Activity Selection

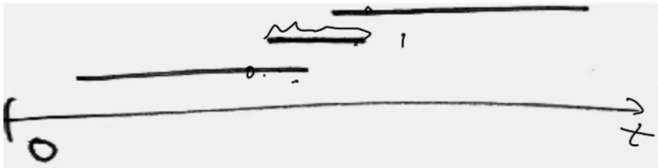
- we have a set S of n activities each with start times s_i and finish times f_i
- we'd like to schedule the maximum set of non-overlapping activities

Brute Force Approach

- we could try *all* compatible meeting combinations
- for each meeting, we'd need to chose to schedule it or not
- this gives a binary choice and a total combinations of 2^n

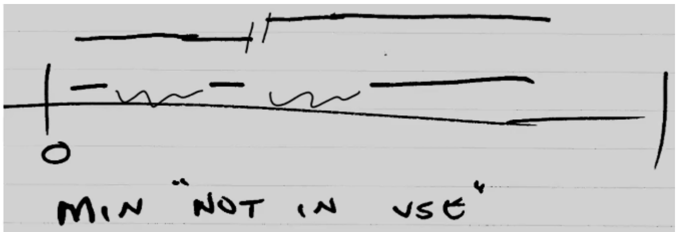
Possible Greedy Approaches

Pick the shortest meeting first



The above depicts a counter example.

Minimize "not in use" time between meetings



The above depicts a counter example.

Pick meetings with the least number of conflicts

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           |__A._|
|_B_||___C___||___D___||_E_|
|_____F____|     |__._G____|
|___H____|         |___I___|
|__J___|             |__K__|
|_L_|                  |_M_|
```

The above depicts a counter example. A has the least number of conflicts (2) while the rest have at least 3. If we pick A, at most we can schedule is 3 meetings however, we could schedule B, C, D, E for 4.

Pick the earliest start time first

The above depicts a counter example.

Pick the earliest finish time first

This greedy choice will actual give a global optimal solution to our problem. However how can we prove this?

Proving our greedy choice

- say that an optimal solution to the problem S is A
- assume that A *does not* have the greedy choice of earliest finish time in S
- take the meeting a with the earliest finish time in A
- because a is not the earliest finish time in S, there exists a meeting s in S that is not in A that has an earlier finish time
- thus, we can replace a with s with no overlap giving us a new optimal solution that *has* the greedy choice
- therefore, there is *always* an optimal solution for this problem that contains the greedy choice