W6_Coding_Assignment 2

Submit Assignment

Due Friday by 11:59pm **Points** 40 **Submitting** a file upload **Available** Jun 19 at 12am - Jun 28 at 11:59pm 10 days

ANA* Implementation

You are tasked with the implementation of ANA*, as per

```
ANA*()
15: G ← ∞; E ← ∞; OPEN ← ∅; ∀s : g(s) ← ∞; g(s_start) ← 0
16: Insert s_start into OPEN with key e(s_start)
17: while OPEN ≠ ∅ do
18:     ImproveSolution()
19:     Report current E-suboptimal solution
20:     Update keys e(s) in OPEN and prune if g(s) + h(s) ≥ G
```

```
ImproveSolution()
 1: while OPEN ≠ ∅ do
 2:     s ← arg max_{s∈OPEN} {e(s)}
 3:     OPEN ← OPEN \ {s}
 4:     if e(s) < E then
 5:         E ← e(s)
 6:     if IsGoal(s) then
 7:         G ← g(s)
 8:         return
 9:     for each successor s' of s do
10:         if g(s) + c(s, s') < g(s') then
11:             g(s') ← g(s) + c(s, s')
12:             pred(s') ← s
13:             if g(s') + h(s') < G then
14:                 Insert or update s' in OPEN with key e(s')
```

You have been given a **base_code** and some example mazes (**trivial.gif**, **medium.gif**, **hard.gif**, **very_hard.gif**) to solve with your implemented search algorithm. It is expected and required for you to provide some of your own searchable grid maps, in addition to those provided.

You are to provide a brief analysis of the performance of each solution, containing, at a minimum, the solution cost vs time.

Note:

- You can run the starting code with $ *python main.py trivial.gif*
- It is not necessarily plausible to solve all of the provided mazes with ANA*
- Your report quality will likely improve if you compare a more basic algorithm's performance against ANA*

Submission: code & report in .zip file