| Romanian Path Finding           |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|---------------------------------|---|------------|----------------|-------------|--------------------|-------------------|----------------------|-----------------|-------|--|--|-------|---|
| HEURISTIC VALUES                |   | Algorithms | A*             | IDA*        | Best First         |                   |                      |                 |       |  |  |       |   |
|                                 | Heuristic Iterative Vals for                        |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
| Table 1                         | Straight line                                       | -          | -              | -           | -                  |                   |                      |                 |       |  |  |       |   |
|                                 | 1st Iteration                                       | -          | None           |             | None               |                   |                      |                 |       |  |  |       |   |
|                                 | 2nd Iteration                                       | -          | 25             | 366         |                    | 3                 |                      |                 |       |  |  |       |   |
|                                 | 3rd Iteration                                       |            | 19             |             | 3 176              | 3                 |                      |                 |       |  |  |       |   |
|                                 | 4th Iteration                                       |            | 10             |             | 3                  | 1                 |                      |                 |       |  |  |       |   |
|                                 | 5th Iteration                                       |            | 10             | 0 100       | n i                |                   |                      |                 |       |  |  |       |   |
|                                 | 6th Iteration                                       |            |                | 0 100       | )<br>)             |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             | U .                |                   |                      |                 |       |  |  |       |   |
|                                 | Heuristic Iterative Vals for                        |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 | Crows Jump Heuristic                                | -          | -              | -           | -                  |                   |                      |                 |       |  |  |       |   |
|                                 | 1st Iteration                                       |            | None           |             | None               |                   |                      |                 |       |  |  |       |   |
|                                 | 2nd Iteration                                       |            | 17             |             | 3 176              | 6                 |                      |                 |       |  |  |       |   |
|                                 | 3rd Iteration                                       |            | 10             | 00 176      | 6 (                | 0                 |                      |                 |       |  |  |       |   |
|                                 | 4th Iteration                                       |            |                | 0 100       |                    | 1                 |                      |                 |       |  |  |       |   |
|                                 | 5th Iteration                                       |            |                | 0 (         |                    | 2                 |                      |                 |       |  |  |       |   |
|                                 |   |            |                | U           | J                  |                   |                      |                 |       |  |  |       |   |
|                                 | 6th Iteration                                       |            |                |             | UI                 |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      | Iterative       |       |  |  |       |   |
| Table 2                         |   | Algorithm  | Breadth First  | Depth First | Uniform Cost       | Best First Search | A*                   | Deepening       | IDA*  |  |  |       |   |
| Heuristic of Straight line      | Max Fringe Length                                   | -          | 4              | 11 30       |                    |                   | 7 1                  | 1 7             | 1     |  |  |       |   |
| -                               | Number of Nodes Generated                           |            | 6              | 6           | 1 129              | 9 9               | 1                    | 5 32            | 62    |  |  |       |   |
|                                 | Max Fringe Length                                   | -          | 4              |             |                    |                   | 7 1:                 |                 |       |  |  |       |   |
|                                 | Number of Nodes Generated                           |            |                | 33 6:       |                    |                   | 1                    |                 | 50    |  |  |       |   |
|                                 | rumber of Nodes Generated                           |            |                |             | 123                | 5                 | 1                    | 32              | . 5   |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
| 8 - Puzzle Stats                |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
| Table 3                         |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
| HEURISTIC VALUES                |   | Algorithms | A*             | IDA*        | Best First         | 1                 |                      |                 |       |  |  |       |   |
| TIEGRISTIC VALUES               | Heuristic Iterative Vals for                        | Aigoritima | ^              | IDA         | Destriist          |                   |                      |                 |       |  |  |       |   |
|                                 | Manhatten Distance                                  |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 | 1st Iteration                                       | -          | None           |             | B Infinity         |                   |                      |                 |       |  |  |       |   |
|                                 |   | -          | None .         |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 | 2nd Iteration                                       | -          | 1              | 10 10       | 0                  |                   |                      |                 |       |  |  |       |   |
|                                 | 3rd Iteration                                       | -          |                | 8           | 8                  |                   |                      |                 |       |  |  |       |   |
|                                 | 4th Iteration                                       | -          |                | 8 8         | В                  |                   |                      |                 |       |  |  |       |   |
|                                 | 5th Iteration                                       |            |                | 6 6         | 6                  |                   |                      |                 |       |  |  |       |   |
|                                 | 6th Iteration                                       |            |                |             | 4                  |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  | <br>_ |   |
|                                 | 7th Iteration                                       | -          |                |             | 4                  |                   |                      |                 |       |  |  |       |   |
|                                 | 8th Iteration                                       | -          |                |             | 4                  |                   |                      |                 |       |  |  |       |   |
|                                 | 9th Iteration                                       | -          |                |             | 2 -                |                   |                      |                 |       |  |  |       |   |
|                                 | 10th Iteration<br>Heuristic Iterative Vals for Tile | -          |                | 0           | None None          |                   |                      |                 |       |  |  |       |   |
|                                 | Heuristic Iterative Vals for Tile                   | S          |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 | Out of Place  | _          | _              | _           | -                  |                   |                      |                 |       |  |  |       |   |
|                                 | 1st Iteration                                       | -          | None           |             | 6 Infinity         |                   |                      |                 |       |  |  |       |   |
|                                 | 2nd Iteration                                       |            |                | 6           | 8                  |                   |                      |                 |       |  |  |       |   |
|                                 | 2rd Horotion  |            |                | 6           |                    |                   |                      |                 |       |  |  |       |   |
|                                 | 3rd Iteration<br>4th Iteration                      | -          |                | 6           | 0                  |                   |                      |                 |       |  |  |       |   |
|                                 | 4th Iteration                                       | -          |                | 6           | 6                  |                   |                      |                 |       |  |  |       |   |
|                                 | 5th Iteration                                       | -          |                | 5           | 5                  |                   |                      |                 |       |  |  |       |   |
|                                 | 6th Iteration                                       | -          |                | 3           | 3                  |                   |                      |                 |       |  |  |       |   |
|                                 | 7th Iteration                                       | -          |                | 4           | 4                  |                   |                      |                 |       |  |  |       |   |
|                                 | 8th Iteration                                       | -          |                | 3           | 3                  |                   |                      |                 |       |  |  |       |   |
|                                 | 9th Iteration                                       |            |                | 2           | 2 -                |                   |                      |                 |       |  |  |       |   |
|                                 | 10th Iteration                                      |            |                | 0           | n                  |                   |                      |                 |       |  |  |       |   |
|                                 | Heuristic Iterative Vals for                        |            |                | _           |                    |                   |                      |                 |       |  |  |       |   |
|                                 | Column-Row  |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 |   |            | None           |             | 7 Infinity         |                   |                      | _               |       |  |  |       | _ |
|                                 | 1st Iteration                                       |            | None           |             | 7 Infinity         |                   |                      |                 |       |  |  |       | - |
|                                 | 2nd Iteration                                       |            |                | 9 9         | 9                  |                   |                      |                 |       |  |  | <br>  |   |
|                                 | 3rd Iteration                                       | -          |                | 7           | 7                  |                   |                      |                 |       |  |  |       |   |
|                                 | 4th Iteration                                       | -          |                | 8 8         | В                  |                   |                      |                 |       |  |  |       |   |
|                                 | 5th Iteration                                       | -          |                | 6 6         | 6                  |                   |                      |                 |       |  |  |       |   |
|                                 | 6th Iteration                                       |            |                | 4           | 4                  |                   |                      |                 |       |  |  |       |   |
|                                 | 7th Iteration                                       |            |                | 4           |                    |                   |                      |                 |       |  |  |       |   |
|                                 | 8th Iteration                                       |            |                |             | 4                  |                   |                      | +               |       |  |  |       | + |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 | 9th Iteration                                       | -          |                | 2 2         | 2                  |                   |                      | -               | -     |  |  |       | - |
|                                 | 10th Iteration                                      | -          |                | 0  (        | 0                  |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
|                                 |   | +          | 1              |             |                    | -                 |                      | Iterative       |       |  |  |       |   |
| Table 2                         |   | Algorithm  | Breadth First  | Depth First | Uniform Cost       | Best First Search | Δ*                   | Deepening       | IDA*  |  |  |       |   |
| I GUIC C                        |   | Algorithin | Diedutii FIISt | Depui FIISt |                    | Dest Lingt Seatch |                      |                 | IUA   |  |  | <br>  |   |
| Heuristic of Manhatten          | Max Fringe Length                                   | -          | 2154<br>3353   | 13 70       |                    | 306               | 3 4:                 |                 |       |  |  |       |   |
|                                 | Number of Nodes Generated                           | -          | 3353           | 31 105      | 5 23993            | 3 443             | 6                    | 1 18485         |       |  |  |       |   |
| Heuristic of Tiles out of Place | Max Fringe Length                                   | -          | 2154           | 13 70       |                    | 316               | 3 23<br>5 34<br>1 14 | 7 20            | 1:    |  |  |       |   |
|                                 | Number of Nodes Generated                           | -          | 3353           | 31 105      | 5 23993            | 3 465             | 34                   | 5 18485         | 35    |  |  |       |   |
|                                 |   |            |                |             |                    |                   |                      |                 |       |  |  |       |   |
| Heuristic of Tiles out of Place | Max Fringe Length                                   | -          | 2154           | 13 70       | 6 15528            | 381               | 14                   | 7 20            | 1:    |  |  |       |   |
| Heuristic of Tiles out of Place | Max Fringe Length<br>Number of Nodes Generated      | -          | 2154<br>3353   | 13 70       | 6 15528<br>5 23993 | 3 381<br>3 545    | 1 14                 | 7 20<br>4 18485 | 1 228 |  |  |       |   |