Departure time ?

Arrival time ✔

Distance ✔

Speed ✔

Arrival time= Departure time + journey time

Journey time (hrs) = Distance (kms)/ Speed (km/hr)

Main Constraint

❖ **You need to deal only with arrivals occurring later in the same day as the departure.**

❖ **the arrival time as an integer on a 24-hour clock (8:30 P.M. = 2030)**

❖ **The function result should be the required departure time (<u>rounded to the nearest minute</u>) as an integer on a 24-hour clock.**

❖ There are many algorithm solutions to this problem

❖ In the following we propose the following design solution:

  1. Convert the arrival time to minutes
  2. Calculate the journey time in minutes (rounded)
  3. Calculate the departure time in minutes (rounded)
  4. Convert the departure time to 24 hrs format

❖ Given a time 2333, what is its corresponding value in minutes?

  ❑ If we can extract the hour value (hr) and minute value (mn),

   the corresponding value in minutes is hr*60+mn

  ❑ How could we extract the hr and mn from the input value?

    – For 2333, hr = 23, mn=33

    – Solution hr= time/100 (integer division), mn= time mod 100

    ☞the variable time, hr, mn should all be integer.

☞ Let's

  ❑ arr_time: arrival time, int data type

  ❑ arr_min: arrival time, int data type ,where

      arr_min=60*(arr_time/100)+arr_time %100

Steps 2-3

❖ **Step 2: Calculate the journey time in minutes and round it**

❑ The time in minutes can be calculated as follows:

Journey time (mns) = 60*(Distance (kms)/ Speed (km/hr))

❑ Although we can round a float/double using round() [math.h should be included in the header of your program], we'll use instead

journey_,min= (int)(60*(Distance (kms)/ Speed (km/hr))+0.5)

❖ Let's define

❑ float time = 60 *(distance/speed);

❑ int journey_min= (int) (time+0.5)

❖ **Step 3: Calculate the departure time in minutes**

departure time = arrival time - journey_min

❖ Let's define   dep_time_min =arr_min- journey_min   (int)

Step 4: Convert the departure time to 24 hrs format

❖ Given a time in minutes, what is its corresponding value in 24hr format?

  ❑ If we deduce the hour value (hr) and minute value (mn), the resulting value will be **100*hr+mn**

  ❑ Using the dep_time_min variable calculated in slide 4, we have ,

  hr = dep_time_min /60; mn = dep_time_min %60

☞ Let's define int dep_hr, dep_min to hold the departure time hour and minutes

  dep_hr = dep_time_min /60

  dep_min = dep_time_min %60

  dep_time = dep_hr * 100 + dep_min;