

# Shopping Cart Collecting Route Planner

Chenyu Wang

## 1. Requirement

- 1) A user interface with basic options
  - 2) A map of the lot with a staff shown and several randomly placed carts
  - 3) A solution (not always the best) shown as a route on the map and text directions.
- Completed: 1) 2) 3)

## 2. Additional Requirement

The user could choose to reset the size of the map or the number of the carts.

## 3. Usage Scenario:

- 1) starting screen:

```
Welcome!
1) go get carts!
2) settings
3) exit
please choose(1/2/3): |
```

- 2) choose 1: start main program

There will be a map of lot:

```
please choose(1/2/3): 1
  0  1  2  3  4  5  6  7
+---+---+---+---+---+---+---+
0| S          C          |
1|          C          C          |
2|                                     |
3|                                     |
4|          C          |
5|                                     C          |
6|          C          |
7|          C          C          |
+---+---+---+---+---+---+---+
```

S: staff, in the left upper corner(0,0);

C: Cart, random number normally ranging from 3~8, random location except (0,0);

Lot size: 8\*8 by default

After providing a map of the lot, the program will provide another map of the lot with a suggested route to collect all the carts with text direction description.

```

    0   1   2   3   4   5   6   7
+---+---+---+---+---+---+---+
0| S   -   -   C               |
1|           C   |   -   C       |
2|           |               |   |
3|           |               |   |
4|           C               |   |
5|           |               |   C   |
6|           C   -   -   |   |   |
7|               C   C       |   |
+---+---+---+---+---+---+---+

```

```

(0,0) -> (0,1)
(0,1) -> (0,2)
(0,2) -> (0,3) pick up the cart!
(0,3) -> (1,3)
(1,3) -> (1,2) pick up the cart!
(1,2) -> (1,3)

```

...

```

(2,2) -> (1,2) pick up the cart!
(1,2) -> (0,2)
(0,2) -> (0,1)
(0,1) -> (0,0) route finished!

```

3)choose 2

```

please choose(1/2/3): 2
1)size
2)number of carts
3)back to the main menu
please choose(1/2/3):

```

Choose 1 to reset the size of the map and 2 to reset the number of carts.

#### 4.Usage Scenario for Additional Requirement:

Custom settings:

```
Welcome!
1) go get carts!
2) settings
3) exit
please choose(1/2/3): 2
1)size
2)number of carts
3)back to the main menu
please choose(1/2/3): 1
please choose a size(5~25):23
1)size
2)number of carts
3)back to the main menu
please choose(1/2/3): 2
please choose a number(3~20):11
1)size
2)number of carts
3)back to the main menu
please choose(1/2/3): 3
Welcome!
1) go get carts!
2) settings
3) exit
```

```
please choose(1/2/3): 1
 0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
0| S                                     |
1|                                     |
2|                                     C |
3|                                     |
4|                                     |
5|                                     C C |
6|                                     C |
7|                                     |
8|                                     |
9|                                     |
10|                                     C |
11|                                     C |
12|                                     |
13|                                     C C |
14|                                     C |
15|                                     |
16|                                     |
17|                                     |
18|                                     |
19|                                     C |
20|                                     |
21|                                     C |
22|                                     |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
```

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
0	S	-	-																					
1																								
2		-	-	-	-	C																		
3																								
4																								
5							-	-	-	-	C	C												
6											C													
7																								
8																								
9																								
10																			C	-	-	-	C	
11																								
12																								
13														-	-	-	-	-	-	-	C	-	C	
14												-	C											
15																								
16																								
17																								
18																								
19			C		-	-	-	-	-	-														
20																								
21											C	-	-	-	-	-	-	-						
22																								

## 5.Main Function Code Snippet:

```
def main():
    global lot
    size = 0
    number = 0
    while True:
        print("Welcome!")
        print("1) go get carts!")
        print("2) settings")
        print("3) exit")
        choice = input("please choose(1/2/3): ")
        if choice == "1":
            if size != 0 and number != 0:
                lot = Lot(size, number)
            elif size != 0:
                lot = Lot(size=size)
            elif number != 0:
                lot = Lot(num_carts=number)
            else:
                lot = Lot()
            print(lot)
            planner = RoutePlanner(lot)
            directions = planner.get_directions()
            lot.add_navigation(directions)
            print(lot)
            lot.print_directions(directions)
        if choice == "2":
            while True:
                print("1)size")
                print("2)number of carts")
                print("3)back to the main menu")
                choice_2 = input("please choose(1/2/3): ")
                if choice_2 == "1":
                    size = int(input("please choose a size(5~25):"))
                elif choice_2 == "2":
                    number = int(input("please choose a number(3~20):"))
                elif choice_2 == "3":
                    break
        if choice == "3":
            break
```