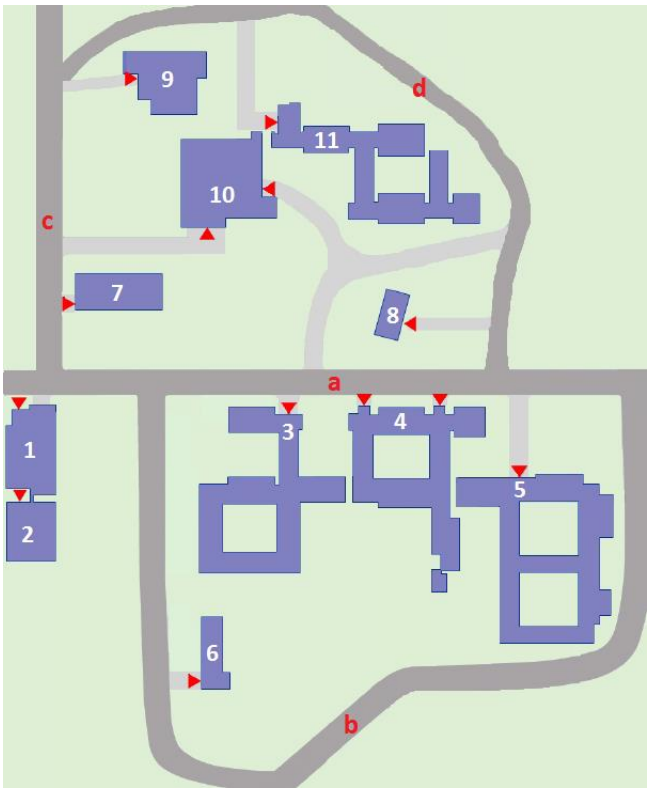
BLG435E, Artificial Intelligence, Fall 2014-2015
Assignment #1

Due: Oct 10, 2014

Submission Type: An archive file including the softcopy report and the source codes to be submitted using ninova.

Consider an autonomous agent that carries packages from a starting point to a given destination in ITU Ayazaga Campus whose map is given on the right. In this question, you are required to model this problem as a search problem and implement the search algorithms to find the most suitable route for the given start and end points.



a) **(10 pts)** Model the given map in a suitable representation as a search problem. You can make estimations for the distances.

b) **(20 pts)** Run tree search versions of BFS and DFS to find a route from **2** to **11** and compare the results. Report your findings.

c) **(20 pts)** Devise two heuristic functions to use with the graph search version of the A* algorithm and show that they are both admissible and consistent.

d) **(20 pts)** Run the graph search version of A* to find a route from **2** to **11** by using the two heuristics you determined in (**c)** separately, analyze and compare the results. Report your findings.

e) **(15 pts)** Discuss what you should do either in representation or in the search algorithms so that the user can give certain places to be visited on the route. For example, finding a route from **2** to **11** by visiting **8**.

f) **(15 pts)** Discuss what you should do either in representation or in the search algorithms so that the user can give certain paths to be passed on the route. For example, finding a route from **2** to **11** by passing from the road **b**.

For this homework, you can use existing BFS, DFS or A* algorithm implementations such as the ones provided for "Artificial Intelligence: A Modern Approach" book: http://aima.cs.berkeley.edu/code.html