Test case explanation for Project OrderManager:

Test start with the Function SKU test:

SKU should be a 12-character value of the form AA-NNNNNN-CC where A is an upper-case letter, N is a digit from 0-9, and C is either a digit or an upper-case letter. For example, "AB-123456-0N". Test result below including one valid and one invalid data:

```
_____________________________
Test Function for isSKU START
isSKU 'AA-000000-A0' is valid
isSKU'AA-000-A0'  is invalid
Test Function for isSKU END
_____________________________
```

Test results for the create, delete and update operations of Customers are shown in below:

```
Inserted rows into table Customer
Test for customer table including insert(create), delete, update START
1: Test inserted (created) customer information and auto-genarated ID

Customer:
CustomerId  Name       Address       City  State     Country
1           Harry       Street1   San Jose  CA        US
2           Sally       Street2   San Jose  CA        US
3           George      Street3   Fremont   CA        US
4           Ada         Street4   Fremont   CA        US

2: Test Deleted customer(name: ada Id 104) information

Customer:
CustomerId  Name       Address       City  State     Country
1           Harry       Street1   San Jose  CA        US
2           Sally       Street2   San Jose  CA        US
3           George      Street3   Fremont   CA        US

3: Test Updated customer(id = 3 old Address: street3; new Address : new street 3) information

Customer:
CustomerId  Name       Address               City  State     Country
1           Harry       Street1           San Jose  CA        US
2           Sally       Street2           San Jose  CA        US
3           George      new street 3      Fremont   CA        US

Test for customer table including insert(create), delete, update END
_____________________________
```

Test results for the create, delete and update operations of Products are shown in below:

```
_____________________________
Inserted rows into table Product
Test for Product table including insert(create), delete, update Start

 1: test for insert(create) Product:
SKU                 Name                Description
AA-000000-0A        MacBook Air         Laptop
AA-000000-0B        MacBook             Laptop
AA-000000-0C        MacBook Pro         Laptop
AA-000000-0D        Ipad Pro            Ipad
AA-000000-0E        Ipad min            Ipad
AA-000000-0F        Apple Watch         Watch
AA-000000-0G        Apple TV            TV
AA-000000-0H        Multi_Apple TV      TV
```

```
2: test Delete Product with SKU: AA-000000-0H

Product:
SKU                 Name                Description
AA-000000-0A        MacBook Air         Laptop
AA-000000-0B        MacBook             Laptop
AA-000000-0C        MacBook Pro         Laptop
AA-000000-0D        Ipad Pro            Ipad
AA-000000-0E        Ipad min            Ipad
AA-000000-0F        Apple Watch         Watch
AA-000000-0G        Apple TV            TV

3; Test Update Product with SKU: AA-000000-0F from Apple TV to Multi TV Apple

Product:

Product with SKU: AA-000000-0A
SKU                 Name                Description
AA-000000-0A        MacBook Air         Laptop
AA-000000-0B        MacBook             Laptop
AA-000000-0C        MacBook Pro         Laptop
AA-000000-0D        Ipad Pro            Ipad
AA-000000-0E        Ipad min            Ipad
AA-000000-0F        Multi TV Apple      Watch
AA-000000-0G        Apple TV            TV
Test for Product table including insert(create), delete, update END
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```

Test results for the create, delete and update operations of InventoryRecord are shown in below:

```
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Inserted rows into InventoryRecord
Test for InventoryRecord table including insert(create), delete, update Start

 1: Test create InventoryRecord
Unit                Price               SKU
100                 1100.0               AA-000000-0A
100                 1500.0               AA-000000-0B
200                 1200.0               AA-000000-0C
120                 500.0                AA-000000-0D
110                 400.0                AA-000000-0E
230                 300.0                AA-000000-0F
400                 900.0                AA-000000-0G

2 : Test delete InventoryRecord Delete SKU: AA-000000-0G
Unit                Price               SKU
100                 1100.0               AA-000000-0A
100                 1500.0               AA-000000-0B
200                 1200.0               AA-000000-0C
120                 500.0                AA-000000-0D
110                 400.0                AA-000000-0E
230                 300.0                AA-000000-0F

Update Inventory with SKU: AA-000000-0F

I3: test nventoryRecord Update SKU: AA-000000-0F from 230 to unit 130
Unit                Price               SKU
100                 1100.0               AA-000000-0A
100                 1500.0               AA-000000-0B
200                 1200.0               AA-000000-0C
120                 500.0                AA-000000-0D
110                 400.0                AA-000000-0E
130                 300.0                AA-000000-0F
Test for Product table including insert(create), delete, update End
-----------------------------------
```

Test results for the create, delete and update operations of SingleOrder are shown in below:

```
_____________________________________
Inserted rows into SingleOrder
Test for SingleOrder table including insert(create), delete, update Start

test_SingleOrder
CustomerId          OrderDate           ShipDate
1                   2018-11-25          2018-11-26
2                   2018-11-25          null
3                   2018-11-25          2018-11-26
3                   2018-11-26          2018-11-27

 Test Delete_SingleOrder with CustomerId: 3
CustomerId          OrderDate           ShipDate
1                   2018-11-25          2018-11-26
2                   2018-11-25          null

Update SingleOrder with CustomerId: 1

 Test update_SingleOrder shipdate to 2018-11-25 CustomerId = 1
CustomerId          OrderDate           ShipDate
1                   2018-11-25          2018-11-25
2                   2018-11-25          null
Test for SingleOrder table including insert(create), delete, update End
_____________________________________
```

Test results for the create, delete and update operations of OrderRecord are shown in below:

```
_____________________________________
Inserted rows into OrderRecord
Test for OrderRecord table including insert(create), delete, update Start

Show test_OrderRecord with OrderId: 1
OrderId             SKU                 Unit                Price
1                   AA-000000-0A        2                   1100.0
1                   AA-000000-0B        1                   1500.0
2                   AA-000000-0A        2                   1100.0
2                   AA-000000-0C        2                   1200.0

 Test Delete_OrderRecord with OrderId: 2
OrderId             SKU                 Unit                Price
1                   AA-000000-0A        2                   1100.0
1                   AA-000000-0B        1                   1500.0

Update OrderRecord with OrderId: 1

Test Update_OrderRecord with OrderId: 1 and SKu = 'AA-000000-0A' : unit change from 2 to 20
OrderId             SKU                 Unit                Price
1                   AA-000000-0A        20                  1100.0
1                   AA-000000-0B        1                   1500.0
Test for Orderrecord table including insert(create), delete, update End
_____________________________________
```

Test Trigger_ReduceInventory:
after insert 4 unit of item SKU AA-000000-0A , the unit of SKU Auto reduce to 100 - 4 = 96 as the table shown below:

```
 new InventoryRecord

 after insert 4 unit of item SKu AA-000000-0A , the unit of SKU should be 100 - 4 = 96
Unit                Price               SKU
96                  1100.0               AA-000000-0A
99                  1500.0               AA-000000-0B
198                 1200.0               AA-000000-0C
120                 500.0                AA-000000-0D
110                 400.0                AA-000000-0E
130                 300.0                AA-000000-0F
```

Test a real-world order case with back-order product—Transaction:

If the order is back-ordered, a single orderRecord failed (throw exception) the whole order will be rolled back.

```
Before insert SingleOrder with back-ordered OrderRecord
OrderId             CustomerId          OrderDate           ShipDate
1                    1                  2018-11-25           2018-11-25
2                    2                  2018-11-25           null

After insert SingleOrder with back-ordered OrderRecord
OrderId             CustomerId          OrderDate           ShipDate
1                    1                  2018-11-25           2018-11-25
2                    2                  2018-11-25           null
```