

Laboratory 5

2.

a) Write a function to return the product of two vectors.

https://en.wikipedia.org/wiki/Dot_product

b) Write a function to return the depth of a list. Example: the depth of a linear list is 1.

c) Write a function to sort a linear list without keeping the double values.

d) Write a function to return the intersection of two sets.

a.

$$\text{myDotProduct}(l_1 \dots l_n, k_1 \dots k_n) = \begin{cases} 0, & \text{if } n = 0 \text{ or } m = 0 \\ -1, & \text{if } n \neq m \\ l_1 * k_1 + \text{myDotProduct}(l_2 \dots l_n, k_2 \dots k_n), & \text{otherwise} \end{cases}$$

b.

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

$$\text{myFindDepth}(l_1 \dots l_n, c) = \begin{cases} c, & \text{if } n = 0 \\ \text{myMax}(\text{myFindDepth}(l_1, c+1), \text{myFindDepth}(l_2 \dots l_n, c)), & \text{if } l_1 \text{ is a list} \\ \text{myFindDepth}(l_2 \dots l_n, c), & \text{otherwise} \end{cases}$$

$$\text{myMain}(l_1, l_2 \dots l_n) = \text{myFindDepth}(l_1, l_2 \dots l_n, 1)$$

c.

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

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

d.

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

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