CS 331: Algorithms and Complexity (Spring 2024)
Unique Number: 50930, 50935 50940, 50945

Assignment 3 - Solution

Due on Thursday, 8 Febrauary, by 11.59pm

Problem 1: Short Answer Section

(10 pts) True or false. If true, briefly justify, otherwise, provide a counter example . When justifying, restrict answers to no more than a few sentences.

1. **(1 pt)** True
2. **(2 pts)** True
3. **(2 pts)** True
4. **(2 pts)** False
5. **(3 pts)** No, the shortest path is not necessarily the path with the fewest edges.

Problem 2

(10 points) I will denote tasks as (p(i), t(i)) where p(i) is the value of the task and t(i) is the duration of the task.

1. (Smallest duration first) Pick task i that has the minimum duration $t(i)$, or

   Proof. This is not optimal. Counterexample: □

2. (Most valuable first) Pick task i that has maximum $p(i)$, or

   Proof. This is not optimal. Counterexample: □

3. (Maximum time-scaled value first) Pick task i that has maximum $p(i)/t(i)$.

   Proof. This is optimal. □

Problem 3

(10 points) Yes