

# CS 312: Artificial Intelligence Laboratory

## Task 5: A\* Algorithm

Using the domain selected in task 2, implement the A\* algorithm.

- 1) Consider three heuristic functions  $h_1(x)$ ,  $h_2(x)$  and  $h_3(x)$ .
- 2)  $h_1(x)$  should overestimate the cost to the goal node.
- 3)  $h_2(x)$  should underestimate the cost to the goal node.
- 4)  $h_3(x)$  should satisfy the monotone property.
- 5) Compare and analyze the paths found by  $h_1(x)$ ,  $h_2(x)$  and  $h_3(x)$ .

**Domains:** [AI LAB Domain](#)

**Note:** If any group wants to change their domain, they need to mail the TAs the details of the new domain for approval. Two groups cannot pick the same domain.

### Evaluation Criteria:

Heuristic Functions: 5

Correctness: 15

Report: 10

Code Quality: 5

Viva: 5

**Deadline:** 11:59 PM 2 March 2020

**Late Submission Policy:** 5% of marks will be deducted per day late.

### For Reference :

A\* algorithm: <https://www.youtube.com/watch?v=yMcZvZayJUA>

### Report Format :

1. Brief description of the domain:
  - a. State-space
  - b. Start node and the goal node
  - c. MOVEGEN and GOALTEST algorithm
2. Heuristic functions considered
3. A\* algorithm analysis and observation