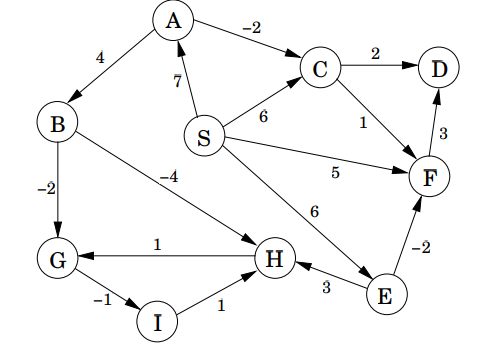
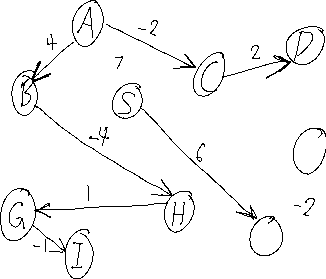
Ryne Kolessar

CSC 321 – Algorithms Assignment #4

11/4/2019

1. (10 points) Textbook, page 120, exercise 4.2. You only need to show the contents of the table as in Figure 4.14 in the textbook.



|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **dist** | **S** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** |
| **0** | 0 | ∞ | ∞ | ∞ | ∞ | ∞ | ∞ | ∞ | ∞ | ∞ |
| **1** | 0 | 7 | ∞ | 6 | ∞ | 6 | 5 | ∞ | ∞ | ∞ |
| **2** | 0 | 7 | ∞ | 6 | 8 | 6 | 5 | ∞ | ∞ | ∞ |
| **3** | 0 | 7 | 11 | 5 | 7 | 6 | 5 | ∞ | ∞ | ∞ |
| **4** | 0 | 7 | 11 | 5 | 7 | 6 | 5 | 9 | ∞ | ∞ |
| **5** | 0 | 7 | 11 | 5 | 7 | 6 | 5 | 9 | 7 | ∞ |
| **6** | 0 | 7 | 11 | 5 | 7 | 6 | 5 | 8 | 7 | ∞ |
| **7** | 0 | 7 | 11 | 5 | 7 | 6 | 5 | 8 | 7 | 7 |
| **8** | 0 | 7 | 11 | 5 | 7 | 6 | 4 | 8 | 7 | 7 |

1. (10 points) Textbook, page 121, exercise 4.8.

Professor F. Lake suggests the following algorithm for ﬁnding the shortest path from node s to node t in a directed graph with some negative edges: add a large constant to each edge weight so that all the weights become positive, then run Dijkstra’s algorithm starting at node s, and return the shortest path found to node t. Is this a valid method? Either prove that it works correctly or give a counterexample.

1. (10 points) Textbook, page 121, exercise 4.11. (Hint. Consult the running timetable on page 114 for Dijkstra’s algorithm for different implementations, and the discussion below it.)