

Elevator Scheduling¹

Your company has been tasked with building several office buildings for a planned office park. The park management would like all the buildings modeled after an existing 5 story building that has been in service for several years since the tenants have been generally pleased with that building. However, there has been one consistent issue that the park manager would like corrected.

Several tenants have complained that their employees are late (arriving after the 9:00am company start time) due to the inability of the 3 elevator configuration to cope with the rush at the start of the day. The management company does not want to spend the money for an extra elevator or even for larger elevators (they currently can support 10 people per car) unless absolutely necessary.

Investigate possible solutions to this problem with an indication of their various advantages and disadvantages. The following are specifics from the existing building:

1. The elevators take approximately 5 seconds between each floor, an extra 15 seconds for each stop, and another 5 seconds if the doors have to reopen. It also takes approximately 25 seconds for the elevator to fill on the ground floor.
2. There are 60 employees on each of the first through fifth floors that use the elevator.
3. On the day this information was gathered, 60 people were late.

¹Courtesy of *Guidelines for Assessment & Instruction in Mathematical Modeling Education*, SIAM.