

##### Pacman Instructions #####

*Assignment:*

Implement

1. Breadth-first search in the class **BFSAgent**,
2. Depth-first search in the class **DFSAgent**,
3. A\* search in the class **AStarAgent**,

within the in **pacmanAgents.py** file, using **scoreEvaluation** as a heuristic.

*Notes:*

- Python 2.7 is required to run the Framework.
- All your code must be inside the **pacmanAgents.py** file.
- Only submit **pacmanAgents.py** file. If you submit anything else you will fail the assignment.
- Only use the heuristic function in the **heuristics.py** file (do not implement your own heuristic).
- **RandomAgent** and **GreedyAgent** are implemented example agents.
- External libraries are not allowed (as you won't submit them)
- You will fail the assignment if you try to change any of the system params
- You are only allowed to use these system functions (accessing/ changing any other functions or variables is considered cheating):
  - **state.getLegalPacmanActions()**: return all the legal actions in this state
  - **state.generatePacmanSuccessor(action)**: return the next state if pacman take a certain action (return a new copy, doesn't modify the current state)

- **scoreEvaluation(state)**: evaluate the current state
- **state.isWin()**: check if this state is win state
- **state.isLose()**: check if this state is lose state
- The forward model (**generatePacmanSuccessor**) is limited to a certain amount of calls, don't waste them. If you exceed the limit, **None** will be returned.
- If you did not reach a terminal state, return the action leading to the node with the best score and no children based on the heuristic function (scoreEvaluation). Do not return the action leading to the best overall node in the tree, as it could be followed by far worse nodes.
- You can't change name of the agent classes.
- For array sorting, you can use python internal sorting function. example: **array.sort(key=lambda x: scoreEvaluation(x))**

*How to run:*

- To play pacman: `python pacman.py`
- To run a certain agent using graphics use the following command:  
`python pacman.py -p AgentName`