9. An insurance company requires that a black box is installed in an insured car to store data about each journey. **MARKS** DO NOT WRITE IN THIS MARGIN

The black box records data for each journey including:

- date of travel
- distance travelled in miles
- time spent driving in hours (for example 1 hour 15 minutes is stored as 1.25).

A sample of the data is shown below.

09/03/2024, 40.25, 1.25
04/04/2024, 5.12, 0.17
04/04/2024, 5.12, 0.21
…

A program is written to analyse this data.

The top-level design for the program is shown below.

1. Read the data from a text file into parallel 1D arrays.
2. Calculate the average speed for each individual journey by dividing the distance for that journey by the time taken for that journey.
3. Calculate the average distance travelled for journeys longer than one hour.
4. Write the average speed of all journeys that have a greater distance than the average distance to a file.

(a) Complete the table below to show the missing data flow for steps 2, 3 and 4. **4**

Step	IN/OUT	Data flow
1	IN	
	OUT	date[], distance[], drivingTime[]
2	IN	
	OUT	
3	IN	
	OUT	avgDistance
4	IN	
	OUT	

9. (continued)

(b) Explain how the data flow identified at the design stage would assist the programmer when implementing the code for the program. **1**

(c) Step 3 calculates the average distance for journeys longer than one hour.

Using a design technique of your choice, design an algorithm for step 3. **4**

MARKS | DO NOT WRITE IN THIS MARGIN

9. (continued)

(d) The company has been the target of a Denial of Service (DOS) attack involving resource starvation.

(i) Describe what is meant by a resource starvation DOS attack. **1**

(ii) State one cost to the company as a result of a DOS attack. **1**