Informed search

The uninformed methods are very inefficient due to the combinatorial explosion, on the other hand, **informed** or **heuristic methods** use domain knowledge to guide the search. For this, information about the proximity of each state to a target state is provided, also with this information we reduce the complexity of the combinatorial explosion while exploring, we call this information **heuristic**. But it has some limitations such as that it doesn’t prevent the combinatorial explosion, if the heuristic is not reliable, the efficiency gets worse and in some cases a solution is not guaranteed.

In this type of search we must determine a **Heuristic function h(n)**, the value that the function returns is evaluated as a number that provides an estimate of how “promising” the state is in reaching a target state. We can interpretate the function in 2 ways:

* By estimating the “quality” of a state.
* By estimating the cost of a state.

There’s an agreement in which we cannot have negative heuristic values (the lower the value the better) and the state that has assigned the value 0 for the heuristic is the target state.

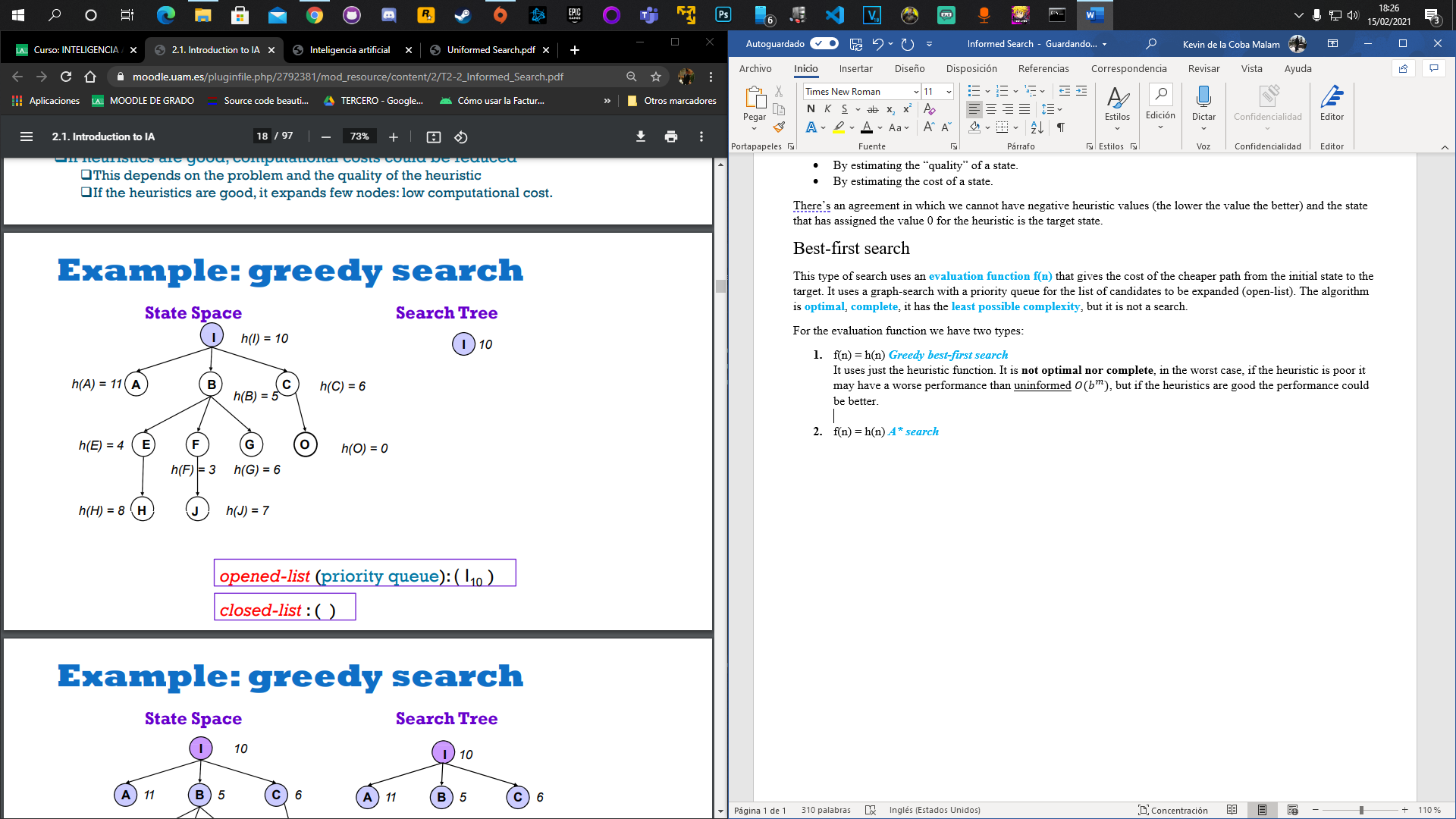
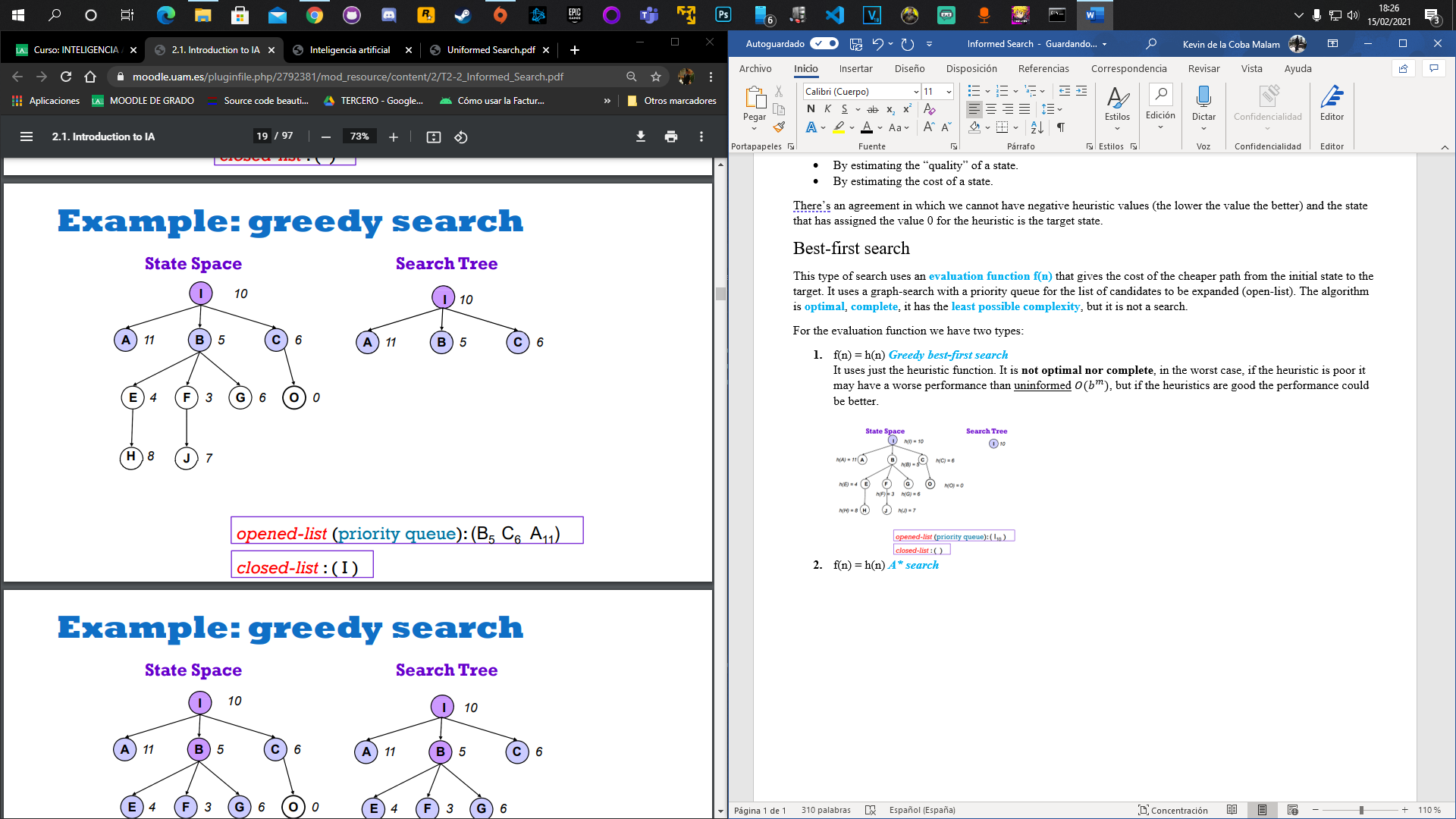
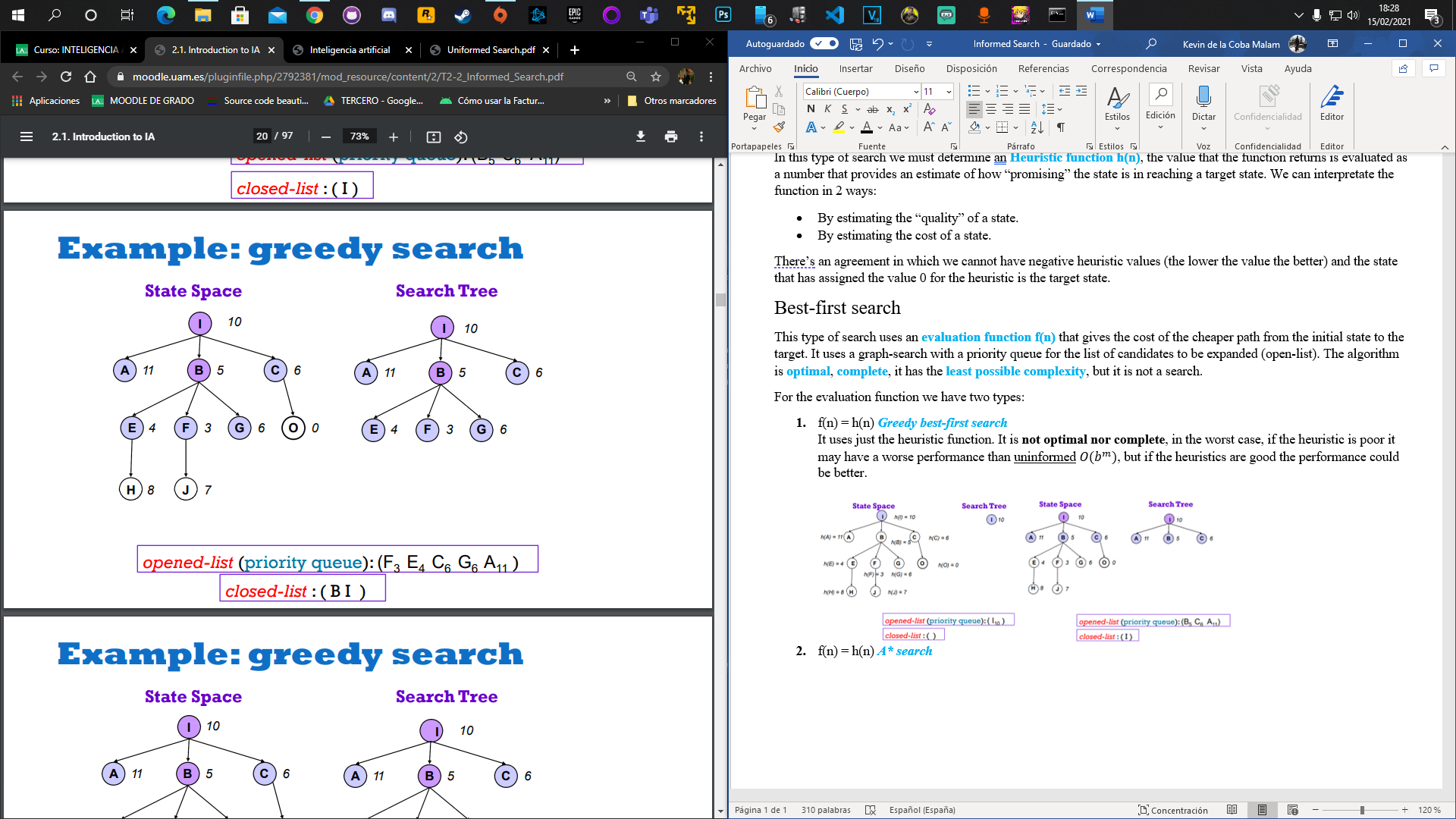
Best-first search

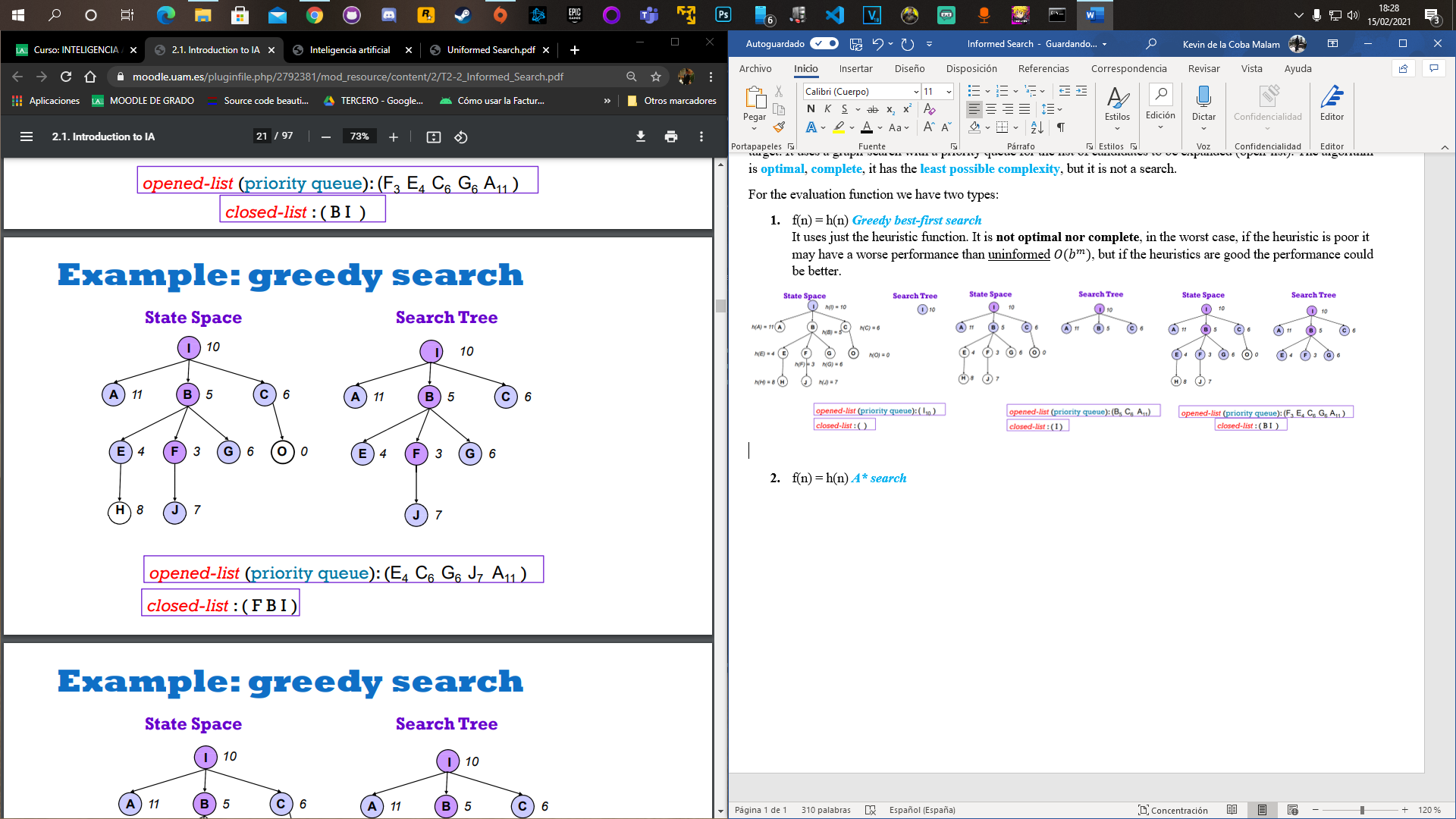
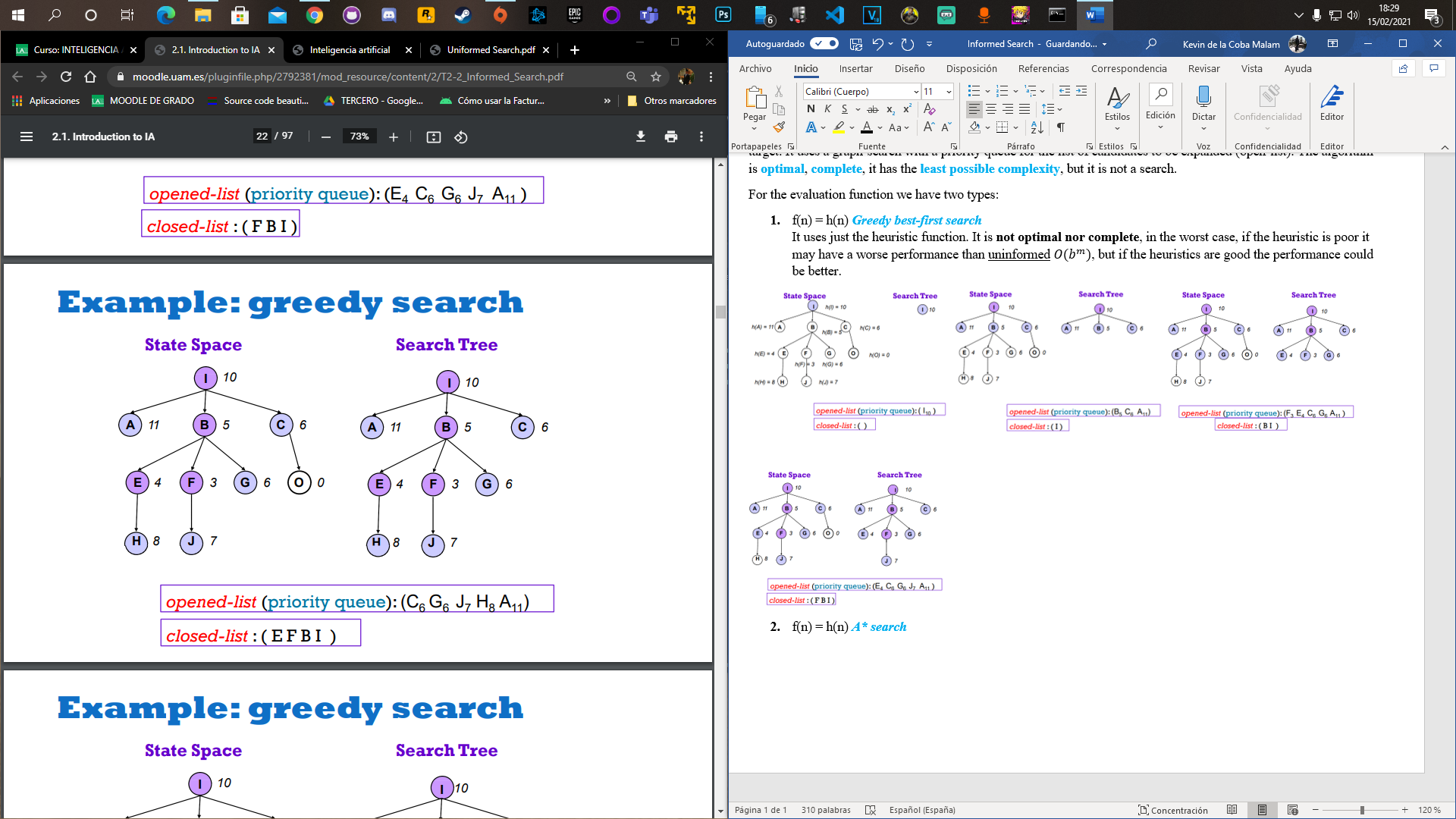
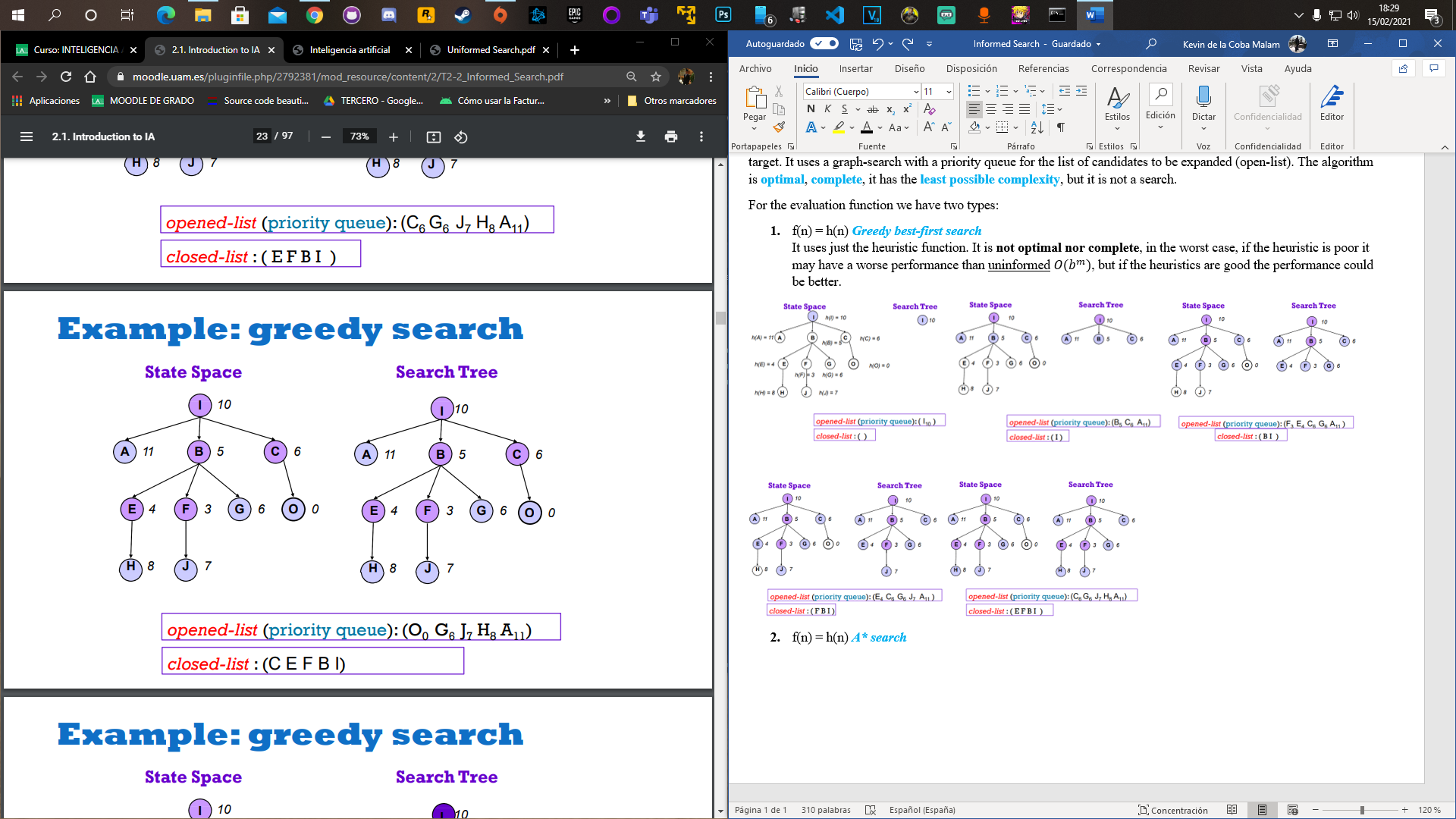
This type of search uses an **evaluation function f(n)** that gives the cost of the cheaper path from the initial state to the target. It uses a graph-search with a priority queue for the list of candidates to be expanded (open-list). The algorithm is **optimal**, **complete**, it has the **least possible complexity**, but it is not a search.

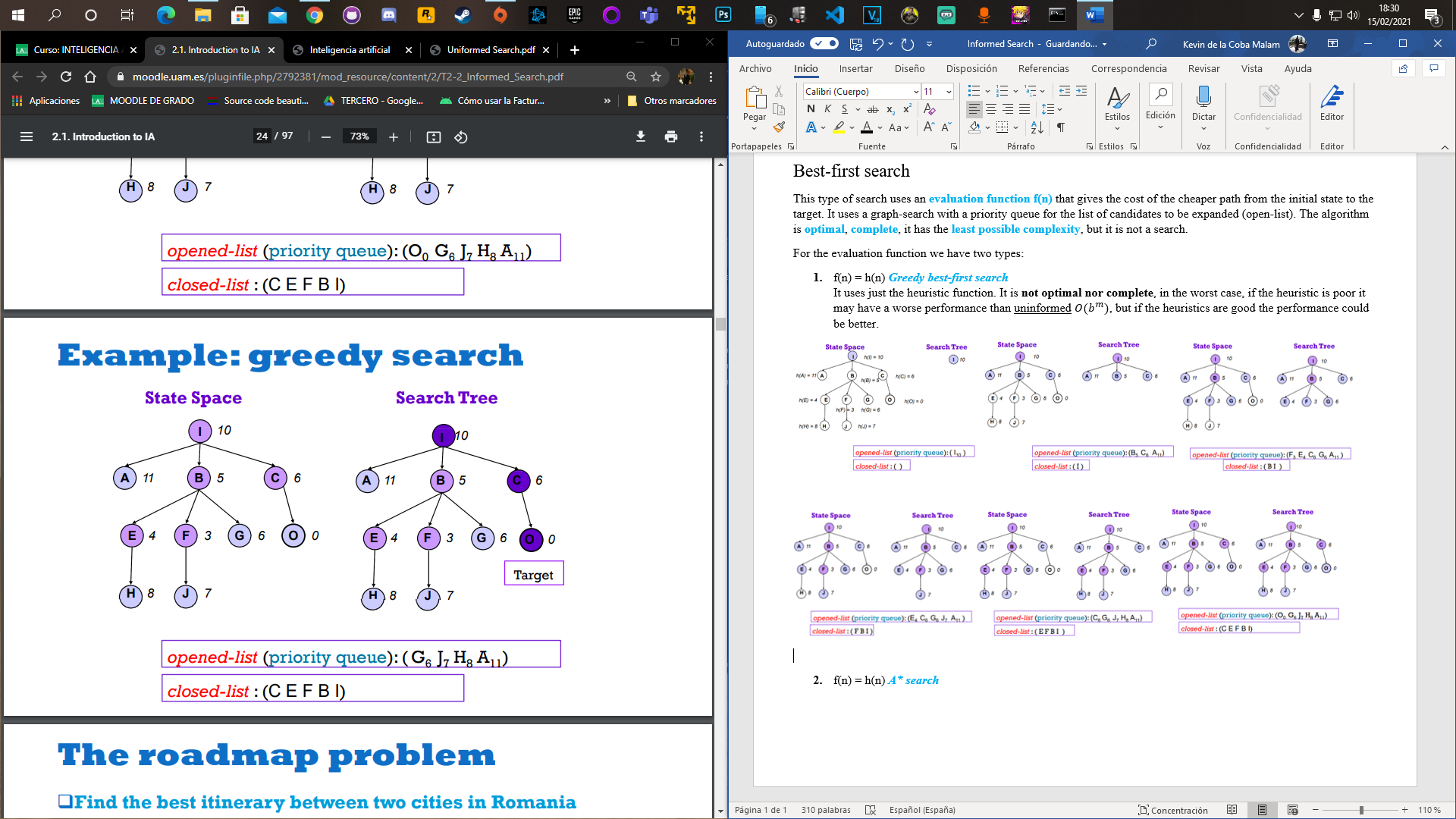
For the evaluation function we have two types:

1. f(n) = h(n) ***Greedy best-first search***

It uses just the heuristic function. It is **not optimal nor complete**, in the worst case, if the heuristic is poor it may have a worse performance than uninformed , but if the heuristics are good the performance could be better.



1. f(n) = g(n) + h(n) ***A\* search***

g(n) is the real cost of the path to n, and h(n) is the heuristic function. Here breadth-first and depth-first **are combined.**