There has been a major wild fire in the California and pretty much every fire truck in the northern California region where dispatched to the wild fire location. Some of the fire trucks can barely make it to the wild fire on a full tank. There are five routes to get there, some of which are shorter but take longer time since they have to drive through high traffic routes and the other are backroads which are longer but take less time. Below is the info on route time and distance. Find a route that is quickest given there fuel constraint of 400 miles.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Route1 | Route2 | Route3 | Route4 | Route5 |
| Distance | 450 | 400 | 390 | 380 | 410 |
| Time in hours | 4.5 | 5.3 | 5.5 | 5.4 | 4 |

Mathematical model

Parameters:

di : Distance travelled when using route i, i ϵ (1, ….., 5)

ti : Time taken when using route i, i ϵ (1,….., 5)

F: maximum distance allowed to travel (400 miles)

Decisions

Xi : Whether to take route i or not, i ϵ (1, ….., 5)

Objective

Min Σi (Xi \* ti) i ϵ (1, …… 5)

Binary Constraint

Xi \* di <= F i ϵ (1, ……., 5) (fuel constraint)

Xi ϵ ( 0, 1) i ϵ (1, ……., 5) (Binary constraint)

Σi Xi >= 1 i ϵ (1, ……., 5) (Atleast one truck should be dispatched)