**Travel Time Calculator**

Start

1. Ask the user to enter the travel distance and store the value in \_TravelDistance (km)
2. Ask the user which direction he wants to go and store the value in \_TravelDirection

*A) North*

*B) South*

*C) East*

*D) West*

***Environmental Factors Sub-process***

1. Check number of people in the car and store it in \_numPeople
2. If user picked up passengers add number of passengers to \_numPeople
3. If user dropped off passengers subtract number of passengers to \_numPeople
4. check the direction of the wind and store the value in \_windDirection

*A) North*

*B) South*

*C) East*

*D) West*

1. Analyze the directional factors and store the value in \_directionalIntensity

*A)* *Travel against the wind: increase each unit time by a factor of the wind level times 20.0%*

*B) Travel with the wind: Decrease each unit time by a factor of the wind level times -30.0%*

*C) Travel perpendicular to wind: Increase each unit time by a factor of the wind level times 5.0%*

1. Check wind force and store the value in \_windForce

*A) Level 0 = no wind*

*B) Level 1 = weak wind*

*C) Level 2 = moderate wind*

*D) Level 3 = strong wind*

***Estimations Based on Environmental Factors***

1. Calculate units of time store the value in \_UnitsToTravel

\_*UnitsToTravel = \_TravelDistance / 2km*

1. Calculate Base Unit Time + min. and store it in \_baseTimePlus

*\_baseUnitTime= \_UnitsToTravel \* 10*

1. Calculate People Time

***\_peopleTime = \_UnitsToTravel \* (\_numPeople \* 0.1)***

1. Calculate Wind Time

\_*windTime = \_baseUnitTime \* (\_directionalIntensity \* (\_windForce/ 100))*

1. Calculate Direction Time

*\_directionTime = \_baseUnitTime + \_peopleTime + \_windTime*

1. Calculate Accumulated Time

*\_accumulatedTime = \_accumulatedTime + \_directionTime*

1. Calculate Accumulated Distance

*\_accumulatedDistance = \_accumulatedDistance + \_travelDistance*

***Display the Result of Calculations***

1. Minutes expressed as Hours and Minutes (HH:MM): \_\_\_\_\_
2. Average minutes per kilometer travelled: \_\_\_\_\_
3. Do you have another destination?
   1. If yes, call Environmental Factors Function
   2. If no go to line 4
4. End

**Unit Test Scenario -1**  
Leaving from point A, you travel east 12 km to point B alone in the car on a nice sunny day with no wind.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Directional**  **Step #** | **Units to**  **Travel** | **Travel**  **Direction** | **Number of**  **People** | **Wind**  **Force** | **Wind**  **Direction** | **Base Unit Time (+ min.)** | **People Time**  **(+ min.)** | **Wind Time**  **(+/- min.)** | **Direction Time (min.)** | **Total**  **Distance (km)** |
| 1 | 6 | East | 1 | 0 | N/A | 60.0 | 6.0 | 0.0 | 66.0 | 12 |

**Unit Test Scenario -2**  
Leaving from point A, you travel south 21 km to point B with (2) passengers and a weak northerly wind.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Directional**  **Step #** | **Units to**  **Travel** | **Travel**  **Direction** | **Number of**  **People** | **Wind**  **Force** | **Wind**  **Direction** | **Base Unit Time (+ min.)** | **People Time**  **(+ min.)** | **Wind Time**  **(+/- min.)** | **Direction Time (min.)** | **Total**  **Distance (km)** |
| 1 | 10.5 | South | 3 | 1 | Northerly | 105.0 | 31.5 | -31.5 | 105.0 | 21 |

**Unit Test Scenario -3**  
Leaving from point A, you travel west 4 km to point B with (2) passengers and a strong westerly wind.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Directional**  **Step #** | **Units to**  **Travel** | **Travel**  **Direction** | **Number of**  **People** | **Wind**  **Force** | **Wind**  **Direction** | **Base Unit Time (+ min.)** | **People Time**  **(+ min.)** | **Wind Time**  **(+/- min.)** | **Direction Time (min.)** | **Total**  **Distance (km)** |
| 1 | 2 | West | 3 | 3 | Westerly | 20.0 | 6.0 | 12.0 | 38.0 | 4 |

**Unit Test Scenario -4**  
Leaving from point A, you travel north 11 km to point B with one (1) passenger and a moderate easterly wind.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Directional**  **Step #** | **Units to**  **Travel** | **Travel**  **Direction** | **Number of**  **People** | **Wind**  **Force** | **Wind**  **Direction** | **Base Unit Time (+ min.)** | **People Time**  **(+ min.)** | **Wind Time**  **(+/- min.)** | **Direction Time (min.)** | **Total**  **Distance (km)** |
| 1 | 5.5 | North | 2 | 2 | Easterly | 55.0 | 11.0 | 5.5 | 71.5 | 11 |

**Final Test Scenario**

1. Depart alone, travel west 17 km, **weather conditions**: weak westerly wind

2. Pick-up 2 passengers, travel north 15 km, **weather conditions**: moderate southerly wind

3. Travel east 9.5 km, **weather conditions**: strong easterly wind

4. Drop-off 1 passenger, travel north 7 km, weather conditions: moderate easterly wind

5. Drop-off 1 passenger, travel east 34 km, **weather conditions**: strong westerly wind

6. Pick-up 3 passengers, travel south 52.5 km, **weather conditions**: no wind (destination reached)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Directional**  **Step #** | **Units to**  **Travel** | **Travel**  **Direction** | **Number of**  **People** | **Wind**  **Force** | **Wind**  **Direction** | **Base Unit Time ( +min.)** | **People Time**  **(+ min.)** | **Wind Time**  **(+/- min.)** | **Direction Time**  **(min.)** | **Accum.**  **Time (min.)** | **Accum.**  **Distance (km)** |
| 1 | 8.5 | West | 1 | 1 | Westerly | 85.0 | 8.5 | 17.0 | 110.5 | 110.50 | 17 |
| 2 | 7.5 | North | 3 | 2 | Southerly | 75.0 | 22.5 | -45.0 | 52.5 | 163.00 | 32 |
| 3 | 4.75 | East | 3 | 3 | Easterly | 47.5 | 14.25 | 28.5 | 90.25 | 253.25 | 41.5 |
| 4 | 3.5 | North | 2 | 2 | Easterly | 35.0 | 7.0 | 3.5 | 45.5 | 298.75 | 48.5 |
| 5 | 17 | East | 1 | 3 | Westerly | 170.0 | 17.0 | -153 | 34.0 | 332.75 | 82.5 |
| 6 | 26.25 | South | 4 | 0 | N/A | 262.5 | 105.0 | 0.0 | 367.5 | 700.25 | 135 |

**Minutes expressed as Hours and Minutes (HH:MM): 11:40**

**Average minutes per kilometer travelled:**