Activity 1. Branch and Bound

The heuristic used for branch and bound is calculating the number of '?' left, so when there are less '?', that means that. we are near to the solution as the numbers are valid, for the moment, and more numbers are filled.

Test case	Time for first solution (backtracking)	Number of developed nodes (backtracking)	Time for first solution (branch and bound)	Number of developed nodes (branch and bound)
Test00	LoR (0.051 ms)	12	LoR (1 ms)	30
Test01	LoR (0.102 ms)	46	LoR (31 ms)	2330
Test02	LoR (0.106 ms)	32	LoR (16 ms)	1580
Test03	LoR (0.524 ms)	36	178 ms	59100
Test04	101 ms	35	1235 ms	786400
Test05	LoR (0.33 ms)	53	116 ms	23450
Test06	LoR (0.285 ms)	39	94 ms	18550
Test07	204 ms	60	13276 ms	8005110

Backtracking works in a better way, as it develops less nodes as in backtracking, I don't copy the board, I work directly on it, and backtracking is a depth first search, and in back tracking we develop each all the children, and then pick the one with best heuristic.