Laboratory practice No. 4: Hast tables and Trees

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October 24, 2020

1 Report

i. For the code in 1.1 see [1].

ii. For the code in 2.1 see [2].

iii. *.

i. In 1.1 we used a hash table because in case that two bees are in the same position it will mean that they are the same, which allows the insertion and search through the distance be in constant time.

ii. *.

iii. *.

iv. To calculate the complexity of the code in 2.1, we first define h as height of the tree. Then we say that:

T(h) = $c_1 + T(h-1)$, where c_1 is a constant.

Solving the equation, we get the following:

$\mathrm{T(h)} = c_1 \cdot h + c_2$

With this last equation, we can define the complexity as: $O(c_1 \cdot h + c_2)$. Using the addition rule, we'll get $O(c_1 \cdot h)$. And with the product rule, we say that the final complexity is $O(h)$.

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2 Midterm Exam [3]

i. *.

- **i.** *b*) The strings that starts with the same letter will collide.
- **ii.** *d*) $O(1)$.

ii. c) 3.

iii. *.

- **i.** false.
- **ii.** 0.
- **iii.** (a.left, suma - a.data)
- **iv.** (a.right, suma - a.data)

iv.

- **i.** c) $T(n) = 2(n/2) + C$.
- **ii.** a) $O(n)$.
- **iii.** d) Wilkenson, Joaquina, Eustaquia, Florinda, Eustaqui, Jovín, Sufranio, Piolina, Wilberta, Piolín, Usnavy.
- **iv.** *a*) Swap the lines 03, 04, 05 with 05, 04, 03

v.

- **i.** (p.data == toInsert).
- **ii.** (p.data < toInsert).

vi. *.

vii. *.

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viii. *.

ix. *a*) 5, 3, 6, 1, 7, 4, 8, 0, 2.

x. *.

xi. *.

xii. *.

i. root.child.

ii. d) $T(n) = nT(n-1) + C$, which is $O(n!)$.

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References

[1] S. Álvarez and D. Madrid. (). "For code 1.1," [Online]. Available: https://github.com/dmadridr/ST0245-002/blob/master/laboratorios/lab04/codigo/SavingBeesHT.java.

[2] ——, (). "For code 2.1," [Online]. Available: https://github.com/dmadridr/ST0245-002/blob/master/laboratorios/lab04/codigo/SavingBeesBT.java.

[3] M. Toro, "Laboratorio Nro. 4 Tablas De Hash y Arboles.," version 19., pp. 12–22, 2019. [Online]. Available: https://github.com/mauriciotoro/ST0245-Eafit/blob/master/laboratorios/lab04/ED1-Laboratorio4%20Vr%209.0.pdf.

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