Due: Sunday, January 26 at the latest 5:59PM on MarkUs

This is a bonus question relating to question 5 in Assignment 1.

Consider the interval scheduling problem. We are given a set S of intervals $[s_1, f_1), [s_2, f_2), \ldots [s_n, f_n)$ and we need to color each interval in S so that intersecting intervals do not get colored with the same color. We know that if we sort the intervals so that $s_1, \leq s_2 \ldots \leq s_n$, and then color greedily, we will obtain an optimum coloring. (By greedy coloring, we mean assigning each interval $[s_i, f_i)$ with the smallest available color (using colors $1, 2, \ldots$) having colored the previous $i-1$ intervals. We called this the EST coloring algorithm as given in class. Now suppose instead we sort the intervals so that $f_1 \leq f_2 \ldots \leq f_n$ and then color greedily. We can call this the EFT coloring algorithm.

The bonus question is to find a set S of intervals such that EFT coloring will not result in an optimum coloring. That is, give a set S of intervals that can be coloried with say k colors (for some k) but EFT will use $\ell > k$ colors. Your example should show how the intervals in S can be colored with k colors and also how EFT would color the intervals.

The bonus is worth an additional 5 points. However, we will only award the bonus for the first person (or team) that submits an example that is substantially different from previously submitted examples. (For example, making disjoint copies of S does not constitute a different example.) We will accept submssions up until Sunday January 26 at 4:59PM.

If you submit a team solution, then that will be your team for the entire term and, in particular, that means at most 3 students in a team.

If you write your solution neatly and take a photo and submit the pdf that will be accepted.