Algorithmics	Student information	Date	Number of session
	UO: 283428		6
	Surname: Triana Fernández		
	Name: Carlos		

Escuela de Ingeniería Informática
Universidad de Oviedo

Universidad de Oviedo
Universidá d'Uviéu
University of Oviedo

Activity 1. Heuristics

The two heuristics developed for this algorithm are based on the zncc of the two halves of the photo. The differences between both, are the prune method included in the more refined version. Taking into account that the develop of the zncc of a solution is always increasing over the steps of creating the photo, we can discard, in an early stage, a large amount of nodes that doesn't meet this criteria.

Activity 2. Measurements taken

n	Time_ BT_balancing	Time_ BnB	Nodes_ BT_balancing	Nodes_ BnB	ZNCC_ BT_balancing	ZNCC_ BnB
2	2	23	0	6	0	0,003239
3	23	25	16	9	0,28835	0,028348
4	36	27	40	12	0,022161	0,018827
5	92	43	98	15	0,030514	0,0434
6	385	42	516	18	0,051728	0,045605
7	979	74	1412	33	0,057557	0,02204
8	2671	69	3860	27	0,062459	0,043453
9	11099	62	15418	27	0,06747	0,066053
10	30608	80	43976	30	0,07797	0,075349
11	87744	121	125354	45	0,088232	0,06451
12	307172	90	446288	36	0,090211	0,083927
13	878456	123	1298386	42	0,091749	0,083718
14		119		42		0,09276

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Activity 3. Discussion

a) Compare results, number of nodes, and times for Backtracking (implemented in the previous session) and BnB implementations.

With the measurements taken, we can see how the number of nodes in the backtracking with balancing increases hugely while the nodes of the branch and bounds increases in a very low rate.

The rate of the increase of nodes is also related to the development of the times. We can see how in the BnB version of the algorithm, when the number of nodes required raises, the time follows; and when the number of nodes is lower than expected, the time is too.

The difference on times between BnB and backtracking is explained by the amount of nodes that each algorithm generate.

b) Discuss about the efficiency of both techniques (Backtracking and Brand 'n' Bound) based on the results obtained. Which implementations takes longer times? Which implementation generates more nodes?

The most efficient algorithm, as we have discussed on the previous question, is the BnB one. It doesn't generate as much nodes as the Backtracking algorithm keeping the execution times low. The results of the BnB algorithm are behind the ones obtained with backtracking, but this difference is not enough to consider it as a better algorithm due to its high times.