CSL 356: Analysis and Design of Algorithms **Date:** September 3, 2011
Instructor: Ragesh Jaiswal

5.1 Minor-1

1. Discuss Minor-1 exam problems.

5.2 Dynamic Programming

1. There is an $n \times n$ grid of one-way street network. At any intersection, you may either travel from west-to-east OR north-to-south. In how many different ways can you travel from north-west corner to the south-east corner. Can you write a program to determine the number of different ways?

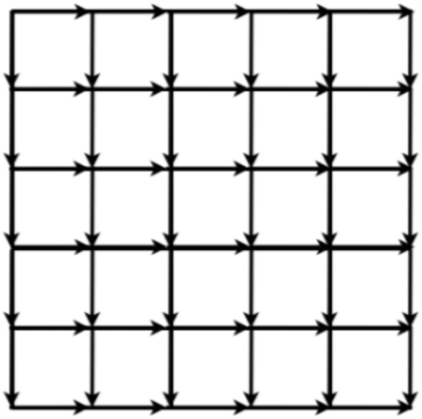

Figure 5.2.1: Example: $n = 6$. In how many ways can you go from the top-left corner to bottom-right corner.

2. (**Knapsack problem**) You are given n items and a sack that can hold at most W units of weight. The weight of the i^{th} item is denoted by $w(i)$ and the value of this item is denotes by $v(i)$. The items are indivisible. This means you cannot take a fraction of any item. Design an algorithm that determines the items that should be filled in the sack such that the total value of items in the sack is maximized with the constraint that the combined weight of the items in the sack is at most W.