CSC373F - Algorithm design and Analysis (Unit cost interval covering algorithm)

$\mathcal{S} := \emptyset; \mathcal{C} := \emptyset$
% $\mathcal{S}$ contains the optimal set we are constructing
% and $\mathcal{C}$ is the currrent set of covered intervals
While $\mathcal{C} \neq \mathcal{I}$
    choose the interval $I \in \mathcal{I} - \mathcal{C}$ with the *earliest* finish time
    choose that $I' \in \mathcal{I}$ that intersects I and has the *latest* finishing time.
    % I' can be I if there is no interval intersecting I with a later finishing time
    $\mathcal{S} := \mathcal{S} \cup \{I'\}; \mathcal{C} := \mathcal{C} \cup \{J | J \text{ intersects } I'\} \cup \{I'\}$
End While

Theorem: The above algorithm correctly computes a minimum size set S of covering intervals. The theorem can be proved using the standard idea of a promising partial solution.