**Use case 1:**

A customer visits the company office in Sydney on Oct 8th.

They bring a package that needs to be delivered to Melbourne.

An employee of the company records the customer’s contact info, weighs the package at 45kg and then checks for a suitable delivery route.

The system reports that there are two routes:

-   Brisbane (Oct 10th 06:00h) → Sydney (Oct 10th 20:00h) → Melbourne (Oct 11th 18:00h)

-   Sydney (Oct 12th 06:00h) → Melbourne (Oct 12th 20:00h) → Adelaide (Oct 13th 15:00h)

Both routes' trucks have free capacity, and the employee suggests the first one, as the package will arrive one day earlier.

The customer agrees and the employee uses the system to add the delivery package to the first route and to update the package’s expected arrival time to Oct 11th 18:00h.

1. **There is a route with those start and end points with an available truck assigned to it.**

**Input:** RegisterCustomer username email

**Output:** Customer with username: steven1 and email: steven\_smith@gmail.com has been registered!

**Input:** CreatePackage Alice Springs Melbourne username weight

**Output:** Package with ID: 21 has been created!

**Input:** ViewPackage IdPackage

**Output:**

PackageID: 21

User: steven1

User email: steven\_smith@gmail.com

Weight: 45 kg

Start location: Alice Springs

End location: Melbourne

Entry date: 09/02 Friday @ 11:30

Package status: unassigned

RouteID: Package is still unassigned.

TruckID: Package is still unassigned.

Final ETA: Package is still unassigned.

**Input:** ShowRoutes

**Output:**

RouteID: 1

Route status: scheduled (on route, arrived)

Route locations: Perth (15/02 Thursday @ 06:00) → Melbourne 16/02 Friday @ 22:00

Route total distance: 3509 km

Route start date: 15/02 Thursday @ 06:00

Route final ETA: 16/02 Friday @ 22:00

TruckID: 1011

Truck capacity: 10 115 kg

Truck status: available

PackagesID: 1, 5, 7, 8, 17, 15, 21

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RouteID: 2

Route status: scheduled

Route locations: Alice Springs (16/02 Friday @ 06:00) → Melbourne 17/02 Saturday @ 07:00

Route total distance: 2255 km

Route start date: 16/02 Friday @ 06:00

Route final ETA: 17/02 Saturday @ 07:00

TruckID: 1026

Truck capacity: 21 115 kg

Truck status: available

PackagesID: 2, 6, 10, 11, 12

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RouteID: 3

Route status: scheduled

Route locations: Bristbane (17/02 Saturday @ 06:00) → Adelaide 18/02 Sunday @ 04:00

Route total distance: 1927 km

Route start date: 17/02 Saturday @ 06:00

Route final ETA: 18/02 Sunday @ 04:00

TruckID: 1026

Truck capacity: 21 115 kg

Truck status: available

PackagesID: 2, 6, 10, 11, 12

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**Input:** ViewTruck TruckID

**Output:**

TruckID: 1026

Truck capacity: 21 115 kg

Truck max capacity: 27 000 kg

Truck max range: 8 000 km

Truck status: available

RouteID: 2

Route status: scheduled

Route locations: Alice Springs (16/02 Friday @ 06:00) → Melbourne 17/02 Saturday @ 07:00

Route total distance: 2255 km

Route start date: 16/02 Friday @ 06:00

Route final ETA: 17/02 Saturday @ 07:00

PackagesID: 2, 6, 10, 11, 12

**Input:** AddPackageToRoute RouteId PackageId weight

**Output:** Package with ID: 21 has been added to route with ID: 2!

**Input:** ViewRoute RouteId

**Output:**

RouteID: 2

Route status: scheduled

Route locations: Alice Springs (16/02 Friday @ 06:00) → Melbourne 17/02 Saturday @ 07:00

Route total distance: 2255 km

Route start date: 16/02 Friday @ 06:00

Route final ETA: 17/02 Saturday @ 07:00

TruckID: 1026

Truck capacity: 21 160 kg

Truck status: available

PackagesID: 2, 6, 10, 11, 12, 21

**Input:** UpdatePackage Assigned RouteId TruckId Eta

**Output:** Package with ID: 21 has been updated!

**Input:** ViewPackage PackageId

**Output:**

PackageID: 21

User: steven1

User email: steven\_smith@gmail.com

Weight: 45 kg

Start location: Alice Springs

End location: Melbourne

Entry date: 09/02 Friday @ 11:30

Package status: assigned

RouteID: 2

TruckID: 1026

Final ETA: 17/02 Saturday @ 07:00

**Use case #2**

Many packages with total weight of 23000kg have gathered in the hub in Alice Springs and an employee of the company uses the system to create a route that leaves on Sep 12th 06:00h with the following stops:

Alice Springs → Adelaide → Melbourne → Sydney → Brisbane

The system determines the route distance to 4041km and calculates estimated arrival times for each of the locations based on a predefined average speed of 87km/h. The employee then finds a free truck that meets the required range and capacity and proceeds to bulk assign the packages to the newly created route by using the route id and the packages’ ids.

1. **There is NO route with those start and end points with an available truck assigned to it.**

**Input:** RegisterCustomer username email

**Output:** Customer with username: steven1 and email: steven\_smith@gmail.com has been registered!

**Input:** CreatePackage Sydney Melbourne username weight

**Output:** Package with ID: 21 has been created!

**Input:** ViewPackage IdPackage

**Output:**

PackageID: 21

User: steven1

User email: steven\_smith@gmail.com

Weight: 45 kg

Start location: Sydney

End location: Melbourne

Entry date: 09/02 Friday @ 11:30

Package status: unassigned

RouteID: Package is still unassigned.

TruckID: Package is still unassigned.

Final ETA: Package is still unassigned.

**Input:** ShowRoutes

**Output:**

RouteID: 1

Route status: scheduled (on route, arrived)

Route locations: Perth (15/02 Thursday @ 06:00) → Melbourne 16/02 Friday @ 22:00

Route total distance: 3509 km

Route start date: 15/02 Thursday @ 06:00

Route final ETA: 16/02 Friday @ 22:00

TruckID: 1011

Truck capacity: 10 115 kg

Truck status: available

PackagesID: 1, 5, 7, 8, 17, 15, 21

===============

RouteID: 2

Route status: scheduled

Route locations: Alice Springs (16/02 Friday @ 06:00) → Melbourne 17/02 Saturday @ 07:00

Route total distance: 2255 km

Route start date: 16/02 Friday @ 06:00

Route final ETA: 17/02 Saturday @ 07:00

TruckID: 1026

Truck capacity: 21 115 kg

Truck status: available

PackagesID: 2, 6, 10, 11, 12

===============

RouteID: 3

Route status: scheduled

Route locations: Bristbane (17/02 Saturday @ 06:00) → Adelaide 18/02 Sunday @ 04:00

Route total distance: 1927 km

Route start date: 17/02 Saturday @ 06:00

Route final ETA: 18/02 Sunday @ 04:00

TruckID: 1026

Truck capacity: 21 115 kg

Truck status: available

PackagesID: 2, 6, 10, 11, 12

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**Input:** ShowHubs

**Output:**

Adelaide weight: 15 650 kg

Adelaide PackageID: 78, 98, 74, 26, 75, 59, 4

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Melbourne weight: 21 788 kg

Melbourne PackageID: 78, 98, 74, 26, 75, 59, 4, 94, 26, 85, 49, 7

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Sydney weight: 10 101 kg

Sydney PackageID: 26, 75, 59, 4, 94, 26, 85, 49, 7

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Bristbane weight: 7 850 kg

Bristbane PackageID: 98, 74, 26, 75,

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Alice Springs weight: 30 945 kg

Alice Springs PackageID: 26, 85, 49, 7, 26, 75, 59, 4, 94, 26, 85, 49, 7

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Darwin weight: 39 466 kg

Darwin PackageID: 26, 85, 49, 7, 26, 75, 59, 4, 94, 26, 85, 49, 7

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Perth weight: 17 523 kg

Perth PackageID: 26, 75, 59, 4, 94, 26, 85, 49, 7

**Input:** CreateRoute Alice Springs Adelaide Sydney Melbourne Brisbane

**Output:**

RouteID: 25

Route status: open

Route locations: Alice Spring (10/02 Saturday @ 06:00) → Adelaide (10/02 Saturday @ 20:00) → Sydney (11/02 Sunday @ 18:00) -> Melbourne (12/02 Monday @ 14:00) -> Brisbane (13/02 Tuesday @ 14:00)

Route total distance: 4041 km

Route capacity: 30 945 kg

Route PackageID: 26, 85, 49, 7, 26, 75, 59, 4, 94, 26, 85, 49, 7

Route start date: 10/02 Saturday @ 06:00

Route final ETA: 13/02 Tuesday @ 14:00

**Input:** ShowTrucks

**Output:**

TruckID: 1007

Truck max capacity: 42 000 kg

Truck max range: 8 000 km

Truck status: available

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TruckID: 1012

Truck capacity: 37 000 kg

Truck max range: 10 000 km

Truck status: available

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TruckID: 1028

Truck capacity: 26 000 kg

Truck max range: 13 000 km

Truck status: available

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**Input:** AddTruckToRoute RouteId TruckId weight

**Output:** Truck with ID: 1007 has been added to route with ID: 25!

**Input:** ViewRoute RouteId

**Output:**

RouteID: 25

Route status: scheduled

Route locations: Alice Spring (10/02 Saturday @ 06:00) → Adelaide (10/02 Saturday @ 20:00) → Sydney (11/02 Sunday @ 18:00) -> Melbourne (12/02 Monday @ 14:00) -> Brisbane (13/02 Tuesday @ 14:00)

Route total distance: 4041 km

Route start date: 10/02 Saturday @ 06:00

Route final ETA: 13/02 Tuesday @ 14:00

TruckID: 1007

Truck capacity: 30 945 kg

Truck status: available

PackagesID: 26, 85, 49, 7, 26, 75, 59, 4, 94, 26, 85, 49, 7

**Input:** AddPackageToRoute RouteId PackageId weight

**Output:** Package with ID: 21 has been added to route with ID: 25!

**Input:** ViewRoute RouteId

**Output:**

RouteID: 25

Route status: scheduled

Route locations: Alice Spring (10/02 Saturday @ 06:00) → Adelaide (10/02 Saturday @ 20:00) → Sydney (11/02 Sunday @ 18:00) -> Melbourne (12/02 Monday @ 14:00) -> Brisbane (13/02 Tuesday @ 14:00)Route total distance: 2255 km

Route start date: 10/02 Saturday @ 06:00

Route final ETA: 13/02 Tuesday @ 14:00

TruckID: 1007

Truck capacity: 30 990 kg

Truck status: available

PackagesID: 26, 85, 49, 7, 26, 75, 59, 4, 94, 26, 85, 49, 7, 21

**Input:** UpdatePackage Assigned RouteId TruckId Eta

**Output:** Package with ID: 21 has been updated!

**Input:** ViewPackage PackageId

**Output:**

PackageID: 21

User: steven1

User email: steven\_smith@gmail.com

Weight: 45 kg

Start location: Sydney

End location: Melbourne

Entry date: 09/02 Friday @ 11:30

Package status: assigned

RouteID: 25

TruckID: 1007

Final ETA: 13/02 Tuesday @ 14:00

**Input:** UpdateTruck Assigned RouteId PackageId weight

**Output:** Truck with ID: 1007 has been updated!

**Input:** ViewTruck TruckId

**Output:**

TruckID: 1007

Truck max capacity: 42 000 kg

Truck capacity: 30 990 kg

Truck max range: 8 000 km

Truck status: available

RouteID: 25

Route start date: 10/02 Saturday @ 06:00

Route final ETA: 13/02 Tuesday @ 14:00

PackagesID: 26, 85, 49, 7, 26, 75, 59, 4, 94, 26, 85, 49, 7, 21