# Function Description

**Function Name:** isValidWeight

**Parameter List:**

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| --- | --- | --- |
| Parameter Name | Type | Description |
| shipment | Shipment\* | Shipment struct containing the destination coordinates (row and column) of the shipment |
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|  |  |  |

**Returns:** integer, return true if valide, otherwise return false

**Description:** Check if the field `m\_weight` of the given shipment is valid.

**Function Name:** isValidBoxSize

**Parameter List:**

|  |  |  |
| --- | --- | --- |
| Parameter Name | Type | Description |
| shipment | Shipment\* | Shipment struct containing the destination coordinates (row and column) of the shipment |
|  |  |  |
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**Returns:** integer, return true if valide, otherwise return false

**Description:** Check if the field `m\_boxSize` of the given shipment is valid.

**Function Name:** isValidDest

**Parameter List:**

|  |  |  |
| --- | --- | --- |
| Parameter Name | Type | Description |
| shipment | Shipment\* | Shipment struct containing the destination coordinates (row and column) of the shipment |
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**Returns:** integer, return true if valide, otherwise return false

**Description:** Check if the field `m\_dest` of the given shipment is valid.

**Function Name:** limitingFactorWithShipment

**Parameter List:**

|  |  |  |
| --- | --- | --- |
| Parameter Name | Type | Description |
| truck | Truck\* | a truck to be calculated with an extra shipment |
| withShipment | Shipment\* | the extra shipment |
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**Returns:** double, return a limiting factor in percentage

**Description:** Calculate the limiting factor of a truck with a extra shipment

**Function Name:** findTruckForShipment

**Parameter List:**

|  |  |  |
| --- | --- | --- |
| Parameter Name | Type | Description |
| map | Map\* | the map of the delivery area with buildings on it |
| trcnks | Truck[] | an array of trucks including the route for each of the trucks |
| numTrucks | int | the number of trucks in the array of trucks |
| shipment | Shipment\* | a data structure containing the size and weight of the shipment |
| diverted | Route\* | a data structure representing the diverted route to the destination (passed by parameter) |
|  |  |  |
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**Returns:** integer, representing the index of the truck in the trucks array on which the shipment should be placed. If no truck can take the shipment, then -1 is returned.

**Description:** Finds the best truck for a shipment. It considers both the load on the truck, the size and weight of the shipment, and the route of the truck to try to place it on a truck which goes closest to the destination. If there is no truck that can deliver the shipment, it returns -1.

**Function Name:** isTruckCanShip

**Parameter List:**

|  |  |  |
| --- | --- | --- |
| Parameter Name | Type | Description |
| truck | Truck\* | a truck to test if it can hold another given shipment |
| shipment | Shipment\* | a shipment to add to the truck |
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**Returns: integer, representing the result of checking, -1 indicates the shipment cannot be added to the truck, otherwise it can.**

**Description:** Test if a truck can hold a shipment