COMP3121 Homework Q3

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1 Answer

This can be solved using greedy. Let $S = [t_1, t_2, \ldots, t_k]$ be the k trains which arrive before midnight and depart after midnight. Lets remove these trains from our set of n trains. We are now left with $n - k$ trains. Lets sort these according to the earliest departing time. Lets pick from the remaining set like we did in activity selection problem. We pick the train departing earliest and then next one without conflicting and so on. Let the number of total trains obtained this way be a_0. We repeat the same process but this time taking t_1 from S as our first train. Lets call the number the trains obtained this way as a_1. We find $a_2, a_3, \ldots, a_k$ in similar manner. We pick the largest number a_x from a_0 to a_k. The number a_x we got represents the largest number of trains that can be hosted using 1 platform without any time conflicts. Remove all the trains we used to compute a_x from our set of trains. Lets repeat the whole process to get a number a_y which represents again represents the largest number of trains from our the set of trains left after using platform 1 for them. Lets call the platform this newly obtained set of trains use as Platform 2. We repeat this process until we are left with no trains in our original train set and have Platform 1, 2, $\ldots$, m where m is as small as possible.