

ADS HOMEWORK 10

Problem 10.1

A) $\langle 3, 10, 2, 4 \rangle$

$m = 5, h_1(k) = k \bmod 5, h_2(k) = 7k \bmod 8$

Calculations:

$$h_1(3) = 3 \bmod 5 = 3$$

$$h_1(10) = 10 \bmod 5 = 0$$

$$h_1(2) = 2 \bmod 5 = 2$$

$$h_1(4) = 4 \bmod 5 = 4$$

Based on the calculations, there are no collisions. As a result, we do not need to use $h_2(k)$ since there are no collisions to resolve.

Problem 10.2

A) The greedy algorithm for selecting the activity with the shortest duration possible may fail at producing a globally optimal solution. For example, let us take starting and ending times of (0,5), (3,7) and (5,10). A greedy algorithm would select only (3,7) as the solution as $7 - 3 = 4$ is the shortest duration possible but the globally optimal solution would select both (0,5) and (5,10) as the solution. Consequently, this shows that the greedy algorithm that selects the activity with the shortest duration fails at producing a globally optimal solution.