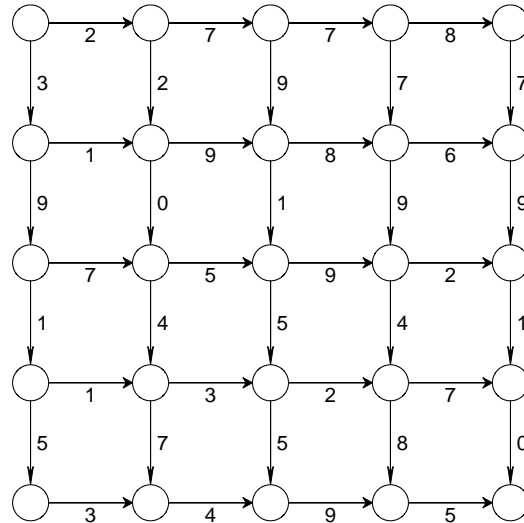


## The Manhattan tourist problem – Craig L. Zirbel – Summer 2009

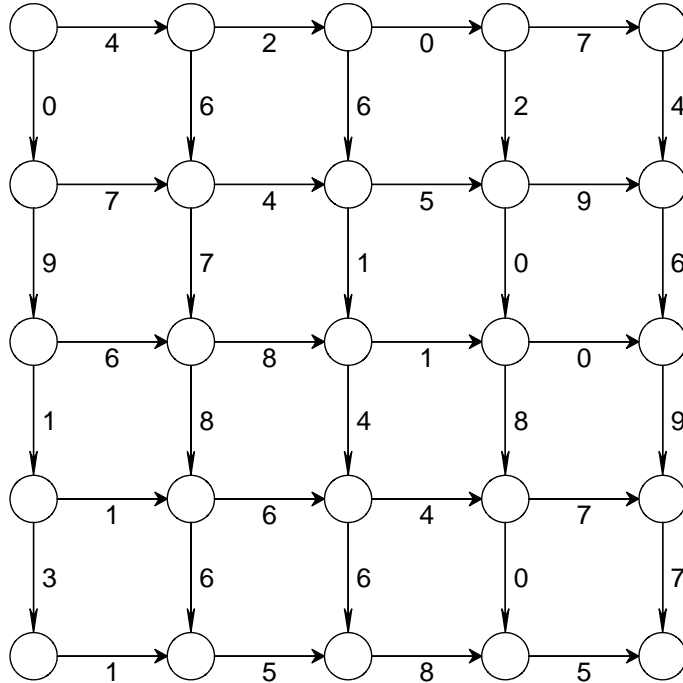
Imagine walking through Manhattan in New York City. The streets are arranged in a rectangular grid, similar to what you see below. You are starting at the northwest corner and will walk south and east to the southeast corner without ever going west or north. Follow the arrows, but make good choices at every intersection you come to. Along the way, you have the opportunity to walk by various sites of interest; the number of such sites on each block is indicated next to the arrow. The question is: What route through the streets will allow you to pass by the largest number of sites of interest?

1. Take a few minutes to try a few paths through the city and sum up how many sites you pass by. What is the largest number you get? How confident are you that your solution is optimal?

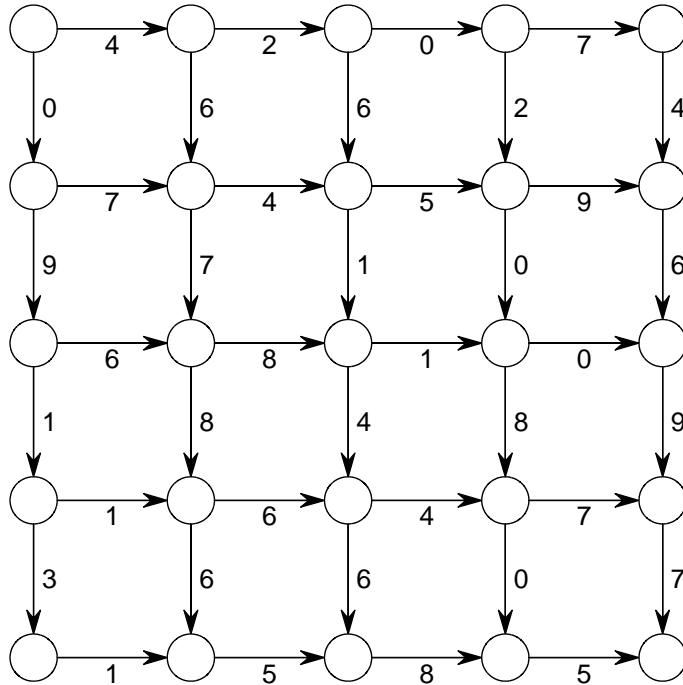


2. The idea of dynamic programming is to solve smaller problems and to use those solutions to build solutions of larger problems. You could call the original problem the 5-5 problem, since you move down 5 and over 5. What would the 1-1 problem be? What would its solution be? How can you use the solution of the 1-1 problem and the 2-0 problem to solve the 2-1 problem?
3. You can leave a record of the optimal number of sites visited in the smaller problems by filling in numbers in the circles above. Write out in a sentence what these numbers mean. How do they help you discover the maximum number of sites that can be visited? How do they help you figure out the optimal path through the city?

Find the maximal route from upper left to lower right



Find the minimal route from upper left to lower right



Scenario 12