Discussion Topic 2 : VIP Riders

You are writing a carpool scheduling application that selects a set of riders for a driver based on their distance from the driver and the cost of the ride. Each rider is at a distance *d* miles from the driver and will pay *c* dollars for the ride. The application selects a set of riders so that their total distance from the driver is not greater than some specified limit of *D* miles with the goal of maximizing the total revenue for the ride. The program should display the revenue for the schedule.

For example, there are four riders with the following *d* and *c* values*:*

The limit *D* is 10 miles. Then the carpool application can select the riders with (*d*, *c*) values (6, 50) , (3, 20) and (1, 7). The total revenue is 50 + 20 + 7 = 77.

[5 points] (b) Modify your program in (a) to meet a limit on the maximum number of riders that can be selected for the carpool.

Suppose that the maximum number of riders is limited to 2. Then, the application can select (6, 50) and (3, 20). The total revenue is 70.

(c) Some riders are marked as VIP riders and must be the only rider in the carpool. Modify the algorithm in (b) so that it can find the maximum revenue by choosing either a VIP rider or a group of non-VIP riders.

(d) Determine the execution time for each test case. What is the running time of your algorithm?

Test cases 1 and 2 are for parts (a) and (b). Test cases 3 and 4 are for part (c)

Test case 1 D = 15
Test case 2 D = 7
Test case 3 D = 10
Test case 4 D = 5