


Algorithmics	Student information	Date	Number of session
	UO:283928	04/20/2022	6
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## Activity 1. Measurements.

n	time_bt	time_bt_balancing	
2	5	21	
3	18	39	
4	50	107	
5	149	232	
6	439	561	
7	1399	1393	
8	3935	3400	
9	11869	8070	
10	35668	19661	
11	106829	48571	
12	380888	117846	
13	13332951	227707	

## Activity 2. Questions.

### a) Algorithm that provides better results.

It will depend on what are we looking for.

If we want the clearest result, backtracking without balancing condition will be the best as it will pick the best result among every possible one. Of course, it is unfeasible for any realistic situation, so a balancing condition is required.

However, if we just want a quick result with a general good value, repeating greedy option few times and keeping the best option will do the trick.

### b) Algorithm to be used in a realistic dataset of a million of images.

Either greedy for a fast result or backtracking with balancing condition in case we want a precise one.

### c) Theoretical complexity for backtracking and validate it with real values.

The theoretical complexity is  $O(3^n)$ .

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**d) Advantage of including the balancing condition in terms of time for backtracking, does it affect the quality of the results?**

Of course results are affected as values are trunked, but still good values are obtained. That means that if the heuristic is good enough, no difference will be noticed. However in terms of speed will be much faster.