

AI Lab - Informed Search Strategies

Alessandro Farinelli

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University of Verona
Department of Computer Science

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Start Your Working Environment

To open the assignment navigate with your browser to: `inf-search/inf_search_2_problem.ipynb`

Uniform-Cost Search Example

At the beginning of *inf-search/inf_search_2_problem.ipynb* you can find an implementation of the Uniform-Cost Search (UCS), using the graph search strategy. The pseudocode is in the next slide.

Uniform-Cost Search (UCS): graph search version

Require: *problem*

Ensure: *solution*

```
1: node  $\leftarrow$  a node with STATE = problem.INITIAL-STATE, PATH-COST = 0
2: frontier  $\leftarrow$  PRIORITY-QUEUE ordered by PATH-COST, with node as the only element
3: explored  $\leftarrow \emptyset$ 
4: loop
5:   if IS-EMPTY(frontier) then return FAILURE
6:   node  $\leftarrow$  REMOVE(frontier)
7:   if problem.GOAL-TEST(node.STATE) then return SOLUTION(node)
8:   explored  $\leftarrow$  explored  $\cup$  node.STATE
9:   for each action in problem.ACTIONS(node.STATE) do
10:    child  $\leftarrow$  CHILD-NODE(problem, node, action)
11:    if child.STATE not in explored and not in frontier then
12:      frontier  $\leftarrow$  INSERT(child, frontier)
13:    else
14:      if child.STATE is in frontier with higher path - cost then
15:        replace that frontier node with child
```

▷ Remove node with highest priority

▷ Increase path cost over parent

- Your assignments for this lesson are at: *inf-search/inf_search_2_problem.ipynb*.
You will be required to implement some informed search algorithms (Greedy Best First and A*)
- The pseudocodes are variations of the Uniform-Cost Search (UCS) where the *priority queue* is ordered by h and $f = g + h$ respectively

Update the repository

This should not be necessary but if you notice any inconsistency between the code presented by the teacher and the one you have on your local repository, you may need to update the local repository.

Important: do a backup copy of your working directory to make sure you avoid any issue

```
> cd AI_Lab
> git commit -a -m "a message describing the commit"
> git pull
> conda activate ai-lab
> jupyter notebook
```