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Given a list of class time intervals L we need to schedule the classes into the minimum number of classrooms. The fundamental idea of the algorithm is to first sort the list of class time intervals with respect to their start time. This will allow them to be iterated through linearly. With this list we assign as many intervals to one classroom such that there are no overlaps. Once this is done, a new classroom is made available and we schedule the remaining classrooms similarly. This process is repeated until there are no classrooms remaining. Note that this algorithm is actually $\mathcal{O}(n^2)$ as can be seen in the case where all the intervals overlap.

Algorithm 1: Optimal classroom scheduling

Result: Schedule into minimum number of classrooms
$L \leftarrow$ list of class times sorted by start time ;
$C \leftarrow$ list of classrooms ;
while *While L is not empty* **do**
    $c \leftarrow$ new classroom initialized to be empty ;
    for *each unscheduled class interval $i \in L$* **do**
        if *i can be scheduled in c conflict free* **then**
            schedule i to c ;
            remove i from L;
        end
        add c to list of classes C ;
    end
end
return C;