Laboratory 5

a.

$$myDotProduct(l_1 \ldots l_m, k_1 \ldots k_m) = \begin{cases} 0, & \text{if } m = 0 \text{ or } m = 0 \\ -1, & \text{if } n \neq m \\ l_1 * k_1 \oplus myDotProduct(l_2 \ldots l_m, k_2 \ldots k_m), & \\ & \text{otherwise} \end{cases}$$

b.

$$myMax(a, b) = \begin{cases} a, & \text{if } a > b \\ b, & \text{otherwise} \end{cases}$$

$$myFindDepth(l_1 \ldots l_m, c) = \begin{cases} c, & \text{if } m = 0 \\ myMax(myFindDepth(l_1, c+1), \\ \qquad myFindDepth(l_2 \ldots l_m, c)), \\ \qquad \text{if } l_1 \text{ is a list} \\ myFindDepth(l_2 \ldots l_m, c), \\ \qquad \text{otherwise} \end{cases}$$

$$myMain(l_1 \, l_2 \ldots l_m) = myFindDepth(l_1 \, l_2 \ldots l_m, 1)$$

c.

$$
\text{myInsert}(l_1 l_2 \ldots l_n, \, e) = \begin{cases} \{e\}, & \text{if } n = 0 \\ l_1 l_2 \ldots l_n, & \text{if } l_1 = e \\ \{e\} \cup l_1 l_2 \ldots l_n, & \text{if } e < l_1 \\ \{l_1\} \cup \text{myInsert}(l_2 \ldots l_n, \, e) \end{cases}
$$

$$
\text{mySort}(l_1 l_2 \ldots l_n) = \begin{cases} \text{nil}, & \text{if } n = 0 \\ \text{myInsert}(\text{mySort}(l_2 \ldots l_n), l_1), & \text{otherwise} \end{cases}
$$

d.

$$
\text{myContains}(e, l_1 l_2 \ldots l_n) = \begin{cases} \text{nil}, & \text{if } n = 0 \\ \text{true}, & \text{if } l_1 = e \\ \text{myContains}(e, l_2 \ldots l_n), & \text{otherwise} \end{cases}
$$

$$
\text{myIntersection}(l_1 \ldots l_n, \, p_1 \ldots p_m) = \begin{cases} \text{nil}, & \text{if } n = 0 \text{ or } m = 0 \\ \{l_1\} \cup \text{myIntersection}(l_2 \ldots l_n, p_1 \ldots p_m), \\ \quad \text{if } \text{myContains}(l_1, p_1 \ldots p_m) \text{ is true} \\ \text{myIntersection}(l_2 \ldots l_n, p_1 \ldots p_m), \\ \quad \text{otherwise} \end{cases}
$$