



**Instructor**  
Daniel Santos

**Subject**  
IA II

**Student Code :** \_\_\_\_\_  
**Date:** 17 Junio, 2019

Responses that are not clear, incomplete or with an inadequate justification will not be taken into account. If you find a wrong question , write the correction

**(1 point)** Complete the following table of asymptotic complexities for each of the operations in the kdtree

-	Worst	Average	Best
Build KD			
Query ( nearest element)			
Memory			

Table 1: Complexity analysis KDTree

Justify the complexity of the kdtree's construction and demonstrate mathematically the query complexity to find the closest element (if necessary, use the white sheet given).

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**(1 point)** Write the pseudo code of Build and Query using the KD tree approach to find the k-farthest elements (Analyze complexity memory and time).

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-	Worst	Average	Best
Build KD			
Query ( nearest element)			
Memory			

Table 2: Complexity analysis KDTree

Bonus Points

**(1 point)** Write a problem in which it is necessary to use Knuth Morris Pratt (KMP) and kdtrees, analyze complexity in space and time.

**(1 point)** If I have a tree of segments and in each segment I have a kdtree, does it make sense to use that combination? If so, write an example

**(1 point)** How can Introselect improve the efficiency of KDTree? Why does it work?

**(1 point)** If  $N$  is the number of records  $k$  is the number of dimensions of those records and  $N > k$  is it advisable to use the kd ?. Justify

**(1 point)** In the middle of the decade of the 60 the Universidad Francisco José de caldas had in a very temporary way the figure of a \_\_\_\_\_ in its symbol.

**(1 point)** ¿Quién es Francisco Zumaqué y Rogelio Arturo Castro García? ¿Qué hicieron? \_\_\_\_\_

