**Logic and Planning**

**Uninformed Search Tests**

The Following are the results of tests using uninformed search.

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| **Problem 1** | **Expansions** | **Goal Tests** | **New Nodes** | **Plan Lenght** | **Time Elapsed** |
| Breath First Search | 43 | 56 | 180 | 6 | 0.0743535709916614 |
| Depth First Graph Search | 12 | 13 | 48 | 12 | 0.01335207000374794 |
| A\* Search H1 | 55 | 57 | 224 | 6 | 0.07291120200534351 |
| Uniform Cost Search | 55 | 5 | 224 | 6 | 0.10046831099316478 |

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| **Problem 2** | **Expansions** | **Goal Tests** | **New Nodes** | **Plan Lenght** | **Time Elapsed** |
| Breath First Search | 3343 | 4609 | 30509 | 9 | 20.04158652901242 |
| Depth First Graph Search | 476 | 477 | 4253 | 466 | 3.575219680002192 |
| A\* Search H1 | 4853 | 4855 | 44041 | 9 | 77.61358179600211 |
| Uniform Cost Search | 4853 | 4855 | 44041 | 9 | 77.85962436001864 |

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| **Problem 3** | **Expansions** | **Goal Tests** | **New Nodes** | **Plan Lenght** | **Time Elapsed** |
| Breath First Search | 14663 | 18098 | 129631 | 12 | 198.60475270700408 |
| Depth First Graph Search | 1511 | 1512 | 12611 | 1442 | 22.499199126003077 |
| A\* Search H1 | 18223 | 18225 | 159618 | 12 | 713.9446880209871 |
| Uniform Cost Search | 18223 | 18225 | 159618 | 12 | 698.5272629769752 |

**Analysis:**

All algorithms seem to perform well with **Problem 1**. **Problem 2** and **Problem 3** running times are definitely higher. One of the things were mentioned in the video lectures about search was that for some route finding problems DFS could be innefective because we could end up traveling all accross the country just to find the best route from two nearby cities. We can see something similar if we check the plan length for DFS. It is larger than others and can’t be took as an optimal plan. In therms of Plan lenght we can say that all other algorithms tested offer optimal plans.

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| **Problem 1** | **Expansions** | **Goal Tests** | **New Nodes** | **Plan Lenght** | **Time Elapsed** |
| A\* Search H1 | 55 | 57 | 224 | 6 | 0.08008713100571185 |
| A\* Search Ignore Preconditions | 41 | 43 | 170 | 6 | 0.1278501100023277 |
| A\* Planning Graph Level Sum | 8 | 10 | 35 | 6 | 1.875899639009731 |

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| **Problem 2** | **Expansions** | **Goal Tests** | **New Nodes** | **Plan Lenght** | **Time Elapsed** |
| A\* Search H1 | 4853 | 4855 | 44041 | 9 | 87.88655748098972 |
| A\* Search Ignore Preconditions | 1506 | 1508 | 13280 | 9 | 29.742081367992796 |
| A\* Planning Graph Level Sum | 17 | 19 | 162 | 9 | 45.7323810380185 |

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| **Problem 3** | **Expansions** | **Goal Tests** | **New Nodes** | **Plan Lenght** | **Time Elapsed** |
| A\* Search H1 | 18223 | 18225 | 159618 | 12 | 675.9131166319712 |
| A\* Search Ignore Preconditions | 5118 | 5120 | 45650 | 12 | 183.82016788300825 |
| A\* Planning Graph Level Sum | 18 | 20 | 169 | 14 | 78.21723176701926 |