1. Sources code

a. Part A

Includes:

```abap
CLASS lcl_products DEFINITION.
  PUBLIC SECTION.

    METHODS: set_attributes
      IMPORTING
        im_id             TYPE  z039_product-product_id
        im_name           TYPE  z039_product-productname
        im_model          TYPE  z039_product-model
        im_brand          TYPE  z039_product-brand
        im_engine         TYPE  z039_product-engine
        im_speed          TYPE  z039_product-topspeed
        im_fuelEfficiency TYPE  z039_product-fuel_efficiency
        im_price          TYPE  z039_product-price,

    get_attributes,
    constructor.
  CLASS-METHODS: get_no_of_products EXPORTING no_of_products TYPE  i.
```

```abap
    PRIVATE SECTION.

    DATA: gv_id              TYPE    z039_product-product_id,
          gv_name            TYPE    z039_product-productname,
          gv_model           TYPE    z039_product-model,
          gv_brand           TYPE    z039_product-brand,
          gv_engine          TYPE    z039_product-engine,
          gv_speed           TYPE    z039_product-topspeed,
          gv_fuelEfficiency  TYPE    z039_product-fuel_efficiency,
          gv_price           TYPE    z039_product-price.

    CLASS-DATA gv_no_of_products    TYPE    i.

ENDCLASS.

CLASS lcl_products IMPLEMENTATION.
METHOD constructor.
  gv_no_of_products  = gv_no_of_products + 1.
 ENDMETHOD.

*Total number of products
METHOD get_no_of_products.
  no_of_products = gv_no_of_products.
ENDMETHOD.

 METHOD  set_attributes.
   gv_id = im_id.
   gv_name = im_name.
   gv_model = im_model.
   gv_brand = im_brand.
   gv_engine = im_engine.
   gv_speed = im_speed.
   gv_fuelefficiency = im_fuelefficiency.
   gv_price = im_price.
 ENDMETHOD.

 METHOD get_attributes.
 WRITE: /'Product ID:        ', gv_id,
        /'Product name:      ', gv_name,
        /'Product model:     ', gv_model,
        /'Product brand:     ', gv_brand,
        /'Product engine:   ',gv_engine,
        /'Product speed:     ', gv_speed,
        /'Fuel efficiency: ', gv_fuelefficiency,
        /'Product price: ', gv_price,
        /.
 ENDMETHOD.

 ENDCLASS.
```

Report

```
*&---------------------------------------------------------------------*
*& Report z_039_ass2a
*&---------------------------------------------------------------------*
*&
*&---------------------------------------------------------------------*
REPORT z_039_ass2a.
INCLUDE z_039_class_include_ass2a.
 DATA: it_products TYPE TABLE OF z039_product,
       wa_products TYPE z039_product,
       lc_product TYPE REF TO lcl_products,
       it_product_list TYPE TABLE OF REF TO lcl_products.

 START-OF-SELECTION.

 SELECT *
 FROM z039_product INTO TABLE it_products.
 SORT it_products BY product_id DESCENDING.

 LOOP AT it_products INTO wa_products.
 CREATE OBJECT lc_product.
  lc_product->set_attributes(
    EXPORTING
      im_id             = wa_products-product_id
      im_name           = wa_products-productname
      im_model          = wa_products-model
      im_brand          = wa_products-brand
      im_engine         = wa_products-engine
      im_speed          = wa_products-topspeed
      im_fuelefficiency = wa_products-fuel_efficiency
      im_price          = wa_products-price
  ).

    APPEND lc_product TO it_product_list.
   ENDLOOP.

   DATA lv_no_of_products TYPE i.
   CALL METHOD lcl_products=>get_no_of_products
     IMPORTING
       no_of_products = lv_no_of_products
     .
    WRITE: /'Total number of products: ',lv_no_of_products.
    ULINE.

   LOOP AT it_product_list INTO lc_product.
   FORMAT COLOR 7.
   WRITE: /'Object: ',sy-tabix.
   FORMAT COLOR OFF.
   lc_product->get_attributes( ).
   ENDLOOP.
```

b. Part B

Program Z_039_DYNPRO_ASS2_B

```
*&---------------------------------------------------------------*
*& Module Pool     Z_039_DYNPRO_ASS2_B
*&---------------------------------------------------------------*
*&
*&---------------------------------------------------------------*

INCLUDE Z_039_DYNPRO_ASS2_TOP          .   " Global Data

* INCLUDE Z_039_DYNPRO_ASS2_O01          . " PBO-Modules
* INCLUDE Z_039_DYNPRO_ASS2_I01          . " PAI-Modules
* INCLUDE Z_039_DYNPRO_ASS2_F01          . " FORM-Routines



INCLUDE z_039_dynpro_ass2_status_0100.

INCLUDE z_039_dynpro_ass2_b_user_0100.

INCLUDE z_039_dynpro_ass2_status_0200.

INCLUDE z_039_dynpro_ass2_user_0200.

INCLUDE z_039_dynpro_ass2_b_user_0200.

INCLUDE z_039_dynpro_ass2_input_valiid.



.
```

Includes:

```
*&---------------------------------------------------------------------*
*& Include Z_039_DYNPRO_ASS2_TOP                      - Module Pool
Z_039_DYNPRO_ASS2_B
*&---------------------------------------------------------------------*
PROGRAM Z_039_DYNPRO_ASS2_B.
TABLES z039_product.
DATA: ok_code LIKE sy-ucomm, wa_products TYPE z039_product.



*----------------------------------------------------------------------*
***INCLUDE Z_039_DYNPRO_ASS2_B_USER_0100.
```

```abap
*--------------------------------------------------------------------*
*&-------------------------------------------------------------------*
*&      Module  USER_COMMAND_0100  INPUT
*&-------------------------------------------------------------------*
*       text
*--------------------------------------------------------------------*

MODULE user_command_0100 INPUT.
  CASE ok_code.
    WHEN 'BACK'.
      LEAVE PROGRAM.
    WHEN 'SELECT'.
    CALL FUNCTION 'ENQUEUE_EZ_Z039_PRODUCT'
      EXPORTING
        mode_z039_product = 'E'
        client            = SY-MANDT
        product_id        = z039_product-product_id

      EXCEPTIONS
        foreign_lock      = 1
        system_failure    = 2
        others            = 3
       .

      SELECT SINGLE * FROM z039_product INTO wa_products WHERE product_id =
z039_product-product_id.

  ENDCASE.
  CLEAR ok_code.



ENDMODULE.


*--------------------------------------------------------------------*
***INCLUDE Z_039_DYNPRO_ASS2_B_USER_0200.
*--------------------------------------------------------------------*
*&-------------------------------------------------------------------*
*&      Module  USER_COMMAND_0200  INPUT
*&-------------------------------------------------------------------*
*       text
*--------------------------------------------------------------------*
MODULE user_command_0200 INPUT.

*Release shared lock

    CALL FUNCTION 'DEQUEUE_EZ_Z039_PRODUCT'
      EXPORTING
        mode_z039_product = 'S'
        client            = SY-MANDT
        product_id        = Z039_product-product_id
       .
  CASE ok_code.
    WHEN 'EXIT'.
      LEAVE PROGRAM.
```

```abap
      WHEN 'BACK'.
      WHEN'SAVE'.
          IF z039_product <> wa_products.

*       Create Exclusive lock

        CALL FUNCTION 'ENQUEUE_EZ_Z039_PRODUCT'
          EXPORTING
            mode_z039_product = 'E'
            client            = SY-MANDT
            product_id        = Z039_product-product_id

          EXCEPTIONS
            foreign_lock      = 1
            system_failure    = 2
            others            = 3
          .


          MODIFY z039_product FROM z039_product.

*Release Exclusive lock
        CALL FUNCTION 'DEQUEUE_EZ_Z039_PRODUCT'
          EXPORTING
            mode_z039_product = 'E'
            client            = SY-MANDT
            product_id        = Z039_product-product_id

          .
          ENDIF.
      ENDCASE.
    CLEAR ok_code.



ENDMODULE.




*----------------------------------------------------------------------*
***INCLUDE Z_039_DYNPRO_ASS2_INPUT_VALIID.
*----------------------------------------------------------------------*
*&---------------------------------------------------------------------*
*&      Module  Input_validation  INPUT
*&---------------------------------------------------------------------*
*       text
*----------------------------------------------------------------------*
MODULE Input_validation INPUT.

  SELECT SINGLE *
    FROM z039_product INTO wa_products
    WHERE product_id = z039_product-product_id.
  IF sy-subrc <> 0.
    MESSAGE e000(z_039_mecl) WITH ok_code.
  ENDIF.
```
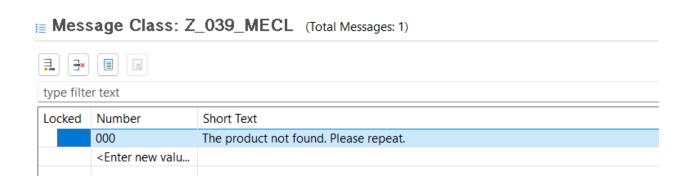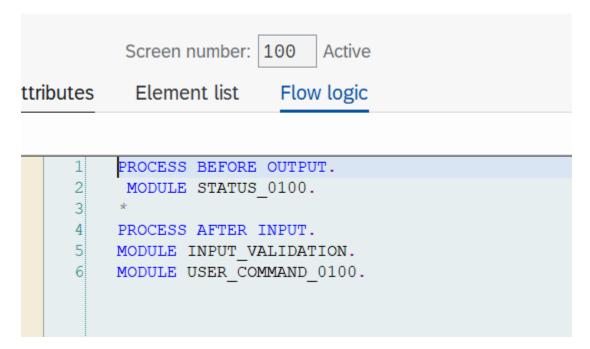
```
ENDMODULE.
```

GUI Status:

```
STATUS_0100
 1 *--------------------------------------------------------------------*
 2 ***INCLUDE Z_039_DYNPRO_ASS2_STATUS_0100.
 3 *--------------------------------------------------------------------*
 4 *&-------------------------------------------------------------------*
 5 *& Module STATUS_0100 OUTPUT
 6 *&-------------------------------------------------------------------*
 7 *&
 8 *&-------------------------------------------------------------------*
 9 MODULE status_0100 OUTPUT.
10  SET PF-STATUS '100'.
11   SET TITLEBAR '100'.
12 ENDMODULE.
```

```
▶ STATUS_0200
 1 *--------------------------------------------------------------------*
 2 ***INCLUDE Z_039_DYNPRO_ASS2_STATUS_0200.
 3 *--------------------------------------------------------------------*
 4 *&-------------------------------------------------------------------*
 5 *& Module STATUS_0200 OUTPUT
 6 *&-------------------------------------------------------------------*
 7 *&
 8 *&-------------------------------------------------------------------*
 9 MODULE status_0200 OUTPUT.
10   SET PF-STATUS '200'.
11 SET TITLEBAR '200'.
12
13 z039_product = wa_products.
14 ENDMODULE.
```

Dynpro Top

```
 Z_039_DYNPRO_ASS2_B ▶
 1 *&-------------------------------------------------------------------*
 2 *& Include Z_039_DYNPRO_ASS2_TOP          - Module Pool     Z_039_DYNPRO_ASS2_B
 3 *&-------------------------------------------------------------------*
 4 PROGRAM Z_039_DYNPRO_ASS2_B.
 5 TABLES z039_product.
 6 DATA: ok_code LIKE sy-ucomm, wa_products TYPE z039_product.
```

Message class:

Message Class: Z_039_MECL (Total Messages: 1)

type filter text

Locked	Number	Short Text
	000	The product not found. Please repeat.
	<Enter new valu...	

Screens:

Screen number: 100   Active

ttributes   Element list   Flow logic

```
1   PROCESS BEFORE OUTPUT.
2    MODULE STATUS_0100.
3   *
4   PROCESS AFTER INPUT.
5   MODULE INPUT_VALIDATION.
6   MODULE USER_COMMAND_0100.
```

Screen number: 200   Active

utes   Element list   Flow logic

```
1   PROCESS BEFORE OUTPUT.
2   MODULE STATUS_0200.
3   *
4   PROCESS AFTER INPUT.
5    MODULE USER_COMMAND_0200.
```

2. The output

Part A

```
Program Z_039_ASS2_24_PART_A
_____

Total number of products:              10
_____

Object:            1
Product ID:        C00010
Product name:      VOLKSWAGEN TIGUAN
Product model:     MATCH
Product brand:     VOLKSWAGEN
Product engine:    DIESEL
Product speed:     123
Fuel efficiency:   46
Product price:      33.888,00


Object:            2
```

```
Program Z_039_ASS2_24_PART_A
```

```
Object:              2
Product ID:          C00009
Product name:        HYUNDAI KONA
Product model:       N LINE
Product brand:       HYNDAI
Product engine:      PETROL
Product speed:       112
Fuel efficiency:  48
Product price:       25.831,00
```

```
Object:              3
Product ID:          C00008
Product name:        HYUNDAI I30
Product model:       PREMIUM
Product brand:       HYNDAI
Product engine:      PETROL
Product speed:       122
Fuel efficiency:  52
Product price:       25.050,00
```

```
Object:            4
Product ID:        C00007
Product name:      NISSAN LEAF
Product model:     SHIRO
Product brand:     NISSAN
Product engine:    ELECTRIC
Product speed:     90
Fuel efficiency:   0
Product price:     24.514,00
```

```
Object:            5
Product ID:        C00006
Product name:      FIAT 500e
Product model:     STANDARD
Product brand:     FIAT
Product engine:    ELECTRIC
Product speed:     93
Fuel efficiency:   0
Product price:     30.120,00
```

```
Object:              6
Product ID:          C00005
Product name:        RENAULT CLIO
Product model:       TECHNO
Product brand:       RENAULT
Product engine:      PETROL
Product speed:       112
Fuel efficiency:     67
Product price:        20.346,00
```

```
Object:              7
Product ID:          C00004
Product name:        RENAULT CLIO
Product model:       EVOLUTION
Product brand:       RENAULT
Product engine:      PETROL
Product speed:       112
Fuel efficiency:     54
Product price:        15.290,00
```

```
Object:           8
Product ID:       C00003
Product name:     HONDA CIVIC
Product model:    ELEGANCE
Product brand:    HONDA
Product engine:   HYBRID
Product speed:    111
Fuel efficiency:  60
Product price:     35.005,00
```

```
Object:           9
Product ID:       C00002
Product name:     TOYOTA COROLLA
Product model:    ICON
Product brand:    TOYOTA
Product engine:   HYBRID
Product speed:    111
Fuel efficiency:  64
Product price:     27.650,00
```

```
Object:              10
Product ID:          C00001
Product name:        VOLKSWAGEN GOLF
Product model:       LIFE
Product brand:       VOLKSWAGEN
Product engine:      PETROL
Product speed:       126
Fuel efficiency:     52
Product price:        24.961,00
```
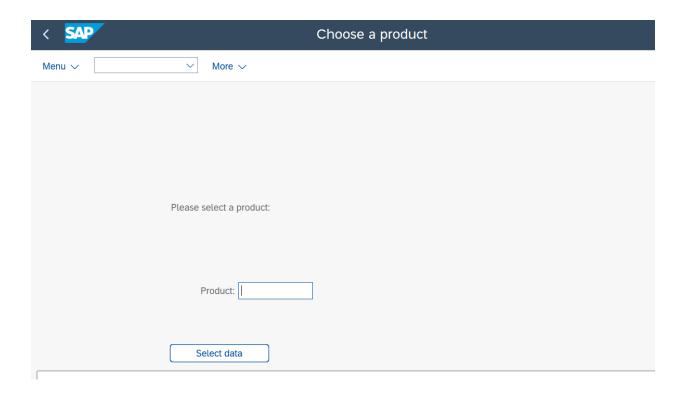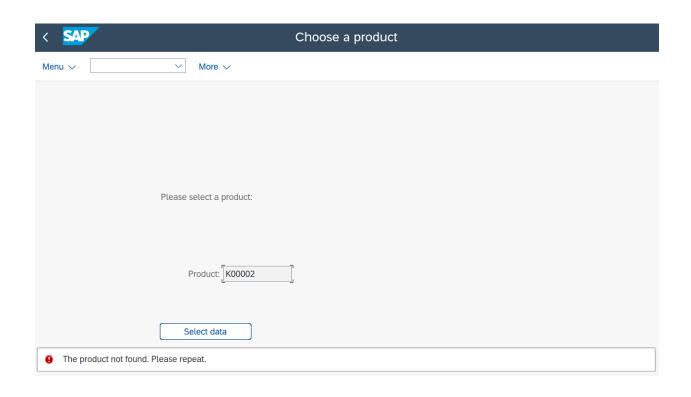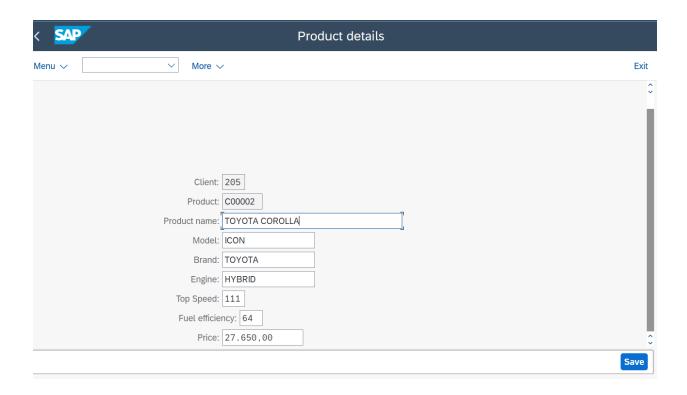
Part B

‹ SAP		Choose a product	

Menu ⌄   [⌄]   More ⌄

Please select a product:

Product: [   ]

[Select data]

Menu ⌄ [⌄]   More ⌄

Please select a product:

Product: [K00002]

[Select data]

🛑 The product not found. Please repeat.

Menu ⌄ [⌄]   More ⌄   Exit

Client: [205]
Product: [C00002]
Product name: [TOYOTA COROLLA]
Model: [ICON]
Brand: [TOYOTA]
Engine: [HYBRID]
Top Speed: [111]
Fuel efficiency: [64]
Price: [27.650,00]

[Save]

The Exclusive lock