CSC373F **Handout 1** **Fall, 2005**

The "obvious greedy algorithm" for the unweighted interval covering problem.

Input: $\{I_1, \ldots, I_n\}$ with $I_j = [s_j, f_j)$
$C := \emptyset$;   % C will be the indices of the cover
$U := \{1, \ldots .n\}$ % U is the set of indices of so far uncovered intervals
While $U \neq \emptyset$
    $k := argmax_{\ell:1 \leq \ell \leq n}[|\{i \in U : I_i \cap I_\ell \neq \emptyset\}|]$
    % I_k will be the interval that intersects the most currently uncovered intervals.
    % To make this algorithm unambiguous we need to state a tie-breaking rule so
    % let k be the smallest index achieving maximum overlap with uncovered intervals.
    % Note that a covered interval can later be used in the cover C.
    $C := C \cup \{k\}$
    $U := U - \{i \in U : I_i \cap I_k \neq \emptyset\}$
EndWhile

The homework problem asks you to show that this algorithm does not always produce an optimal size cover.