CMPSC 130B Prog3 Report

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1 Principle of Optimality

The principle of optimality states that, whatever the initial state, the remaining decisions must be optimal with regard to the state the follows the first decision. This applies in this problem when we look at it as a toroid graph. From the initial state, we only have two paths to chose from. The optimal path to the destination will be optimal with regard to at least one of those two paths. In my case, I'm looking for which of the two choices has the minimum combined weight and path cost. The path with the smallest value of total surface area is the optimal one.

2 Recurrence Relation

The recurrence relation used in my algorithm is between the pair of points, and the two previous points that it can make a triangle with. Each pair, known as a node, has two parameters which keeps track of the smallest path that leads to the node and the area of the triangle which is formed with the previous point on that smallest path. The relation is path(i)(j) = minpath(i-1)(j)+cost(i-1)(j), path(i)(j-1) + cost(i)(j-1)

3 Table of Partial Solutions

The table of partial solutions for my algorithm are a series of incomplete paths from the starting point at the top left corner to the endpoint at the bottom right. Each path can only go either one node down or one node right. The correct solution would be the path that reaches the destination with the lowest cost, which is defined as the smallest surface area.