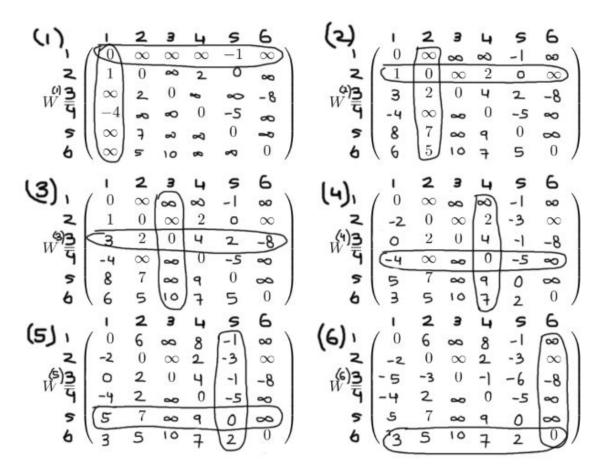
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CIS 315
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Assignment #4

Question 1



Question 2

In order to perform the computations in place, we must show that $d_{\rm ik}{}^{(k)} \; = \; d_{\rm ik}{}^{(k-1)}$

as we can no longer reference the previous $D^{(k-1)}$. Due to the fact that $d_{ik}^{(k)}$ is the subpath from i to k with all vertices in {1, 2... k}, but k cannot be an intermediate vertex (because this would create a cycle), $d_{ik}^{(k)} = d_{ik}^{(k-1)}$. The same applies to the path from k to j.

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Question 3
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Step 1 (structure of subproblem):
      P(i) = the minimum penalty required to reach hotel i
      a_i = distance in miles to hotel i from starting, n is final hotel
Step 2 (recursion):
      Base: P(0) = 0 (minimum penalty to reach a_0 is 0)
      Recurrence (for 1 <= k <= n):
      P(k) = min for \{0 \le j \le k\} of all \{P(j) + (200 - (a_k - a_j))^2\}
Question 4
Step 1 (structure of subproblems):
      A(i) = optimal cost up to month i assuming you end up in Albany
      B(i) = optimal cost up to month i assuming you end up in Beaverton
      where 1 <= i <= n (n is the final month)
Step 2 (recursion):
      Base: A(1) = a_1
            B(1) = b_1
      Recurrence (for 2 <= k <= n):
      // cost of this month plus whatever would be better from last month
      A(k) = a_k + min(A(k-1), B(i-1) + M)
      // same principle
      B(k) = b_k + min(B(k-1), A(i-1) + M)
```