Laboratory No. 4
Hash Tables and Trees

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3.1 To manage the bees we use a hash table; it was decided to implement this data structure since there had to be an efficient time complexity and we found that the insertion time of the hash tables is O (1). As important requirements we had the search and elimination of robotic bees which are carried out in time O (1) also with these tables, with these conditions the most viable and efficient option is finally this.

3.4
> **Complexity 2.1**: O log(n)

3.5
> **2.1.** n es is the number of nodes that the tree has.

4) Simulacrum partial

4.1
> **4.1.1 b)** that start with the same letter collide
> **4.1.2 d)** complexity: O(1)

4.2
> **4.2.1** Closest common ancestor
> **4.2.2** complexity: O(n)
> **4.2.3** you can swing the tree to an AVL type

4.3
> **4.3.1** return true
> **4.3.2** complexity: O(m+n)

4.4
> **4.4.1 c)** T(n)=2.T(n/2)+C, that is O(n)
> **4.4.2 a)** O(n)
> **4.4.3 d)** Wilkenson, Joaquina, Eustaquia, Florinda, Eustaquio, Jovín, Sufranio, Piolina, Wilberta, Piolín, Usnavy
> **4.4.4 c)** Change the order of lines 03, 04 and 05 to 03, 05, 04

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UNIVERSIDAD EAFIT®
Acreditación Institucional
Renovación 2018-2026
Resolución MEN 2158 de 2018

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ESTRUCTURA DE DATOS 1
Código ST0245

4.5 **a)** p != null
   b) toInsert > p

4.7
   4.7.1 a) 0, 2, 1, 7, 10, 5, 13, 11, 9, 4
   4.7.2 b) 2
   4.7.3 d) $O(n)$

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