<u>Exercise 16.1-4</u> (10 points)

Not just any greedy approach to the activity-selection problem produces a maximum-size set of mutually compatible activities. Give an example to show that the approach of selecting the activity of least duration from those that are compatible with previously selected activities does not work. Do the same for the approaches of always selecting the compatible activity that overlaps the fewest other remaining activities and always selecting the compatible remaining activity with the earliest start time.

- **1.** A counter-example for always selecting the compatible activity with least duration.

Activity i	Starting Time	Finishing Time	Duration
1	3	5	2
2	1	4	3
3	4	7	3

  The solution derived from this approach is $\{1\}$, but the optimal solution should be $\{2, 3\}$.

  2. A counter-example for always selecting the compatible activity that overlaps the fewest other remaining activities

Activity i	Starting Time	Finishing Time	# of overlaps
1	3	5	2
2	0	2	2
3	6	8	2
4	2	4	3
5	4	6	3
6	1	3	3
7	1	3	3
8	5	7	3
9	5	7	3

  The solution derived from this approach is $\{1, 2, 3\}$, but the optimal solution should be $\{2, 3, 4, 5\}$

  3. A counter-example for always selecting the compatible remaining activity with earliest start time.

  The solution derived from this approach is $\{1\}$, but the optimal solution should be $\{2, 3\}$.

Activity i	Starting Time	Finishing Time
1	1	5
2	2	3
3	4	5