EECS 293
Software Craftsmanship
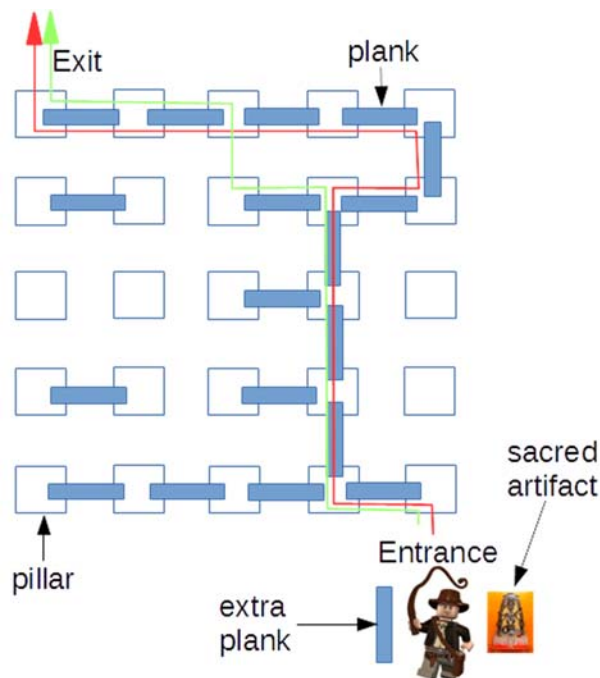2014 Fall Semester

Programming Assignment 6

Due at your recitation session on October 6-10, 2014

Reading

Read Sections 9.2 and 9.3 in the textbook.

Programming

Dr. Jones has just recovered the sacred artifact from the Temple of Doom but the high priests are in hot pursuits. He now faces a maze that looks like the diagram.

The maze consists of a square grid of pillars standing in a pit. The bottom of the pit is crawling with deadly snakes and falling would be fatal. There is no way of jumping across pillars, but some of the gaps are bridged with planks

that make it (reasonably) safe to cross from one pillar to another. Dr. Jones carries one more plank that can also be used to bridge the gaps between two of the pillars. He only has time to use it at most once: he would have no time to pick it up and re-use it somewhere else. As the high priests are close behind, Dr. Jones needs to cross the maze as quickly as possible.

In the diagram, Dr. Jones could follow the red route (of length 10), but if he uses his plank once on the green gap, he would reach the exit in only 8 crossings.

Write pseudo-code for an algorithm that finds the shortest path through the maze, possibly using the extra plank once. The input to the algorithm is the size of the pillar grid and the plank layout. Provide a written argument to demonstrate the correctness of the algorithm, and analyze its running time. Design examples to test the algorithm. No implementation is required: you will implement your pseudo-code in the next programming assignments.

Discussion Guidelines

The class discussion will focus on the pseudo-code for the shortest path methods. No implementation is required in this assignment. The pseudo-code must be of sufficiently good quality that you can easily generate code from it in the next programming assignment. You may also be required to walk through your pseudo-code on your examples. It is better to present correct pseudo-code for a clearly specified subset of requirements than incorrect pseudo-code or to address an unclearly stated subset of requirements.

Submission

Bring a copy to recitation to display on a projector. Additionally, submit an electronic copy of your program to blackboard.