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Optimization and Its Applications in Industry 4 Era

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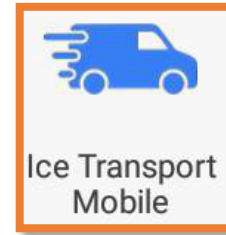
Faculty of Engineering
Khon Kaen University

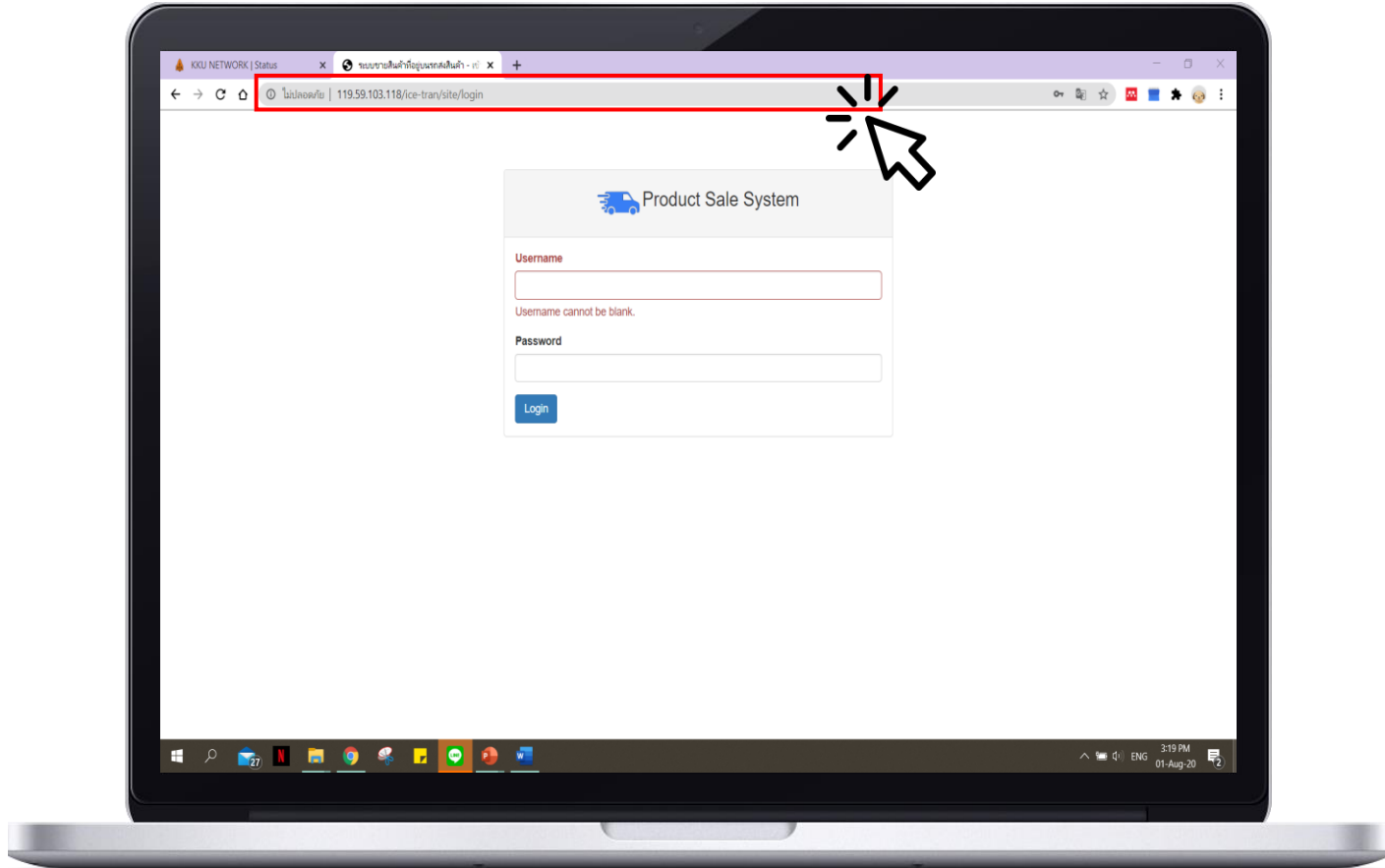


Curriculum Development
of Master's Degree Program in
Industrial Engineering for Thailand Sustainable Smart Industry

Download the application with android system

(Google drive: [ice-tran-mobile-0.0.2.zip](#))





Go to Link

["http://119.59.103.118/ice-tran"](http://119.59.103.118/ice-tran)

and login

Username: admin

Password: 123456

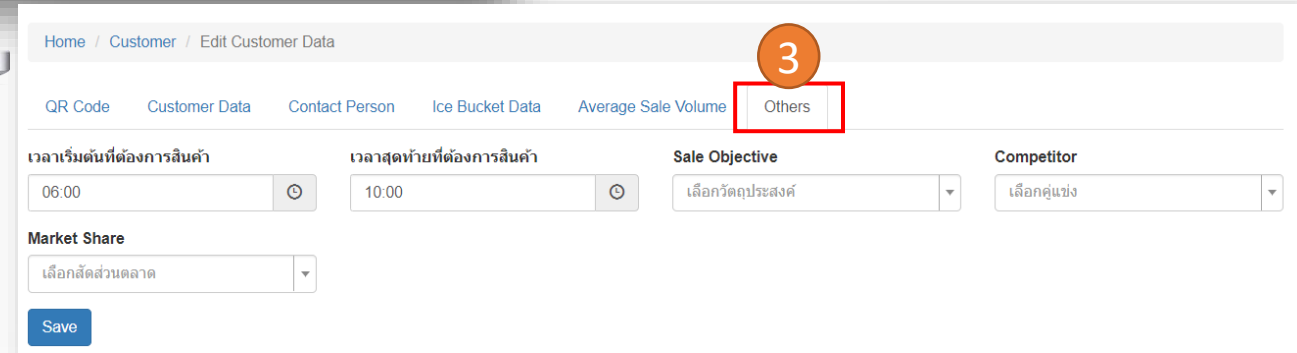
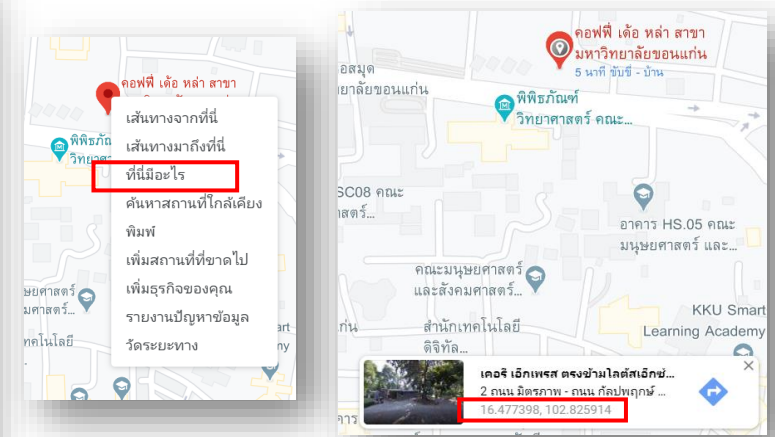
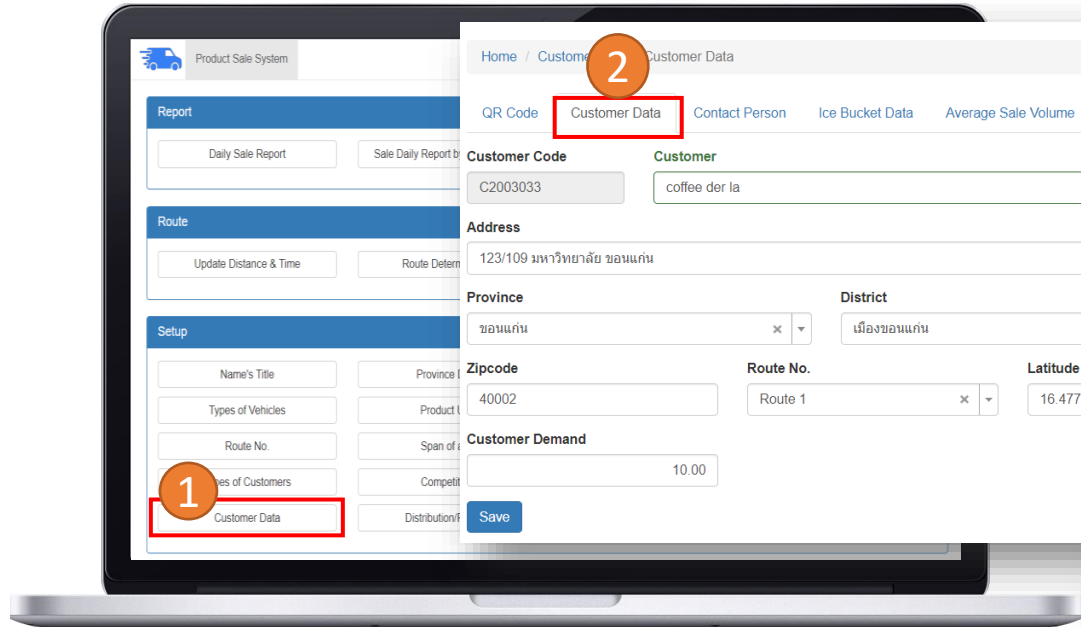
- Before making use of the demonstrated software, users must fill all required vehicle data in the software :

The screenshot displays the 'Product Sale System' interface. The 'Vehicle' management section is active, showing a table with the following data:

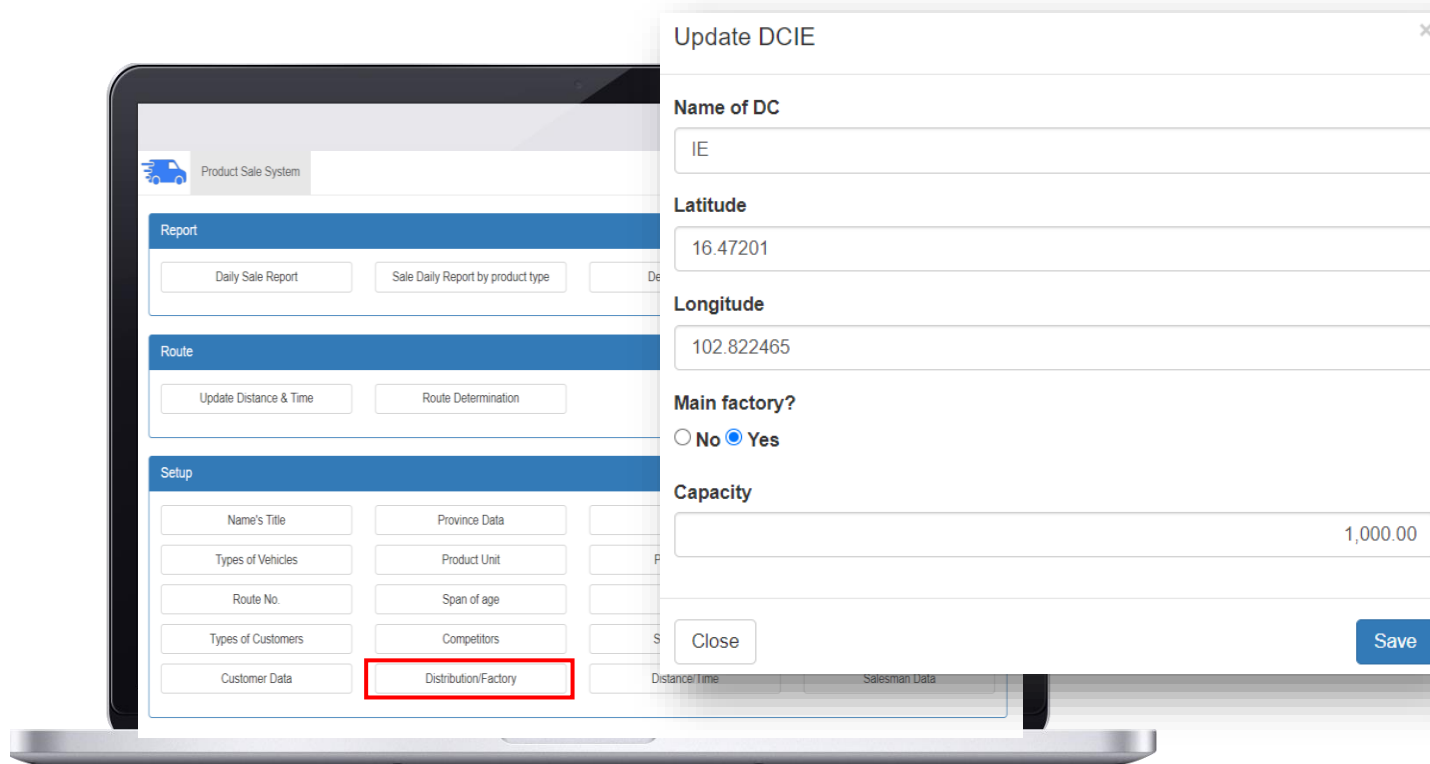
| # | Vehicle license | Vehicle Type | Route No. | Edited By | Date of update | Actions |
|---|-----------------|--------------|-----------|------------------|---------------------|---------------|
| 1 | C789 | Ice Truck | Route 3 | นายAdministrator | 17/03/2020 11:18:50 | [Eye] [Trash] |
| 2 | B456 | Ice Truck | Route 2 | นายAdministrator | 21/03/2020 10:27:54 | [Eye] [Trash] |
| 3 | A123 | Ice Truck | Route 1 | นายAdministrator | 31/07/2020 14:08:42 | [Eye] [Trash] |

The 'Create Vehicle' form includes the following fields:

- Vehicle license: A123
- Vehicle Type: Ice Truck
- Route No.: Route 1
- Maximum Capacity (Sack): 300
- Fuel Consumption (Baht/Kilometer): 7.50

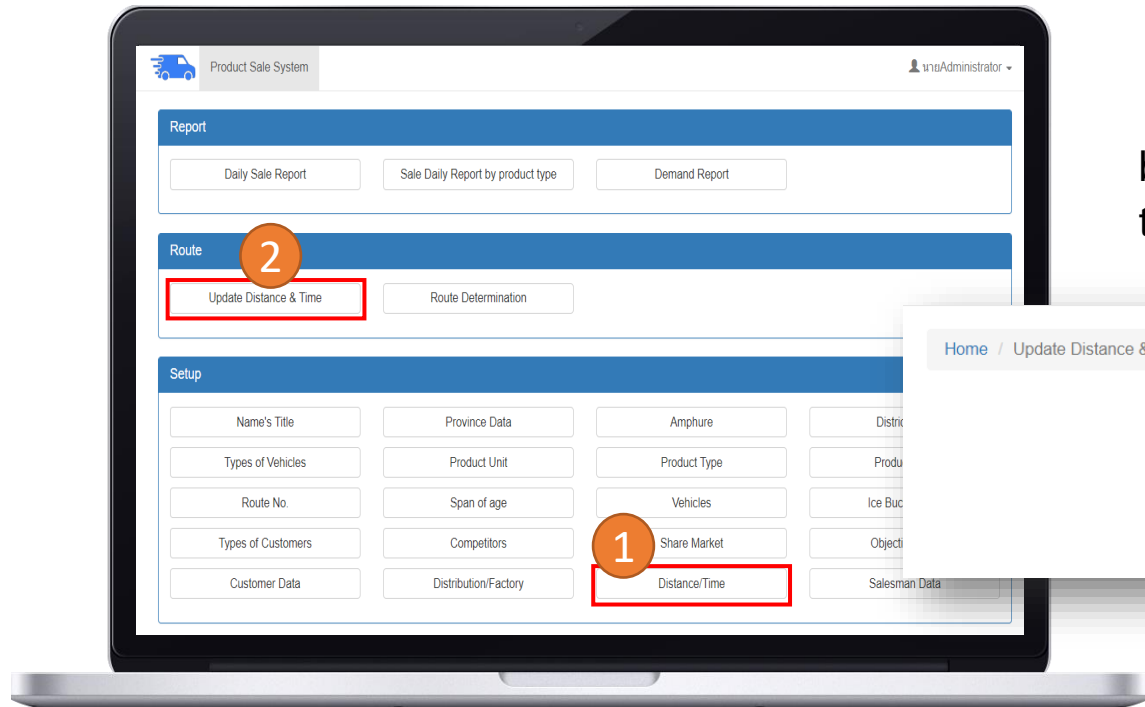


- Customer data which included the following :
 - a. Customer's name
 - b. Rout number
 - c. Latitude
 - d. Longitude
 - e. Earliest time to receive goods
 - f. Latest time to receive goods

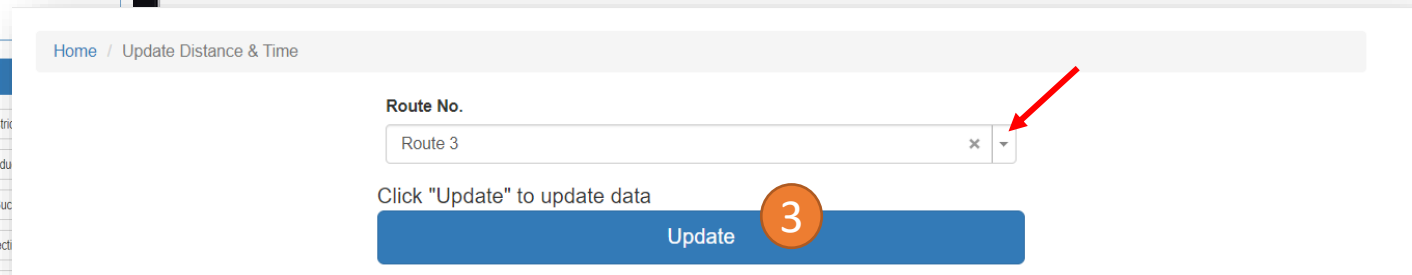


- Distribution center data which are factory and DCs.
- In case there is no DC, please fill the factory as the main distribution unit.

- Distance and time used from point to point (i.e., between DCs, between DC and customer, and from customer to customer)
 - Input directly through the menu of **“Distance/Time data”**



- In case there is any new/update customer or DCs, we have to update the data in **“Update Distance/Time data”** menu.





Salesman Data



Product Sale System

Report

Daily Sale Report Sale Daily Report by product type Demand R

Route

Update Distance & Time Route Determination

Setup

| | | | |
|--------------------|----------------------|---------------|----------------------|
| Name's Title | Province Data | Amphure | District Data |
| Types of Vehicles | Product Unit | Product Type | Product Data |
| Route No. | Span of age | Vehicles | Ice Bucket Data |
| Types of Customers | Competitors | Share Market | Objective Data |
| Customer Data | Distribution/Factory | Distance/Time | Salesman Data |

Home / พนักงาน

Sales staff Showing 1-6 of 6 items

| # | Staff Position | Vehicle license | Vehicle Type | Route | Name's title | First Name | Last Name | Username | Edited By | Date of update | Actions |
|---|----------------|-----------------|--------------|-----------|--------------|---------------|------------|----------|------------------|---------------------|---------|
| 1 | ผู้ดูแลระบบ | (not set) | (not set) | (not set) | นาง | Administrator | | admin | (not set) | (not set) | |
| 2 | พนักงานขาย | A123 | Ice Truck | Route 1 | นาง | เทียรติคุณ | นัสนสุวรรณ | user1 | นางAdministrator | 07/08/2020 14:50:05 | |
| 3 | พนักงานขาย | F616 | Ice Truck | Route 6 | นาง | Keattikun | Noisuwan | user6 | นางAdministrator | 07/08/2020 14:50:18 | |
| 4 | พนักงานขาย | C789 | Ice Truck | Route 3 | นาง | PATIPAT | | | | | |
| 5 | พนักงานขาย | B456 | Ice Truck | Route 2 | นาง | Manop | | | | | |
| 6 | พนักงานขาย | D321 | Ice Truck | Route 4 | นาง | Kongki | | | | | |

Create Sales Staff

Name's title
Select name's title

Username

First Name

Password

Last Name

Confirm password

Staff Position
Select staff position

Vehicle
Select vehicle

Email

Mobile Number

Close Save

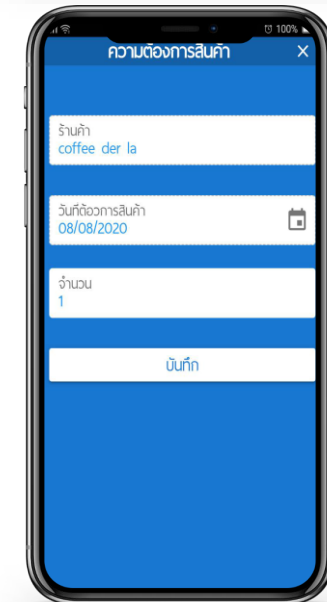


- Demand data. We can input this data through 2 ways:
 - a. Via the menu “Demand report” .

The screenshot shows a web interface with a 'Report' menu containing 'Daily Sale Report', 'Sale Daily Report by product type', and 'Demand Report' (highlighted with a red box). An inset shows a table with columns: Date of Request, Route no., Customer, Qty Required, and Actions. A red arrow points from the 'Demand Report' button to a 'Create Demand' modal form. The modal form has fields for Customer (dropdown), Date of Request (calendar), Qty Required (input), and buttons for Close and Save.

- b. Via the mobile application.

The screenshot shows a mobile application interface with a menu containing 'QR Code' (highlighted with a red box), 'Customer Data', 'Contact Person', 'Ice Bucket Data', 'Average Sale Volume', and 'Others'. The breadcrumb trail at the top reads 'Home / Customer / Edit Customer Data'.



To determine the route:

- Select "Route No."
- Select "Date to send product"
- Click "Calculate"

Product Sale System นายAdministrator

Home / Route Determination

Route No. 2 Date to send product 3 Start time to send product Max travel time for each route (min) Differential price

No. of particles Iteration Max of consecutive iterations not producing an improving solution No. of DC

Click "Calculate" to determine route 4

Click "Export" to export data to calculate by other softwares' algorithms and click "Import" to import the results to this program

5 ส่งข้อมูลให้พนักงานขับรถ
ค่าไรรวม 1,078.24 บาท



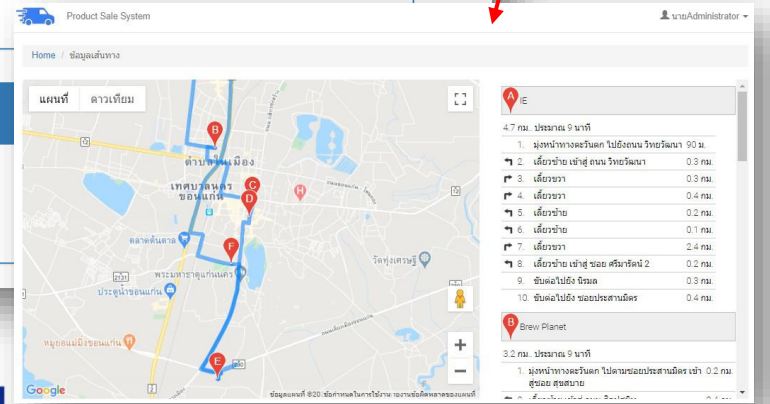
Product Sale System

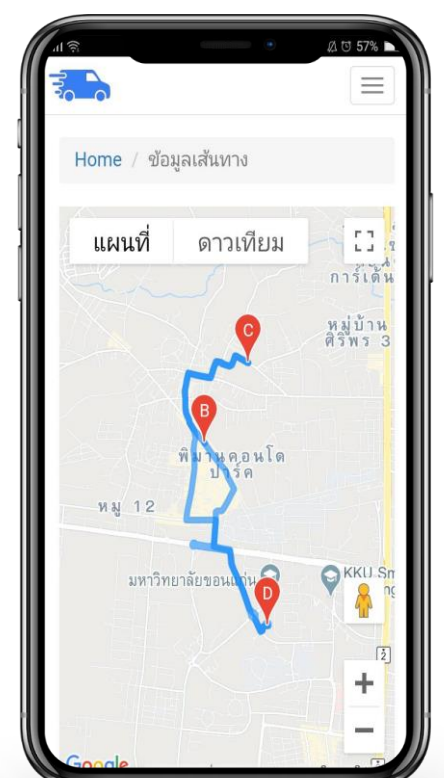
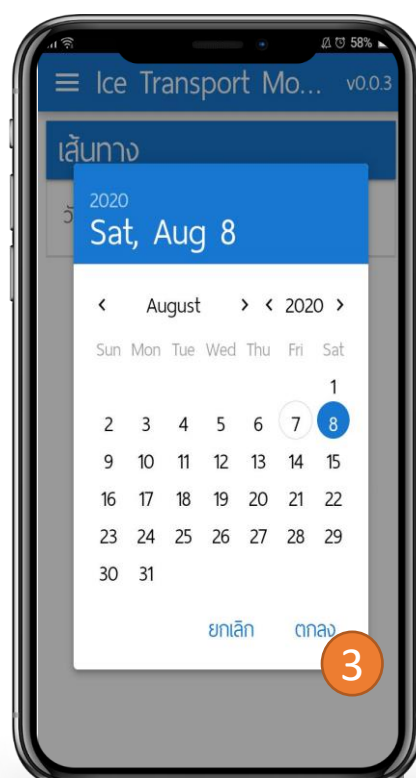
Report

Daily Sale Report Sale Daily Report by product type Demand Report

Route

Update Distance & Time Route Determination 1





For user who develop their own algorithm, all data can be exported using "Export" menu. The data will be exported as Excel file shown in the Figure.

The software can also display the route obtained from user's algorithm by importing the route (in Excel format) using "Browse files" menu. Route must be written in a specific format of "Name of DC : Customer code 1 : Customer code 2 : ... : Name of DC"

| | A | B | C | D | E | F | G | H |
|----|----------|-------|----------|----------|----------|----------|----------|----------|
| 1 | # | le | C2008006 | C2008007 | C2008008 | C2008009 | C2008010 | C2008011 |
| 2 | IE | 0 | 3.9 | 4.69 | 7.32 | 7.71 | 9.04 | 14.32 |
| 3 | C2008006 | 4.25 | 0 | 1.9 | 3.34 | 3.73 | 5.03 | 10.31 |
| 4 | C2008007 | 4.59 | 0.88 | 0 | 3.23 | 3.62 | 5.33 | 9.84 |
| 5 | C2008008 | 7.59 | 4.04 | 2.73 | 0 | 0.39 | 2.18 | 7.02 |
| 6 | C2008009 | 7.98 | 4.43 | 3.12 | 0.39 | 0 | 1.79 | 6.63 |
| 7 | C2008010 | 9 | 5.49 | 4.19 | 2.2 | 1.8 | 0 | 5.28 |
| 8 | C2008011 | 13.87 | 10.32 | 9.7 | 6.14 | 5.75 | 4.39 | 0 |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |

Export

เลือกไฟล์ ไม่ได้เลือกไฟล์ใด

| A | B | C | D | E |
|------------|---------------------------|----------|----------|--------|
| vehicle_id | routes | distance | duration | profit |
| 44 | DDD:C2003015:C2003016:DDD | 20 | 25 | 120 |



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Thank You



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