# Introduction to Computer Science
# HW #4
# Due: 2014/05/07

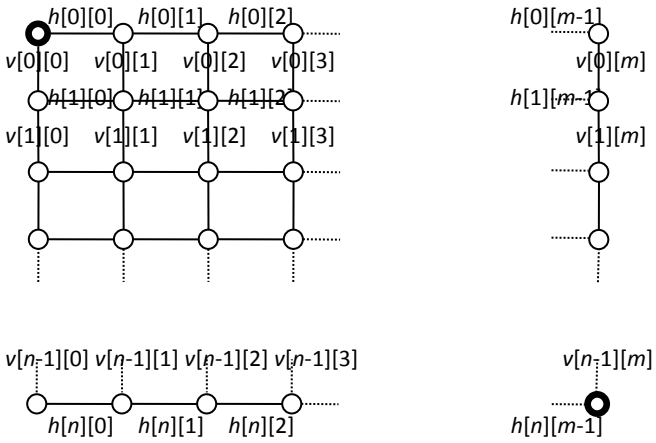
## Chapter 5 Review Problems (8% each):

Problems 18, 23, 36, 49, 55.

**Note:** Use pseudo-code to present your algorithms.

## Programming Problem (50%):

Consider a graph of *m* by *n* grids:




Design an algorithm to find the shortest path from the upper-left node to the lower-right node with **right and down moves only**. Costs of vertical edges are stored in an 2D array *v*[0..*n*-1][0..*m*]; costs of horizontal edges are stored in another 2D array *h*[0..*n*][0..*m*-1]. These costs are **positive real-values**.

You can use readParameters() to read all parameters (*m*, *n, v*[][], and *h*[][]) from **input**. Remember to call release() when done. Check out **hw4.cpp** for more information.

Your program should print out 2 lines. The 1st line is the total cost of the shortest right-down path. The 2nd line is a string of (*m*+*n*) characters of 'v' or 'h', standing for vertical (down) or horizontal (right) respectively.

## Bonus (5%)

Your program outputs a 3rd line, which is the cost of actual shortest path (no restriction of right or down). To earn full credit, your program should finish within several seconds for 300x200 grids (input3).