Cairo University
Faculty of Engineering
Bachelor Programs
Credit Hours System
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[CMPN402] - Machine Intelligence

Final Report

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1. Experience Gained

At first, we studied the four required algorithms theoretically. It was easy to state how each algorithm work, but it was a little bit difficult to imagine it on a real application.

After we'd implemented each of these algorithms (*Iterative Depth Deepening – A* – Simulated Annealing – Constraint Satisfaction*) it became somewhat easier to see the meaning of what we had studied during the first part of this course. We've seen which algorithm will assure to find all possible paths with the best solution, which is the most exhaustive algorithm and which algorithm will find a different solution each time we run the application…etc.

2. Implementation Issues

There was a time during implementation when we got completely stuck for a while, as we were trying to implement the "*Simulated Annealing*". The reason to that would perhaps be that we were not subjected to enough examples through the course. We only studied the algorithm theoretically. However, we searched more about the algorithm and understood how it works in detail, took a look at few examples, and we continued with the coding. It took us some time, but in the end, we managed to do it.

3. Testing Results (Of a One–Time run)

Algorithm name	Maximum number of nodes stored at any one time during the execution	Number of diamonds collected	Collected all diamonds or not	Time Elapsed
A*	8	4	True	00:00.000049
IDDFS	49	4	True	00:00.000058
CSP	45	4	True	00:00.000067
SA	18	4	True	00:00.000077
Human	15	4	True	00:04.851471

The following charts are just to display the ratio between the results in a better illustration:

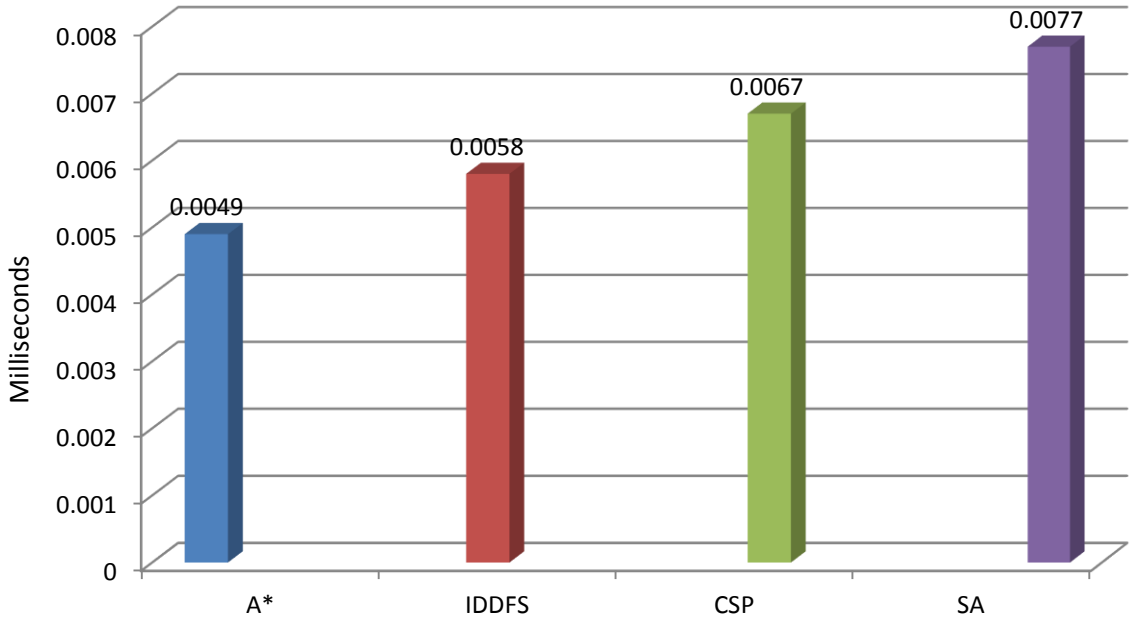

Figure 1 – Comparison between algorithms

In order to make sure that the resulted values are independent on the computer performance, we tried to run the algorithms multiple random times. The resulted numbers were within the range of the first run, so we accepted that. The following are screen shots of the score board after multiple runs:

Figure 2 – Algorithms result

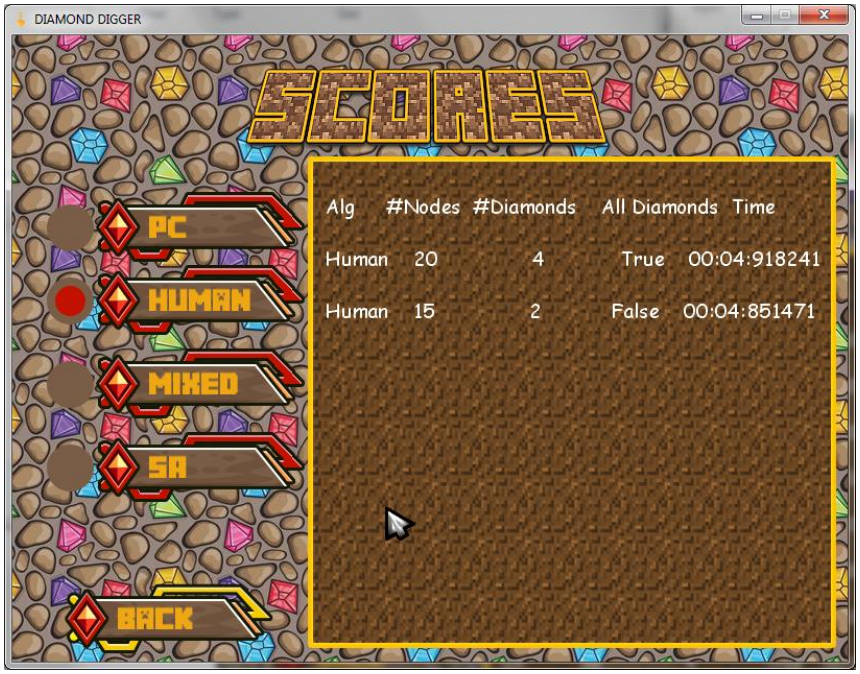

Figure 3 – Human results

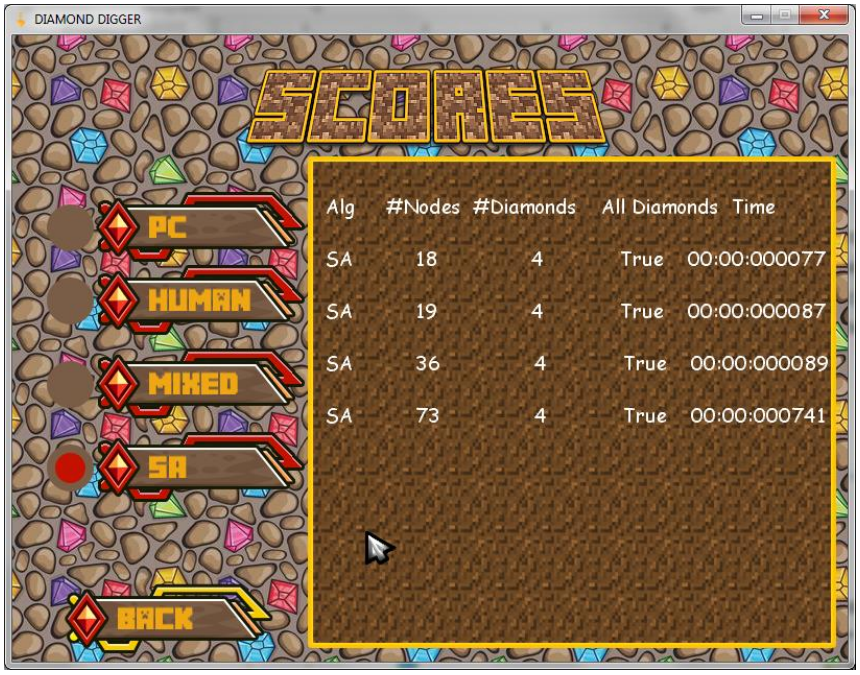

Figure 4 – SA algorithm result