Homework 11

Problem 11.1 Understanding Red Black Trees

a) < 3, 10, 2, 4 >, $h_1(k) = k \bmod 5$ and $h_2(k) = 7k \bmod 8$, $m = 5$

- key : 3

$h_1(3) = 3 \bmod 5 = 3$ ✓ 1 probe

- key : 10

$h_1(10) = 10 \bmod 5 = 0$ ✓ 1 probe

- key : 2

$h_1(2) = 2 \bmod 5 = 2$ ✓ 1 probe

- key : 4

$h_1(4) = 4 \bmod 5 = 4$ ✓ 1 probe

No collision happened; hence we did not need the second hash function.

10 (idx 0)
2 (idx 2)
3 (idx 3)
4 (idx 4)

Problem 11.2 Greedy Algorithms

A)

Activities	a_1	a_2	a_3
start	0	5	4
finish	5	8	6
duration	5	3	2

The greedy algorithm that selects the activity with shortest duration will produce as solution only a_3. But the optimal solution is S = { a_1, a_2}. Hence, this algorithm will fail at producing a globally optimal solution.