**[1] > make\_store,kroger,33000**

**OK:change\_completed**

**> make\_store,kroger,37000**

**ERROR:store\_identifier\_already\_exists**

**> make\_store,publix,33000**

**OK:change\_completed**

Make stores that will sell items to customers. The store identifiers (e.g., **kroger**, **publix**) must be

unique within the system.

1. make\_store时，Store Name必须 unique，🡪 重复make existing store报错

**[2] > display\_stores**

**name:kroger,revenue:33000**

**name:publix,revenue:33000**

**OK:display\_completed**

Display the stores that have been created.

2. Unchanged

**[3] > sell\_item,kroger,pot\_roast,5**

**OK:change\_completed**

**> sell\_item,kroger,cheesecake,4**

**OK:change\_completed**

**> sell\_item,publix,cheesecake,8**

**OK:change\_completed**

**> sell\_item,whole\_foods,antipasto,10**

**ERROR:store\_identifier\_does\_not\_exist**

**> sell\_item,kroger,cheesecake,3**

**ERROR:item\_identifier\_already\_exists**

Make items for the store to sell. The store identifiers must be valid (i.e., defined), and the item names

(e.g., **pot\_roast**, **cheesecake**) must be unique within the store where they are defined.

3. （1）sell\_item 调用的Store 必须存在 🡪 对不存在的store name sell\_item, 报错

（2）同一Store中，item name必须unique 🡪 store中已有某item，重复sell\_item 报错

**[4] > display\_items,kroger**

**cheesecake,4**

**pot\_roast,5**

**OK:display\_completed**

**> display\_items,publix**

**cheesecake,8**

**OK:display\_completed**

**> display\_items,whole\_foods**

**ERROR:store\_identifier\_does\_not\_exist**

Display the items for each store. The store identifiers must be valid.

4. Store name不存在时，对该store display\_items 报错

**[5] > make\_pilot,ffig8,Finneas,Fig,888-888-8888,890-12-3456,panam\_10,33**

**OK:change\_completed**

**> make\_pilot,ggrape17,Gillian,Grape,999-999-9999,234-56-7890,twa\_21,31**

**OK:change\_completed**

**> make\_pilot,ffig8,Frances,Faro,777-777-7777,678-90-1234,eastern\_6,36**

**ERROR:pilot\_identifier\_already\_exists**

**> make\_pilot,kkiwi23,Kiara,Kiwi,555-555-5555,890-12-3456,panam\_10,28**

**ERROR:pilot\_license\_already\_exists**

Make pilots to fly the drones in the system. The pilot's identifiers (e.g., **ffig8**, **ggrape17**) must be

unique within the system.

5. （1）make\_pilot时，pilot identifier 要unique 🡪 重复的 pilot identifier 报错

（2）make\_pilot时，pilot license 要unique 🡪 重复的 pilot license 报错

**[6] > display\_pilots**

**name:Finneas\_Fig,phone:888-888-8888,taxID:890-12-3456,licenseID:panam\_10,**

**experience:33**

**name:Gillian\_Grape,phone:999-999-9999,taxID:234-56-7890,licenseID:twa\_21,**

**experience:31**

**OK:display\_completed**

Display the status of the pilots within the system.

6. Unchanged

**[7] > make\_drone,kroger,1,40,1**

**OK:change\_completed**

**> make\_drone,whole\_foods,1,40,3**

**ERROR:store\_identifier\_does\_not\_exist**

**> make\_drone,kroger,1,100,1**

**ERROR:drone\_identifier\_already\_exists**

**> make\_drone,publix,1,40,3**

**OK:change\_completed**

**> make\_drone,kroger,2,20,3**

**OK:change\_completed**

Make drones that are used to deliver the groceries. The store identifiers must be valid, and the

drone identifiers (e.g., **1**, **2**) must be unique within the store where they are defined.

7. （1）make\_drone时，Store name 要预先存在 🡪 对不存在的store make\_drone 报错

（2）make\_drone时，该store 的drone identifier 要unique 🡪 make 已有的drone identifier 报错

**[8] > display\_drones,kroger**

**droneID:1,total\_cap:40,num\_orders:0,remaining\_cap:40,trips\_left:1**

**droneID:2,total\_cap:20,num\_orders:0,remaining\_cap:20,trips\_left:3**

**OK:display\_completed**

**> display\_drones,publix**

**droneID:1,total\_cap:40,num\_orders:0,remaining\_cap:40,trips\_left:3**

**OK:display\_completed**

**> display\_drones,whole\_foods**

**ERROR:store\_identifier\_does\_not\_exist**

Display the status of the drones for a given store. The store identifiers must be valid.

8. display\_drones时，Store name 要预先存在 🡪 对不存在的store name display\_drones 报错

**[9] > fly\_drone,kroger,1,ffig8**

**OK:change\_completed**

**> fly\_drone,whole\_foods,1,ggrape17**

**ERROR:store\_identifier\_does\_not\_exist**

**> fly\_drone,publix,2,ggrape17**

**ERROR:drone\_identifier\_does\_not\_exist**

**> fly\_drone,publix,1,hhoneydew20**

**ERROR:pilot\_identifier\_does\_not\_exist**

**> fly\_drone,publix,1,ggrape17**

**OK:change\_completed**

Assign pilots to command/fly the drones. The store, drone and pilot identifiers must all be valid.

Remember that a drone can only be flown/commanded by one pilot at a time, and a pilot can only

fly/command one drone at a time.

9. （1）fly\_drone，Store name 要预先存在 🡪 对不存在的store fly\_drone 报错

（2）fly\_drone，drone identifier 要预先存在 🡪 对不存在的drone identifier 会报错

（3）fly\_drone，pilot identifier 要预先存在 🡪 对不存在的pilot identifier 会报错

**[10] > display\_drones,kroger**

**droneID:1,total\_cap:40,num\_orders:0,remaining\_cap:40,trips\_left:1,flown\_by**

**:Finneas\_Fig**

**droneID:2,total\_cap:20,num\_orders:0,remaining\_cap:20,trips\_left:3**

**OK:display\_completed**

**> display\_drones,publix**

**droneID:1,total\_cap:40,num\_orders:0,remaining\_cap:40,trips\_left:3,flown\_by**

**:Gillian\_Grape**

**OK:display\_completed**

**> display\_drones,whole\_foods**

**ERROR:store\_identifier\_does\_not\_exist**

Display the status of the drones for a given store. The store identifiers must be valid, and the drone

information must include the pilot's name (e.g., **Finneas Fig**, **Gillian Grape**) if (and only if) a

pilot has been assigned.

10. error部分和上面#8 重复，即： display\_drones：Store name 要预先存在 🡪 对不存在的store display\_drones 报错

(这里强调的是： 如果pilot 已经被assign 了， 则display pilot name -- 这个A3 已经implement过，但是double check下)

**[11] > make\_customer,aapple2,Alana,Apple,222-222-2222,4,100**

**OK:change\_completed**

**> make\_customer,aapple2,Ariana,Asparagus,333-333-3333,5,150**

**ERROR:customer\_identifier\_already\_exists**

**> make\_customer,ccherry4,Carlos,Cherry,444-444-4444,5,300**

**OK:change\_completed**

Make customers to purchase items from stores. Customer identifiers (e.g., **aapple2**, **ccherry4**)

must be unique within the system.

11. make\_customer：customer identifier 要unique 🡪 重复make existing customer identifier 报错

**[12] > display\_customers**

**name:Alana\_Apple,phone:222-222-2222,rating:4,credit:100**

**name:Carlos\_Cherry,phone:444-444-4444,rating:5,credit:300**

**OK:display\_completed**

Display the status of the customers within the system.

12. Unchanged

**[13] > start\_order,kroger,purchaseA,1,aapple2**

**OK:change\_completed**

**> start\_order,kroger,purchaseB,1,aapple2**

**OK:change\_completed**

**> start\_order,whole\_foods,purchaseC,1,aapple2**

**ERROR:store\_identifier\_does\_not\_exist**

**> start\_order,kroger,purchaseA,1,aapple2**

**ERROR:order\_identifier\_already\_exists**

**> start\_order,kroger,purchaseC,3,aapple2**

**ERROR:drone\_identifier\_does\_not\_exist**

**> start\_order,kroger,purchaseC,1,bbanana3**

**ERROR:customer\_identifier\_does\_not\_exist**

**> start\_order,kroger,purchaseD,2,ccherry4**

**OK:change\_completed**

**> start\_order,publix,purchaseA,1,ccherry4**

**OK:change\_completed**

Allow the customers to place orders with a store, where the order will be delivered by the designated

drone. The store, drone and customer identifiers must all be valid. And the order identifier must be

unique within the store where the order has been placed.

13. （1）start\_order，Store name 要预先存在 🡪 对不存在的store start\_drone 报错

（2）start\_order，order identifier 要unique 🡪 如果已经存在该 order identifier，则报错

（3）start\_order，customer identifier 要预先存在 🡪 对不存在的customer identifier 会报错

**[14] > display\_orders,kroger**

**orderID:purchaseA**

**orderID:purchaseB**

**orderID:purchaseD**

**OK:display\_completed**

**> display\_orders,publix**

**orderID:purchaseA**

**OK:display\_completed**

**> display\_orders,whole\_foods**

**ERROR:store\_identifier\_does\_not\_exist**

Display the orders that have been placed with a given store. The store identifiers must be valid.

Also, the contents of the orders must be displayed as well. Though all of the orders are blank here –

because the customers haven't requested any items yet – later executions of this command will

demonstrate what the orders look like when items have been added.

14. display\_orders：Store name 要预先存在 🡪 对不存在的store display\_orders 报错

**[15] > request\_item,kroger,purchaseA,pot\_roast,3,10**

**OK:change\_completed**

**> request\_item,kroger,purchaseB,pot\_roast,4,5**

**OK:change\_completed**

**> request\_item,whole\_foods,purchaseA,cheesecake,1,10**

**ERROR:store\_identifier\_does\_not\_exist**

**> request\_item,kroger,purchaseE,cheesecake,1,10**

**ERROR:order\_identifier\_does\_not\_exist**

**> request\_item,kroger,purchaseA,truffle\_risotto,1,10**

**ERROR:item\_identifier\_does\_not\_exist**

**> request\_item,kroger,purchaseA,pot\_roast,1,10**

**ERROR:item\_already\_ordered**

**> request\_item,kroger,purchaseA,cheesecake,1,90**

**ERROR:customer\_cant\_afford\_new\_item**

**> request\_item,kroger,purchaseA,cheesecake,10,5**

**ERROR:drone\_cant\_carry\_new\_item**

**> request\_item,publix,purchaseA,cheesecake,3,10**

**OK:change\_completed**

**> request\_item,kroger,purchaseD,cheesecake,1,10**

**OK:change\_completed**

Customers request that items sold in the given stores be added to their orders. Though the weight

of an item is designated as part of the catalog of items offered by the store, the quantity and price

are determined when this command is executed. The store, order and item identifiers must be valid.

And an item can be added to an order only once. Finally, per the problem description, the drone

must be able to carry the weight of all of the items in the orders being carried, and the customer

must have enough credits to afford all of the items that they have requested so far.

15. （1）request\_item，Store name 要预先存在 🡪 对不存在的store request\_item报错

（2）request\_item，item identifier 要预先存在 🡪 对不存在的item request\_item, 则报错

（3）request\_item，order中的item 要unique 🡪 对该order 中 已经存在的 item request，则报错

（4）request\_item，assigned drone 要有足够的 remaining capacity 🡪 item total weight > drone remaining capacity时, 报错

（5）request\_item，customer 要有足够的 credit 🡪 customer credit >= item total price 时才能request, **但是老师没有说customer credit < item total price 时如何报错**

**[16] > display\_orders,kroger**

**orderID:purchaseA**

**item\_name:pot\_roast,total\_quantity:3,total\_cost:30,total\_weight:15**

**orderID:purchaseB**

**item\_name:pot\_roast,total\_quantity:4,total\_cost:20,total\_weight:20**

**orderID:purchaseD**

**item\_name:cheesecake,total\_quantity:1,total\_cost:10,total\_weight:4**

**OK:display\_completed**

**> display\_orders,publix**

**orderID:purchaseA**

**item\_name:cheesecake,total\_quantity:3,total\_cost:30,total\_weight:24**

**OK:display\_completed**

**> display\_customers**

**name:Alana\_Apple,phone:222-222-2222,rating:4,credit:100**

**name:Carlos\_Cherry,phone:444-444-4444,rating:5,credit:300**

**OK:display\_completed**

**> display\_stores**

**name:kroger,revenue:33000**

**name:publix,revenue:33000**

**OK:display\_completed**

**> display\_drones,kroger**

**droneID:1,total\_cap:40,num\_orders:2,remaining\_cap:5,trips\_left:1,flown\_by:**

**Finneas\_Fig**

**droneID:2,total\_cap:20,num\_orders:1,remaining\_cap:16,trips\_left:3**

**OK:display\_completed**

**> display\_drones,publix**

**droneID:1,total\_cap:40,num\_orders:1,remaining\_cap:16,trips\_left:3,flown\_by**

**:Gillian\_Grape**

**OK:display\_completed**

**> display\_pilots**

**name:Finneas\_Fig,phone:888-888-8888,taxID:890-12-3456,licenseID:panam\_10,**

**experience:33**

**name:Gillian\_Grape,phone:999-999-9999,taxID:234-56-7890,licenseID:twa\_21,**

**experience:31**

**OK:display\_completed**

All of these display commands have already been discussed. They are repeated here to help

illustrate the changes in the system as orders are either purchased or cancelled by the customers.

16. 这里只是recap 所有的display command，🡪 用来double check code

**[17] > purchase\_order,kroger,purchaseA**

**OK:change\_completed**

Customers may close an order and request that it be delivered as quickly as possible. When the

delivery occurs: (a) the customer pays the store for the (final) order; (b) the drone uses fuel to deliver

the order; and, (c) the pilot flying the drone is credited with a successful delivery.

17. 和A3 的#15一样

**[18] > display\_orders,kroger**

**orderID:purchaseB**

**item\_name:pot\_roast,total\_quantity:4,total\_cost:20,total\_weight:20**

**orderID:purchaseD**

**item\_name:cheesecake,total\_quantity:1,total\_cost:10,total\_weight:4**

**OK:display\_completed**

**> display\_orders,publix**

**orderID:purchaseA**

**item\_name:cheesecake,total\_quantity:3,total\_cost:30,total\_weight:24**

**OK:display\_completed**

**> display\_customers**

**name:Alana\_Apple,phone:222-222-2222,rating:4,credit:70**

**name:Carlos\_Cherry,phone:444-444-4444,rating:5,credit:300**

**OK:display\_completed**

**> display\_stores**

**name:kroger,revenue:33030**

**name:publix,revenue:33000**

**OK:display\_completed**

**> display\_drones,kroger**

**droneID:1,total\_cap:40,num\_orders:1,remaining\_cap:20,trips\_left:0,flown\_by**

**:Finneas\_Fig**

**droneID:2,total\_cap:20,num\_orders:1,remaining\_cap:16,trips\_left:3**

**OK:display\_completed**

**> display\_drones,publix**

**droneID:1,total\_cap:40,num\_orders:1,remaining\_cap:16,trips\_left:3,flown\_by**

**:Gillian\_Grape**

**OK:display\_completed**

**> display\_pilots**

**name:Finneas\_Fig,phone:888-888-8888,taxID:890-12-3456,licenseID:panam\_10,**

**experience:34**

**name:Gillian\_Grape,phone:999-999-9999,taxID:234-56-7890,licenseID:twa\_21,**

**experience:31**

**OK:display\_completed**

After the previous delivery, note that **$30** (the cost of the **purchaseA** order from **kroger**) has been

transferred from the customer to the store, and the pilot and drone stats have also been updated.

18. recap 所有的display command，和A3 #15 一样 🡪 purchase order 后，double check 一些参数的变化

**[19] > purchase\_order,whole\_foods,purchaseA**

**ERROR:store\_identifier\_does\_not\_exist**

**> purchase\_order,kroger,purchaseF**

**ERROR:order\_identifier\_does\_not\_exist**

**> purchase\_order,kroger,purchaseB**

**ERROR:drone\_needs\_fuel**

**> purchase\_order,kroger,purchaseD**

**ERROR:drone\_needs\_pilot**

For the purchase & delivery of an order to be successful, the store and order identifiers must be valid,

and the drone must have an assigned pilot and enough fuel (i.e., at least one more remaining trip).

19. （1）purchase\_order，Store name 要预先存在 🡪 对不存在的store purchase\_order报错

（2）purchase\_order，order identifier 要预先存在 🡪 对不存在的order purchase\_order, 则报错

（3）purchase\_order，assigned drone 必须 trip\_left >= 1 🡪 assigned drone trip\_left < 1，则报错

（4）purchase\_order，assigned drone 要 hasAssignedPilot 🡪 如果assigned drone 没有assigned pilot, 报错

**[20] > fly\_drone,kroger,2,ffig8**

**OK:change\_completed**

**> purchase\_order,kroger,purchaseD**

**OK:change\_completed**

Since the initial request to complete the **purchaseD** order failed because there was no pilot, we

assigned a pilot and the re-executed the purchase command.

20. 和A3 #9， #15 一样

**[21] > display\_orders,kroger**

**orderID:purchaseB**

**item\_name:pot\_roast,total\_quantity:4,total\_cost:20,total\_weight:20**

**OK:display\_completed**

**> display\_orders,publix**

**orderID:purchaseA**

**item\_name:cheesecake,total\_quantity:3,total\_cost:30,total\_weight:24**

**OK:display\_completed**

**> display\_customers**

**name:Alana\_Apple,phone:222-222-2222,rating:4,credit:70**

**name:Carlos\_Cherry,phone:444-444-4444,rating:5,credit:290**

**OK:display\_completed**

**> display\_stores**

**name:kroger,revenue:33040**

**name:publix,revenue:33000**

**OK:display\_completed**

**> display\_drones,kroger**

**droneID:1,total\_cap:40,num\_orders:1,remaining\_cap:20,trips\_left:0**

**droneID:2,total\_cap:20,num\_orders:0,remaining\_cap:20,trips\_left:2,flown\_by**

**:Finneas\_Fig**

**OK:display\_completed**

**> display\_drones,publix**

**droneID:1,total\_cap:40,num\_orders:1,remaining\_cap:16,trips\_left:3,flown\_by**

**:Gillian\_Grape**

**OK:display\_completed**

**> display\_pilots**

**name:Finneas\_Fig,phone:888-888-8888,taxID:890-12-3456,licenseID:panam\_10,**

**experience:35**

**name:Gillian\_Grape,phone:999-999-9999,taxID:234-56-7890,licenseID:twa\_21,**

**experience:31**

**OK:display\_completed**

After the previous delivery, note that **$10** (the cost of the **purchaseD** order from **kroger**) has been

transferred from the customer to the store, and the pilot and drone stats have also been updated.

21. 和A3 #15 一样，🡪 这里double check purchase成功后，customer credit，store revenue，pilot number of successful flights， drone trip\_left 的变化

**[22] > purchase\_order,publix,purchaseA**

**OK:change\_completed**

We execute one more purchase for demonstration purposes.

22. 重复上面的 #20, , 🡪 额外的use case

**[23] > display\_orders,kroger**

**orderID:purchaseB**

**item\_name:pot\_roast,total\_quantity:4,total\_cost:20,total\_weight:20**

**OK:display\_completed**

**> display\_orders,publix**

**OK:display\_completed**

**> display\_customers**

**name:Alana\_Apple,phone:222-222-2222,rating:4,credit:70**

**name:Carlos\_Cherry,phone:444-444-4444,rating:5,credit:260**

**OK:display\_completed**

**> display\_stores**

**name:kroger,revenue:33040**

**name:publix,revenue:33030**

**OK:display\_completed**

**> display\_drones,kroger**

**droneID:1,total\_cap:40,num\_orders:1,remaining\_cap:20,trips\_left:0**

**droneID:2,total\_cap:20,num\_orders:0,remaining\_cap:20,trips\_left:2,flown\_by**

**:Finneas\_Fig**

**OK:display\_completed**

**> display\_drones,publix**

**droneID:1,total\_cap:40,num\_orders:0,remaining\_cap:40,trips\_left:2,flown\_by**

**:Gillian\_Grape**

**OK:display\_completed**

**> display\_pilots**

**name:Finneas\_Fig,phone:888-888-8888,taxID:890-12-3456,licenseID:panam\_10,**

**experience:35**

**name:Gillian\_Grape,phone:999-999-9999,taxID:234-56-7890,licenseID:twa\_21,**

**experience:32**

**OK:display\_completed**

After the previous delivery, note that **$30** (the cost of the **purchaseA** order from **publix**) has been

transferred from the customer to the store, and the pilot and drone stats have also been updated.

23. 重复上面的 #21, 🡪 额外的use case

**[24] > cancel\_order,whole\_foods,purchaseB**

**ERROR:store\_identifier\_does\_not\_exist**

**> cancel\_order,kroger,purchaseG**

**ERROR:order\_identifier\_does\_not\_exist**

**> cancel\_order,kroger,purchaseB**

**OK:change\_completed**

This is an example of cancelling an order, which simply removes the order from the system. The store

and order identifiers must still be valid; however, a pilot and sufficient fuel for the assigned drone are

not required for successful cancellation.

24. （1）cancel\_order，Store name 要预先存在 🡪 对不存在的store cancel\_order报错

（2）cancel\_order，order identifier 要预先存在 🡪 对不存在的order cancel\_order, 则报错

**[25] > display\_orders,kroger**

**OK:display\_completed**

**> display\_orders,publix**

**OK:display\_completed**

**> display\_customers**

**name:Alana\_Apple,phone:222-222-2222,rating:4,credit:70**

**name:Carlos\_Cherry,phone:444-444-4444,rating:5,credit:260**

**OK:display\_completed**

**> display\_stores**

**name:kroger,revenue:33040**

**name:publix,revenue:33030**

**OK:display\_completed**

**> display\_drones,kroger**

**droneID:1,total\_cap:40,num\_orders:0,remaining\_cap:40,trips\_left:0**

**droneID:2,total\_cap:20,num\_orders:0,remaining\_cap:20,trips\_left:2,flown\_by**

**:Finneas\_Fig**

**OK:display\_completed**

**> display\_drones,publix**

**droneID:1,total\_cap:40,num\_orders:0,remaining\_cap:40,trips\_left:2,flown\_by**

**:Gillian\_Grape**

**OK:display\_completed**

**> display\_pilots**

**name:Finneas\_Fig,phone:888-888-8888,taxID:890-12-3456,licenseID:panam\_10,**

**experience:35**

**name:Gillian\_Grape,phone:999-999-9999,taxID:234-56-7890,licenseID:twa\_21,**

**experience:32**

**OK:display\_completed**

None of the store, customer, drone, or pilot stats were changed because of the cancellation.

25. 基本是重复上面的 #21, 只是被cancel 的order 不再 display ( 和A3 #16 一样)

**[26] > stop**

**stop acknowledged**

**simulation terminated**

26. unchanged