's last element

$$\text{rep}(l_1 \dots l_n) = \begin{cases} \text{nil}; \text{if } n=0 \\ \text{rep}(l_1; n) \cup \text{rep}(l_2 \dots l_n); \text{if } l_1 \text{ is list} \\ l_1 \cup \text{rep}(l_2 \dots l_n); \text{otherwise} \end{cases}$$

last elem. of l_1