CSCI3160: Quiz 2

Name: Student ID

Problem 1 Solution.

(i) Only two BSTs are possible.

(ii) The left tree (shown above) has average cost $10 \cdot 1 + 20 \cdot 2 = 50$, while the right tree has average cost $10 \cdot 2 + 20 \cdot 1 = 40$. Therefore, $optavg(1, 2) = 40$.

(iii) From our lecture, we know:

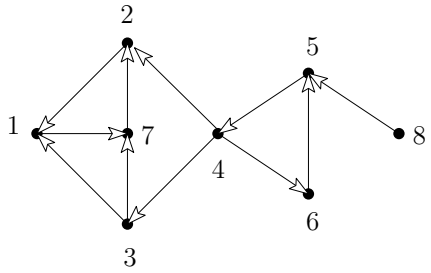
$$optavg(1, 4 \mid 3) = \Big(\sum_{i=1}^{4} W[i]\Big) + optavg(1, 2) + optavg(4, 4).$$

From Question 2, we know $optavg(1, 2) = 40$. On the other hand, $optavg(4, 4)$ is clearly 40 (there is only one BST to consider: the tree has a single node, which is 40). Therefore, $optavg(1, 4 \mid 3) = 100 + 40 + 40 = 180$.

Problem 2 Solution.

(i) Here is a possible solution. Discovery order: 1, 2, 4, 5, 6, 8, 7, 3. Turn-black order: 6, 8, 5, 4, 3, 7, 2, 1.

(ii) G' is show below:



(iii) 1, 7, 2, 3, 4, 6, 5, 8.

(iv) {1, 7, 2}, {3}, {4, 6, 5}, {8}.

(v) True.