Recitation Car Acceleration Based on Road Type - Problem 5

Write a C++ program that will calculate the final speed of a car after 25 seconds. The program will ask the user for the initial speed (km/h) and the type of road (Highway, City, Off-road). The rate of acceleration will depend on the type of road and the initial speed.

- *If the initial speed is less than 20 km/h, then the acceleration rate for each road type is as follows:*
    - *Highway → 8 (km/h) per second*
    - *City → 5 (km/h) per second*
    - *Off-road → 2 (km/h) per second*
- *If the initial speed is between 20 and 60 km/h, then the acceleration rate for each road type is as follows:*
    - *Highway → 10 (km/h) per second*
    - *City → 7 (km/h) per second*
    - *Off-road → 3 (km/h) per second*
- *If the initial speed is greater than 60 km/h, then the acceleration rate for each road type is as follows:*
    - *Highway → 5 (km/h) per second*
    - *City → 3 (km/h) per second*
    - *Off-road → 1(km/h) per second*

Recitation Car Acceleration Based on Road Type - Problem 5.a.: algorithm

Write out the steps you would use to solve this problem by hand as pseudocode.

Initialize function

Create variable for speed and road type

Get user speed and road type

If (speed is less than 20)

    If (road type is highway)

        Speed = User speed + (8 kph times 25)

    Else if (road type is city)

        Speed = User speed + (5 kph times 25)

Else if (road type is offroad)

Speed = User speed + (2 kph times 25)

Else if (speed is >/= 20 but less than 60)

If (road type is highway)

Speed = User speed + (10 kph times 25)

Else if (road type is city)

Speed = User speed + (7 kph times 25)

Else if (road type is offroad)

Speed = User speed + (3 kph times 25)

Else if speed is >/= 60)

If (road type is highway)

Speed = User speed + (5 kph times 25)

Else if (road type is city)

Speed = User speed + (3 kph times 25)

Else if (road type is offroad)

Speed = User speed + (1 kph times 25)

Else if speed doesn't fit or input is wrong

Tell the user invalid input

End program

Recitation Car Acceleration Based on Road Type - Problem 5.b.: examples

Pick possible inputs for your program. Follow the steps you wrote for these values to find your result, and verify it.

18, highway, results:

64, offroad, results:

38, city, results:

Recitation Car Acceleration Based on Road Type - Problem 5.c.: boundary conditions

Identify two possible values that are “boundaries” in this problem that you will have to test. What should happen for these values?

The way the program is written, 20 and 60 kph are both non-inclusive and would return no result. Due to this, I’m going to make the 20 to 60 inclusive for 20 and make 60+ inclusive for 60.