2.2 A*

Output1:

<No.8
BreadFirst
Diff:6
Manhattan
0.08121827>

<No.7
BreadFirst
Diff:6
Hamming
0.08121827>

<No.6
BreadFirst
Diff:8
Hamming
0.01923077>

<No.5
BreadFirst
Diff:8
Manhattan
0.01923077>

<No.4
AStar
Diff:6
Manhattan
0.08121827>

<No.3
AStar
Diff:6
Hamming
0.033264033>

<No.2
AStar
Diff:8
Manhattan

0.01923077>

<No.1
AStar
Diff:8
Hamming
0.005328597>

```java
        // No.4
        // AStar
        // Diff:6
        // Manhattan
        EpuzzGen gen4 = new EpuzzGen( var1: 12345);
        int[][] puzzle4 = gen4.puzzGen( var1: 6);
        SearchState initState4 = (SearchState) new PuzzleState(puzzle4, lc: 1, distance: "manhattan");

        Float resas4 = searcher.runSearchE(initState4,  strat: "AStar");
        writer.println(resas4);
```

RunPuzzleSearch › main()

RunPuzzleSearch

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_241.jdk/Contents/Home/bin/java ...
0.08121827

Process finished with exit code 0
```

```java
        // No.3
        // AStar
        // Diff:6
        // Hamming
        EpuzzGen gen3 = new EpuzzGen( var1: 12345);
        int[][] puzzle3 = gen3.puzzGen( var1: 6);
        SearchState initState3 = (SearchState) new PuzzleState(puzzle3, lc: 1, distance: "hamming");

        Float resas3 = searcher.runSearchE(initState3,  strat: "AStar");
        writer.println(resas3);
```

RunPuzzleSearch › main()

RunPuzzleSearch

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_241.jdk/Contents/Home/bin/java ...
0.033264033
```

```java
        // No.2
        // AStar
        // Diff:8
        // Manhattan
        EpuzzGen gen2 = new EpuzzGen( var1: 12345);
        int[][] puzzle2 = gen2.puzzGen( var1: 8);
        SearchState initState2 = (SearchState) new PuzzleState(puzzle2, lc: 1, distance: "manhattan");

        Float resas2 = searcher.runSearchE(initState2,  strat: "AStar");
        writer.println(resas2);
```

RunPuzzleSearch › main()

RunPuzzleSearch

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_241.jdk/Contents/Home/bin/java ...
0.01923077
```

```java
        // No.1
        // AStar
        // Diff:8
        // Hamming
        EpuzzGen gen1 = new EpuzzGen( var1: 12345);
        int[][] puzzle1 = gen1.puzzGen( var1: 8);
        SearchState initState1 = (SearchState) new PuzzleState(puzzle1, lc: 1, distance: "hamming");

        Float resas1 = searcher.runSearchE(initState1,  strat: "AStar");
        writer.println(resas1);
```

RunPuzzleSearch › main()

RunPuzzleSearch

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_241.jdk/Contents/Home/bin/java ...
0.005328597

Process finished with exit code 0
```

```java
        // No.8
        // BreadthFirst
        // Diff:6
        // Manhattan
        EpuzzGen gen8 = new EpuzzGen( var1: 12345);
        int[][] puzzle8 = gen8.puzzGen( var1: 6);
        SearchState initState8 = (SearchState) new PuzzleState(puzzle8, lc: 1, distance: "manhattan");

        Float resas8 = searcher.runSearchE(initState8, strat: "breadthFirst");
        writer.println(resas8);
```

RunPuzzleSearch › main()

RunPuzzleSearch

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_241.jdk/Contents/Home/bin/java ...
0.0027505588

Process finished with exit code 0
```

```java
        // No.7
        // BreadFirst
        // Diff:6
        // Hamming
        EpuzzGen gen7 = new EpuzzGen( var1: 12345);
        int[][] puzzle7 = gen7.puzzGen( var1: 6);
        SearchState initState7 = (SearchState) new PuzzleState(puzzle7, lc: 1, distance: "hamming");

        Float resas7 = searcher.runSearchE(initState7, strat: "breadFirst");
        writer.println(resas7);
```

RunPuzzleSearch › main()

RunPuzzleSearch

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_241.jdk/Contents/Home/bin/java ...
0.033264033

Process finished with exit code 0
```

```java
        // No.5
        // BreadFirst
        // Diff:8
        // Manhattan
        EpuzzGen gen5 = new EpuzzGen( var1: 12345);
        int[][] puzzle5 = gen5.puzzGen( var1: 8);
        SearchState initState5 = (SearchState) new PuzzleState(puzzle5, lc: 1, distance: "manhattan");

        Float resas5 = searcher.runSearchE(initState5, strat: "breadFirst");
        writer.println(resas5);
```

RunPuzzleSearch › main()

RunPuzzleSearch

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_241.jdk/Contents/Home/bin/java ...
0.01923077

Process finished with exit code 0
```

```java
        // No.6
        // BreadFirst
        // Diff:8
        // Hamming
        EpuzzGen gen6 = new EpuzzGen( var1: 12345);
        int[][] puzzle6 = gen6.puzzGen( var1: 8);
        SearchState initState6 = (SearchState) new PuzzleState(puzzle6, lc: 1, distance: "hamming");

        Float resas6 = searcher.runSearchE(initState6, strat: "breadFirst");
        writer.println(resas6);
```

RunPuzzleSearch › main()

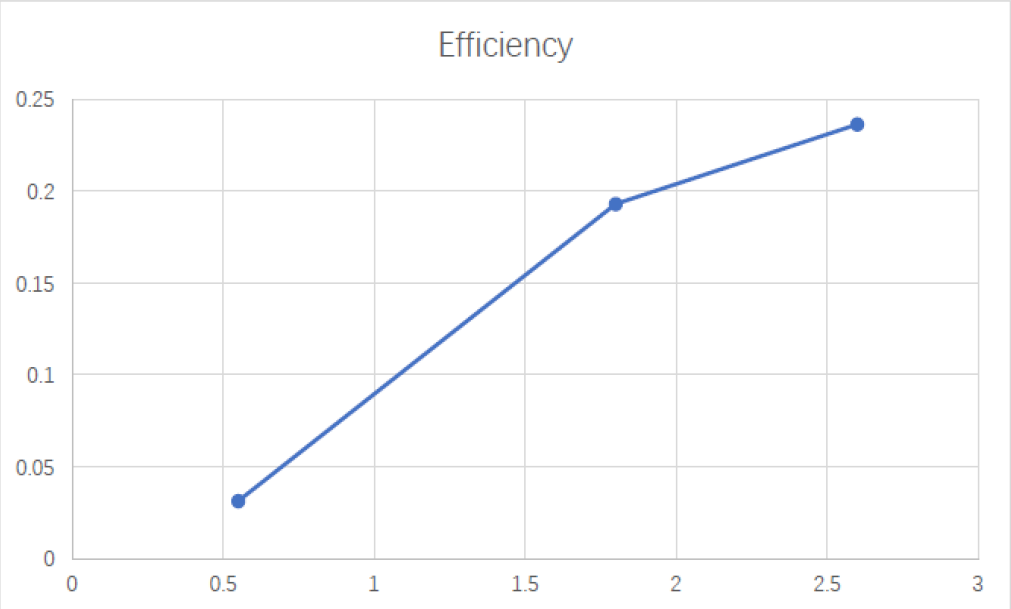
RunPuzzleSearch

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_241.jdk/Contents/Home/bin/java ...
0.005328597

Process finished with exit code 0
```

Results for full experiment

	A*Hamming	A*Manhattan	BreadthFirst-Hamming
Average Efficiency	0.1929631	0.2363194	0.031298533



Output2:

breadthFirst:
code: 20
difficulty: 6
average efficiency: 0.031298533
A*(Manhattan):
code: 20
difficulty: 6
average efficiency: 0.2363194