

Warehouse Guiding Application

User Manual

Team Bug Killers

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Version History

Version	Comment	Date (mm/dd/yyyy)
1.0	Provisional User Manual	10/06/2021
1.1	Updated Overview of System and Installation	10/12/2021
1.2	Alpha Release	10/20/2021
1.3	Beta Release	11/15/2021
1.4	Beta Release 2	11/29/2021
1.5	Final Release	12/5/2021

1. Overview of System

Basic Features

1. Loading warehouse map from file
2. Finding path to a single product and show the instructions
3. Dynamic starting and ending points
4. Finding the shortest path for an order of products
5. Reading multiple orders from file
6. Automatically choosing suitable algorithm (Brute Force or Genetic Algorithm)
7. Allowing user to input time limit
8. Robust error handling
9. Friendly user interface and prompts

Usage Instructions/Scenario(s)

Input the data

First you will see the window asking you to enter the file path of the warehouse map, as shown in Figure 1.1.

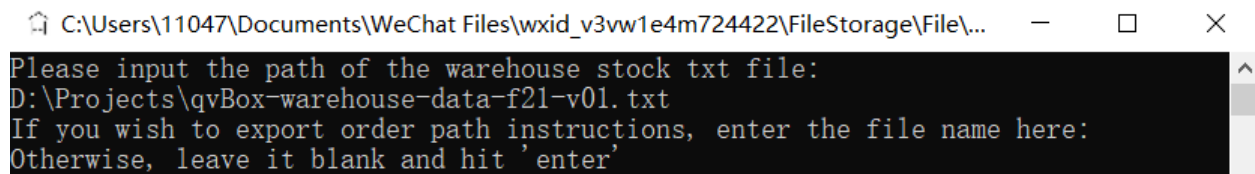


Figure 1.1 - Enter the file path

When you enter the wrong file path, our program will notify you as shown in Figure 1.2.

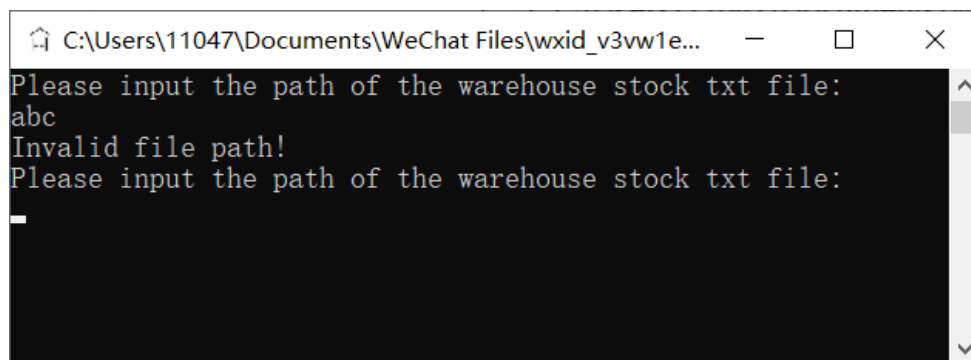


Figure 1.2 - Invalid file path error

After entering the correct file path, you will be asked to input the file path to store the instructions. You can choose to input one or simply hit 'enter' on the keyboard if you don't wish to store instructions to a file, as shown in Figure 1.3.

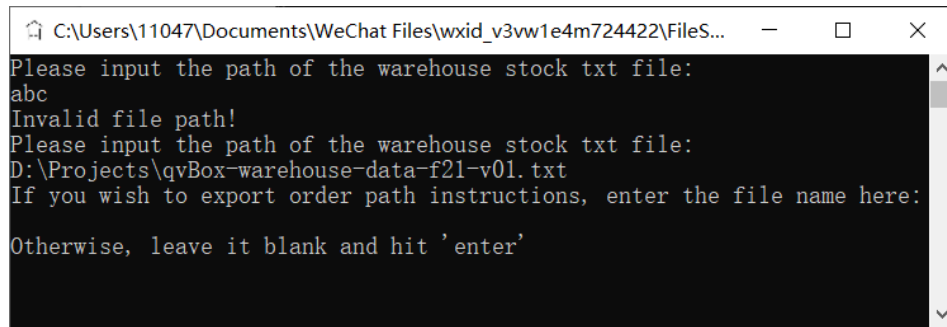


Figure 1.3 - Option to store instructions

Then you will see the printed warehouse map and the options you have. You have four options:

1. Navigate to a specific product from warehouse origin (coordinate 0 0)
2. Find an order of products
3. Load and find multiple orders from file
4. Exit

The UI is shown in Figure 1.4.


```

C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorage\File\2021-12\warehouse_final.exe
Enter item id:
1
The item for id: 1 is marked as '$' on the map.
The path from your location 'S' to the item '$' is marked with 'P' on the map.
Move East 2 units
24 . . . . .
23 . . . . .
22 . . . . .
21 . . . . .
20 . . . . . X . X . . . . .
19 . . . . . X . X . . . . .
18 . . . . . X . X . . . . . X
17 . . . . . X . X . . . . .
16 . . X . . X X X X X X . X . X . . . . .
15 . . . . . X X X . X X X . X . X . . . . .
14 . . . . . X X X . X X X . X . X . . . . .
13 . . . . . X X X X X . X . X X X . . . . .
12 . . . . . X X X X X . X . X X X . . . . .
11 . . . . . X X X X X X X X X X X X . . . . .
10 . . . . . X X X X X X X X X X X X . . . . .
9 . . . . . X X X . X X X . X X X . . . . .
8 . . . . . X X X . X X X . X X X . . . . .
7 . . . . . X . X . X X X X X X X X . . . . .
6 . . . . . X . X . X X X X X X X X . . . . .
5 . . . . . X . X . X . X . X . X X X X . . . . .
4 . X X . X . X . X . X . X . X X X X X . . . . .
3 . . . . . . . . . . . . . . . . . . . . . . . .
2 . . . . . . . . . . X . X . X . X . . . . . . .
1 . . . . . . . . . . . . . . . . . . . . . . . .
0 S P $ . X . . X . X . X . X . X . X . X . X . X
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

What would you like to do?
1: navigate to a specific product from warehouse origin (coordinate 0 0)
2: find an order of products
3: load and find multiple orders from file
4: exit

```

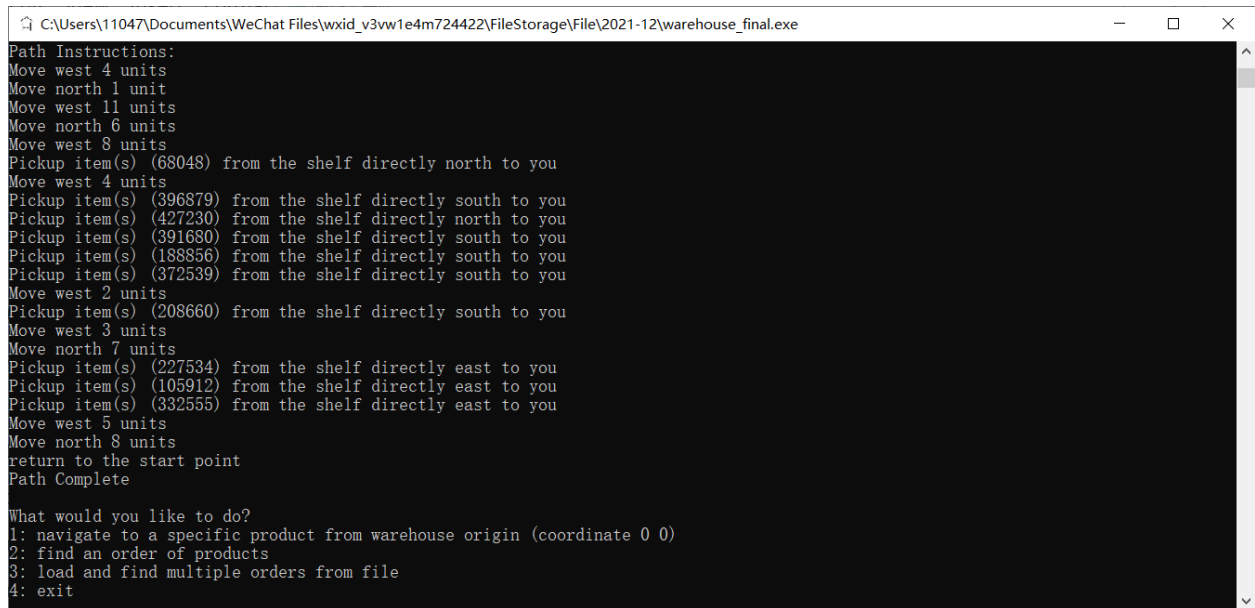
Figure 1.6 - Path and instructions (single product)

Option 2: Find an order of products

If you want to find an order of products, enter ‘2’. Then you will be prompted to specify several parameters including:

1. Start point coordinate
2. End point coordinate
3. Time limit for the program
4. Size of the order
5. Id of the products in the order

The UI is shown in Figure 1.7.



```
C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorage\File\2021-12\warehouse_final.exe
Path Instructions:
Move west 4 units
Move north 1 unit
Move west 11 units
Move north 6 units
Move west 8 units
Pickup item(s) (68048) from the shelf directly north to you
Move west 4 units
Pickup item(s) (396879) from the shelf directly south to you
Pickup item(s) (427230) from the shelf directly north to you
Pickup item(s) (391680) from the shelf directly south to you
Pickup item(s) (188856) from the shelf directly south to you
Pickup item(s) (372539) from the shelf directly south to you
Move west 2 units
Pickup item(s) (208660) from the shelf directly south to you
Move west 3 units
Move north 7 units
Pickup item(s) (227534) from the shelf directly east to you
Pickup item(s) (105912) from the shelf directly east to you
Pickup item(s) (332555) from the shelf directly east to you
Move west 5 units
Move north 8 units
return to the start point
Path Complete

What would you like to do?
1: navigate to a specific product from warehouse origin (coordinate 0 0)
2: find an order of products
3: load and find multiple orders from file
4: exit
```

Figure 1.9 - Instructions (order of products)

Option 3: Load and find multiple orders from file

If you wish to find multiple orders from a file, enter '3'. Then you will be prompted to enter the path of the order file. After the file is recognized successfully, you can choose from the following options:

1. Find next unfulfilled order
2. Choose order number
3. Exit file orders

If you enter '1', the program will automatically load the next unfulfilled order and find the shortest path to pick up the products. You will be asked to enter the parameters just like in the single order. Then the map with the path and instructions will be printed. The UI is shown in Figure 1.10, 1.11 and 1.12.

```

C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorage\File\2021-12\warehouse_final.exe
What would you like to do?
1: navigate to a specific product from warehouse origin (coordinate 0 0)
2: find an order of products
3: load and find multiple orders from file
4: exit
3
Please input the path of the order file:
D:\Projects\eeecs221_project\src\warehouse\qvBox-warehouse-orders-list-part01.txt
Orders Have been successfully loaded!

Would you like to:
(1) find next unfulfilled order
(2) choose order number
(3) exit file orders
1
Please enter the START point warehouse coordinates separated by a single space:
37 0
Please enter the END point warehouse coordinates separated by a single space:
23 0
Your start and end points are (37,0) and (23,0)
Please enter the time limit to find the path in seconds:
1

```

Figure 1.10 - Find next unfulfilled order (multiple orders)

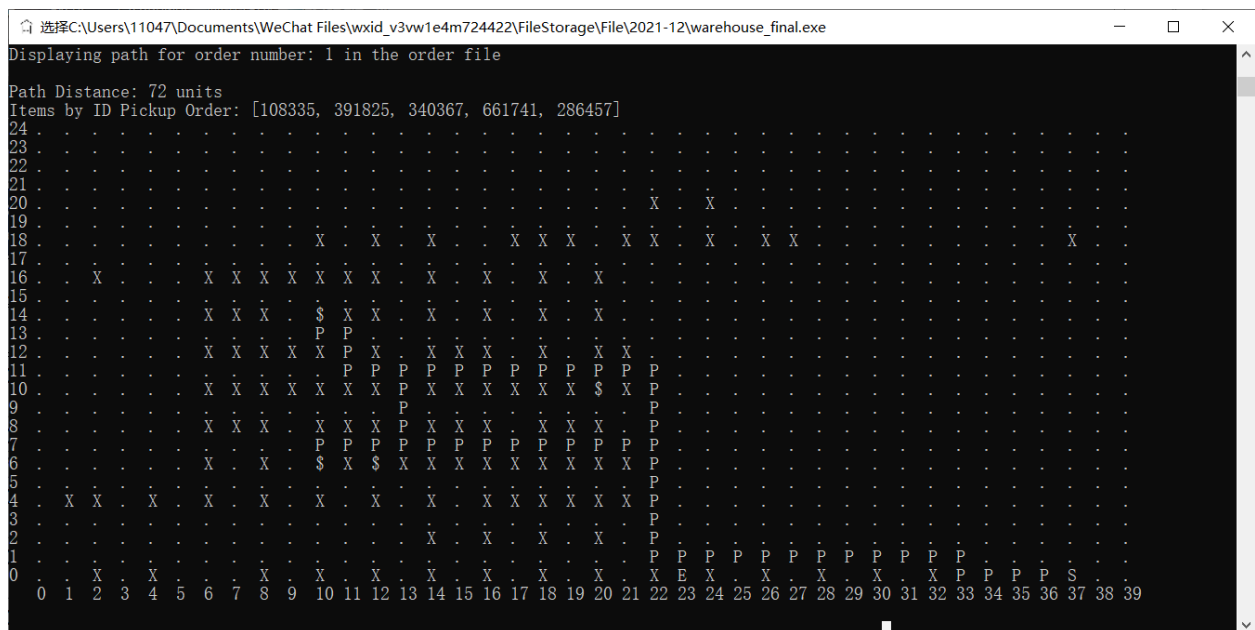
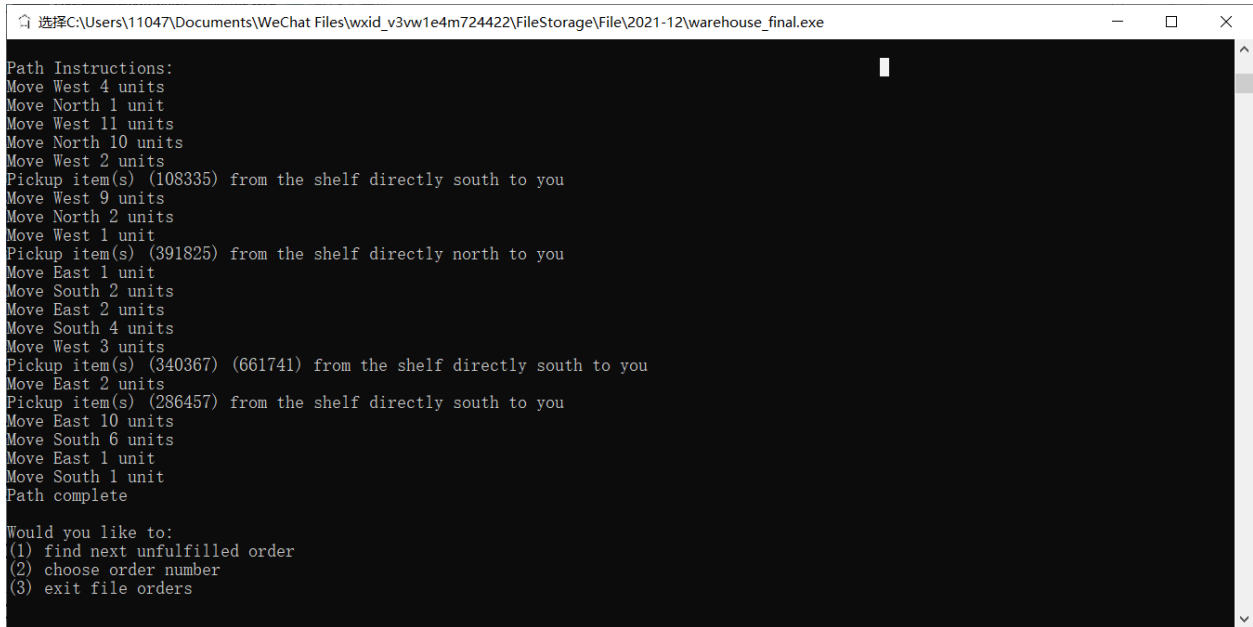


Figure 1.11 - Map with shortest path (multiple orders)

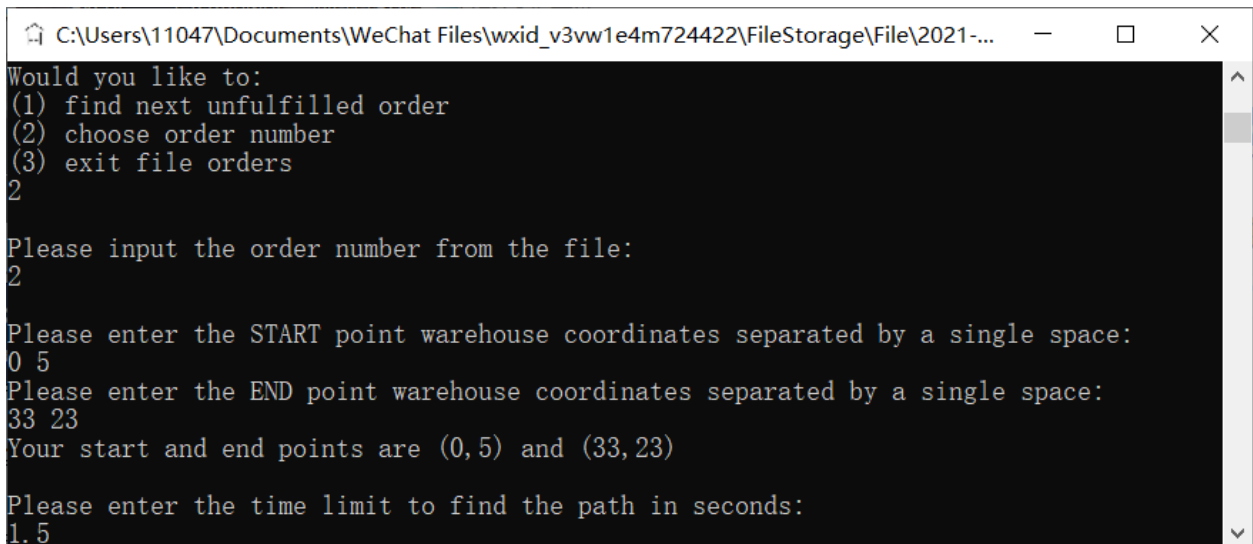


```
Path Instructions:
Move West 4 units
Move North 1 unit
Move West 11 units
Move North 10 units
Move West 2 units
Pickup item(s) (108335) from the shelf directly south to you
Move West 9 units
Move North 2 units
Move West 1 unit
Pickup item(s) (391825) from the shelf directly north to you
Move East 1 unit
Move South 2 units
Move East 2 units
Move South 4 units
Move West 3 units
Pickup item(s) (340367) (661741) from the shelf directly south to you
Move East 2 units
Pickup item(s) (286457) from the shelf directly south to you
Move East 10 units
Move South 6 units
Move East 1 unit
Move South 1 unit
Path complete

Would you like to:
(1) find next unfulfilled order
(2) choose order number
(3) exit file orders
```

Figure 1.12 - Instructions (multiple orders)

In addition to finding the next unfulfilled order, you can also specify the order number by entering ‘2’. The program will jump to that order and find the shortest path for it, as shown in Figure 1.13, 1.14 and 1.15.



```
Would you like to:
(1) find next unfulfilled order
(2) choose order number
(3) exit file orders
2

Please input the order number from the file:
2

Please enter the START point warehouse coordinates separated by a single space:
0 5
Please enter the END point warehouse coordinates separated by a single space:
33 23
Your start and end points are (0,5) and (33,23)

Please enter the time limit to find the path in seconds:
1.5
```

Figure 1.13 - Choose order number (multiple orders)

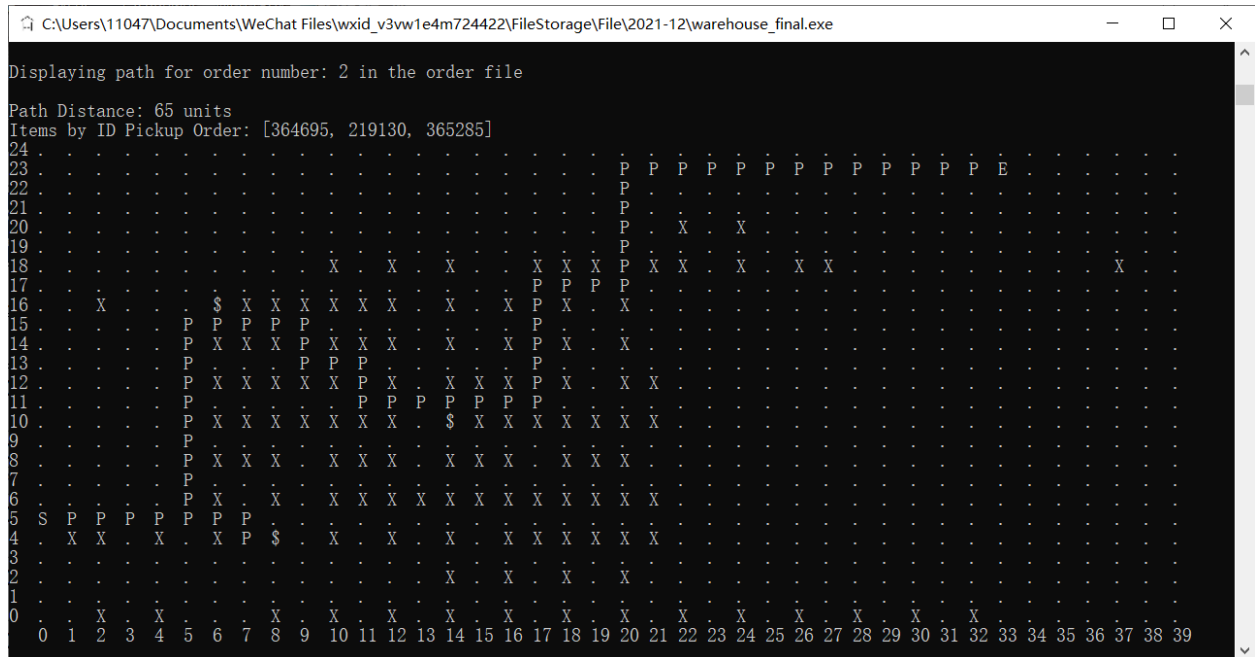


Figure 1.14 - Map with shortest path for specified order (multiple orders)

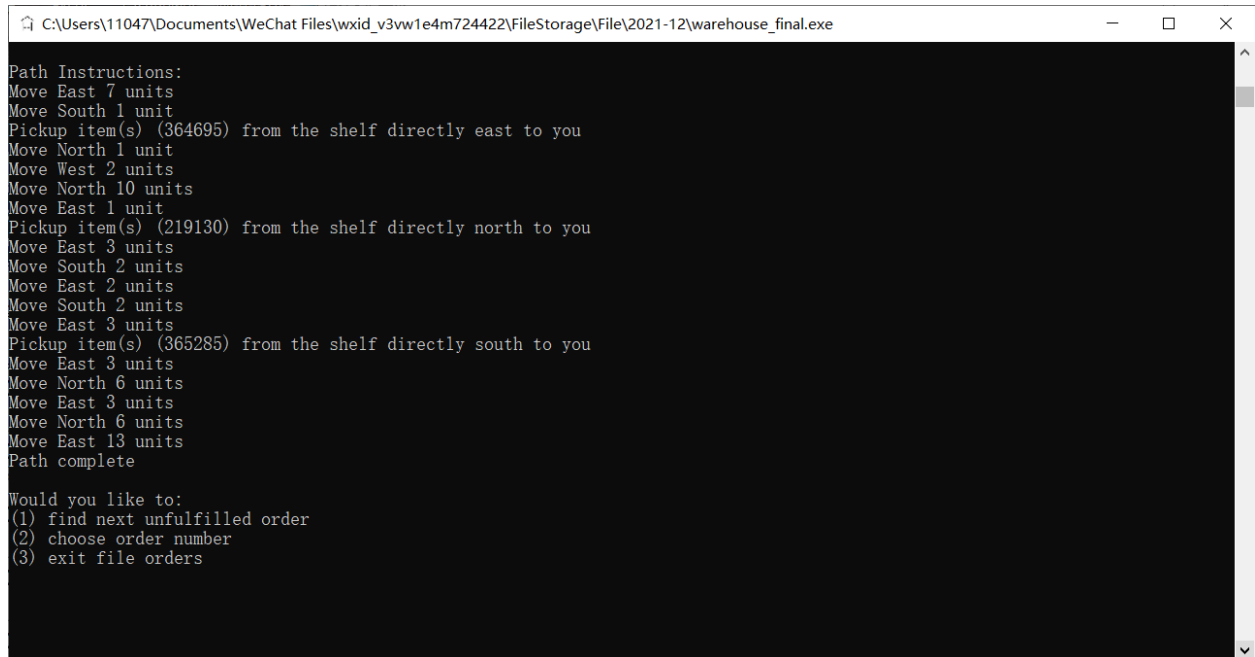
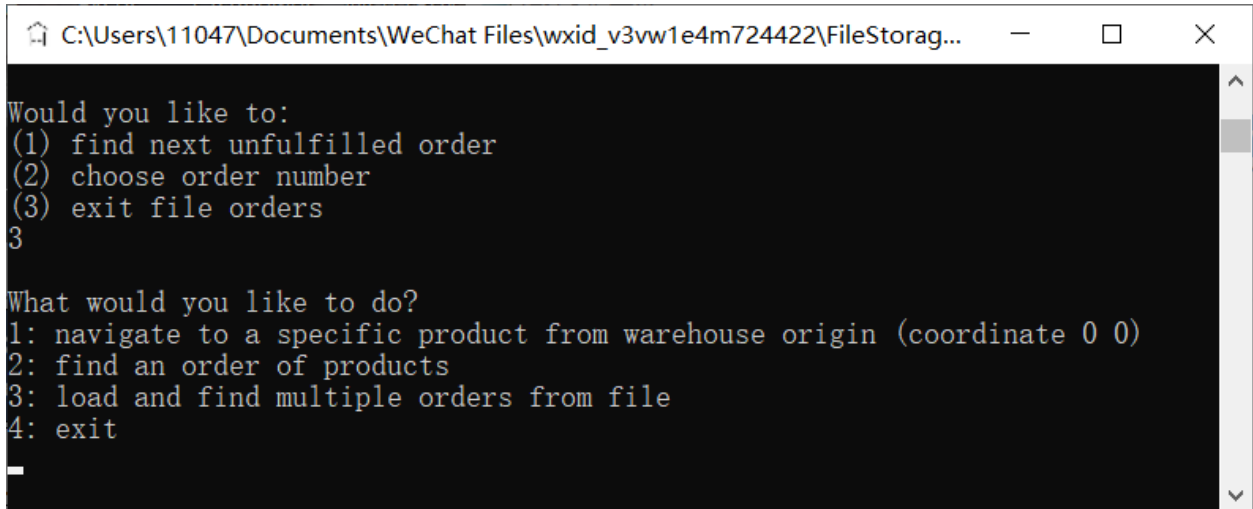


Figure 1.15 - Instructions for specified order (multiple orders)

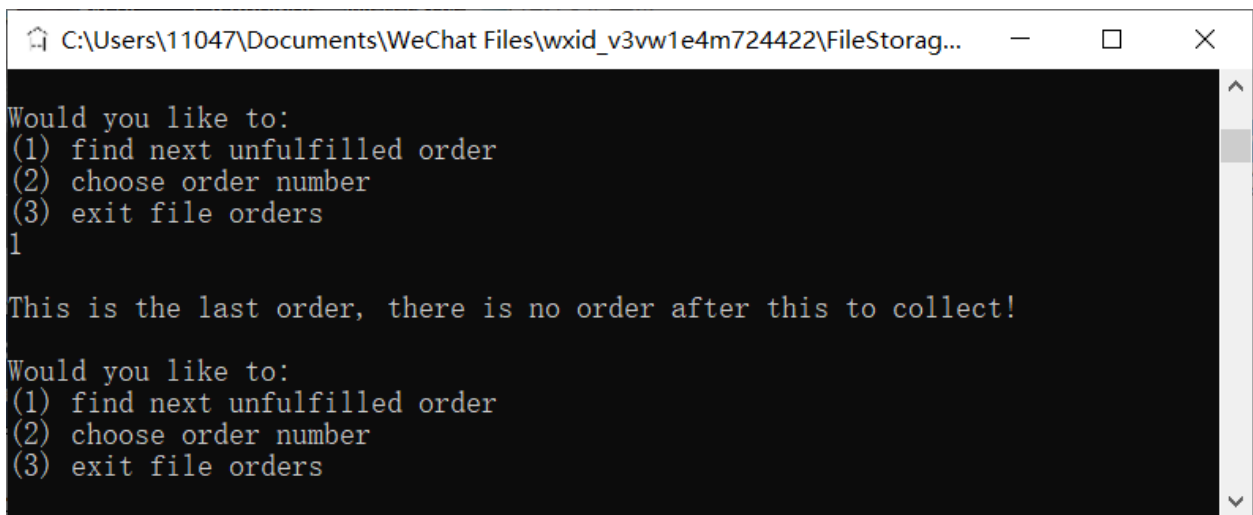
You can also enter '3' to quit file orders. Then you will be back to the main menu, as shown in Figure 1.16.



```
C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorag...  
Would you like to:  
(1) find next unfulfilled order  
(2) choose order number  
(3) exit file orders  
3  
  
What would you like to do?  
1: navigate to a specific product from warehouse origin (coordinate 0 0)  
2: find an order of products  
3: load and find multiple orders from file  
4: exit  
_
```

Figure 1.16 - Exit file orders (multiple orders)

If all the orders in the file were processed, the program will prompt you that there is no order left and you need to enter '3' to go back to the main menu. The UI is shown in Figure 1.17.



```
C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorag...  
Would you like to:  
(1) find next unfulfilled order  
(2) choose order number  
(3) exit file orders  
1  
  
This is the last order, there is no order after this to collect!  
  
Would you like to:  
(1) find next unfulfilled order  
(2) choose order number  
(3) exit file orders
```

Figure 1.17 - No order left (multiple orders)

Advanced Features

1. Supporting exporting instructions to txt file

2.Installation

System Requirements

MINIMUM:

OS: Windows 7 (32/64 bit)

Processor: Intel Core™ 2 Duo 2.0+ GHz or an equivalent AMD CPU

Memory: 4 GB RAM

Graphics: Not required

Storage: 50 MB available space

Java Runtime Environment (JRE): 17

RECOMMENDED:

OS: Windows 10 (64 bit)

Processor: Intel CPU Core™ i7 4790 4 GHz or an equivalent AMD CPU

Memory: 8 GB RAM

Graphics: Not required

Storage: 50 MB available space

Java Runtime Environment (JRE): 17

Setup & Configuration

1. Make sure you have properly installed Java Runtime Environment (JRE) 17 on your Windows computer. If you haven't, please follow the instructions on https://java.com/en/download/help/download_options.html
2. Click [here](#) to download WarehouseGuidingApp.exe
3. Double click the executable file to run the application
4. Enjoy using it!

Uninstalling

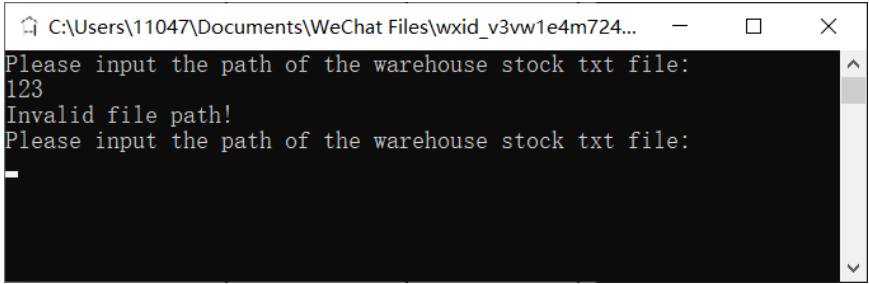
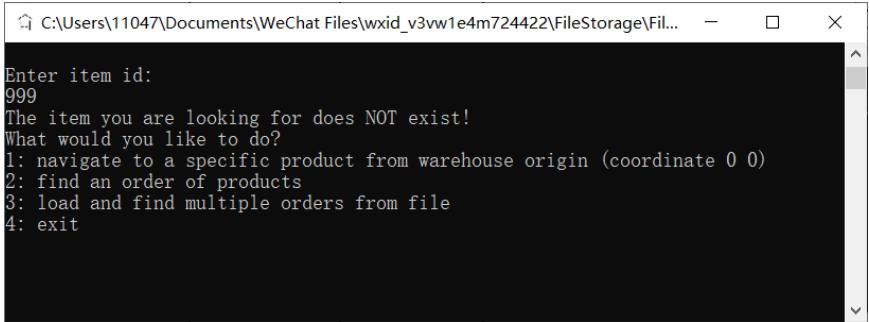
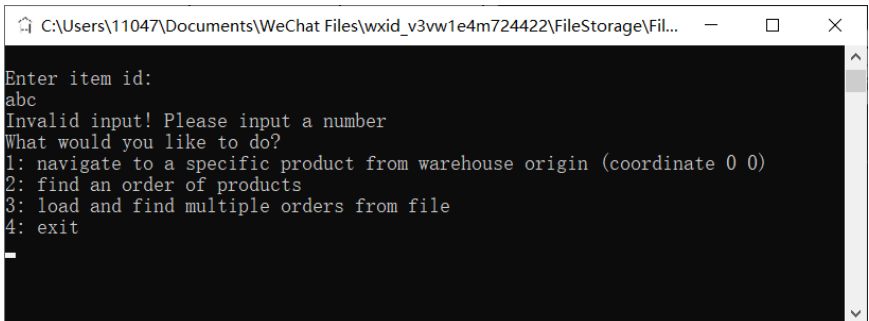
1. Simply delete WarehouseGuidingApp.exe in the directory where you downloaded it previously

3.Back Matter

Copyright

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Error Messages

Error Input	Output	Screenshot(All based on Final Release)
Invalid file path of warehouse map	Invalid file path!	 A terminal window titled 'C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724...' displays the following text: 'Please input the path of the warehouse stock txt file:', '123', 'Invalid file path!', and 'Please input the path of the warehouse stock txt file:' followed by a cursor.
Invalid item ID (not exist)	The item you are looking for does NOT exist!	 A terminal window titled 'C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorage\Fil...' displays the following text: 'Enter item id:', '999', 'The item you are looking for does NOT exist!', 'What would you like to do?', and a numbered list: '1: navigate to a specific product from warehouse origin (coordinate 0 0)', '2: find an order of products', '3: load and find multiple orders from file', and '4: exit'.
Invalid item ID (not a number)	Invalid input! Please input a number.	 A terminal window titled 'C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorage\Fil...' displays the following text: 'Enter item id:', 'abc', 'Invalid input! Please input a number', 'What would you like to do?', and a numbered list: '1: navigate to a specific product from warehouse origin (coordinate 0 0)', '2: find an order of products', '3: load and find multiple orders from file', and '4: exit'.

Invalid option number (any other input except '1' or '2' or '3')	Invalid input! Please input '1' or '2' or '3'.	<pre> C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorage\File\2021-... What would you like to do? 1: navigate to a specific product from warehouse origin (coordinate 0 0) 2: find an order of products 3: load and find multiple orders from file 4: exit 5 Invalid input! Please input '1' or '2' or '3' or '4'. What would you like to do? 1: navigate to a specific product from warehouse origin (coordinate 0 0) 2: find an order of products 3: load and find multiple orders from file 4: exit </pre>
Invalid file path of order file	Invalid file path!	<pre> C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorage\File\2021-... Please input the path of the order file: abc Invalid file path! Please input the path of the order file: </pre>
Wrong start or end location input	You can't start or end in one of item shelves	<pre> C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorage\File\2021-... Please enter the START point warehouse coordinates separated by a single space: 30 0 You can't start in one of item shelves Please enter the START point warehouse coordinates separated by a single space: </pre>
Start or end location either be negative or too large	please input the correct START location(only Positive Integer Number) & please input the START location within warehouse coordinate	<pre> C:\Users\11047\Documents\WeChat Files\wxid_v3vw1e4m724422\FileStorage\File\2021-... Please enter the START point warehouse coordinates separated by a single space: -1 -1 Please input a valid START location(only Positive Integer Numbers) Please enter the START point warehouse coordinates separated by a single space: 999 999 Please input the START location within warehouse coordinates of X:0-39 Y:0-24 Please enter the START point warehouse coordinates separated by a single space: </pre>

	es of X:0-39 Y: 0-24	
Wrong format of time limit	please input the correct time limit (only positive number)	<pre> Please enter the START point location seperated by a blank. 0 0 Please enter the END point location seperated by a blank. 0 0 Your start and end points are (0,0) and (0,0) Please enter the time limit to find the path in seconds 1.1.1 please input the correct time limit (only positive number) Please enter the time limit to find the path in seconds -123 please input the correct time limit (only positive number) Please enter the time limit to find the path in seconds 1.12 </pre>
Wrong input of items' size	please input the correct size (only positive integer number)	<pre> Type the size of the order: -1 please input the correct size (only positive integer number) Type the size of the order: 1.2 please input the correct size (only positive integer number) Type the size of the order: 5 please type id of products separated by blanks: (we will only accept the first 5 products) _ </pre>
Input items that are not placed in warehouse	please input the items that are placed in the warehous e	<pre> Type the size of the order: 1 please type id of products separated by blanks: (we will only accept the first 1 products) 32131231 please input the items that are placed in the warehouse please type id of products separated by blanks: (we will only accept the first 1 products) </pre>