

# CS410/560 - Software Engineering

---

## Assignment 3 G AN

**Group members : Yi Ren (002269013), Wentao Lu (002276355)**

## Requirements Engineering

This exercise is for a simplified supermarket cash register system. The normal procedure

for using the cash register is as follows:

- A customer arrives at the checkout with items to pay.
- The cashier records the identification number of each item, as well as the quantity if it is greater than one.
- The checkout displays the price of each item and its description.
- When all purchases are recorded, the cashier signals the end of the sale.
- The cash register displays the total purchases.
- The customer chooses his method of payment:
  - ✓ cash: the cashier collects the money received; the cashier indicates the currency to be returned to the customer;
  - ✓ check: the cashier checks the creditworthiness of the customer by transmitting a request to an authorization center via the cashier;
  - ✓ credit card: a bank terminal is part of the cash register. It transmits an authorization request to an authorization center according to the type of card.
- The cash register registers the sale and prints a receipt.
- The cashier gives the customer the receipt.

After the items have been entered, the customer can present discount coupons for certain items to the cashier. When payment is completed, the checkout transmits information on the number of items sold to the inventory management system.

Every morning, the store manager initializes the cashes register for the day.

1. Write a detailed use case diagram for the cash register. Feel free to use the use case relationships to make your diagram more precise.



## 2. Write an essential detailed description of the main use case: PROCESS CHECKOUT. (See Textual Use Case Description Example in 7. Modeling with UML Part 2, slide 10).

ID	1
Name	Record itme info
Participating actor	Cashier
Entry condition	A customer arrives at the checkout with items to pay
Exit condition	All the items recorded
Flow of events	1. Customer put items on the counter. 2. Cashier set up the system to get ready for a new customer. 3. Cashier record items one by one, input the number of each item. 4. All items of the customer being served are recorded.
Special requirements	If a customer shows a coupon, the cashier need to deal with it.

ID	2
Name	Add coupons
Participating actor	Cashier
Entry condition	Customer has a valid counter for a item.
Exit condition	The discount is taken into account.
Flow of events	<ul style="list-style-type: none"> <li>1. Customer shows coupon for a certain item.</li> <li>2. Cashier validate the coupon .</li> <li>3. Cashier input the coupon into system.</li> <li>4. Display the adjusted price.</li> </ul>
Special requirements	No

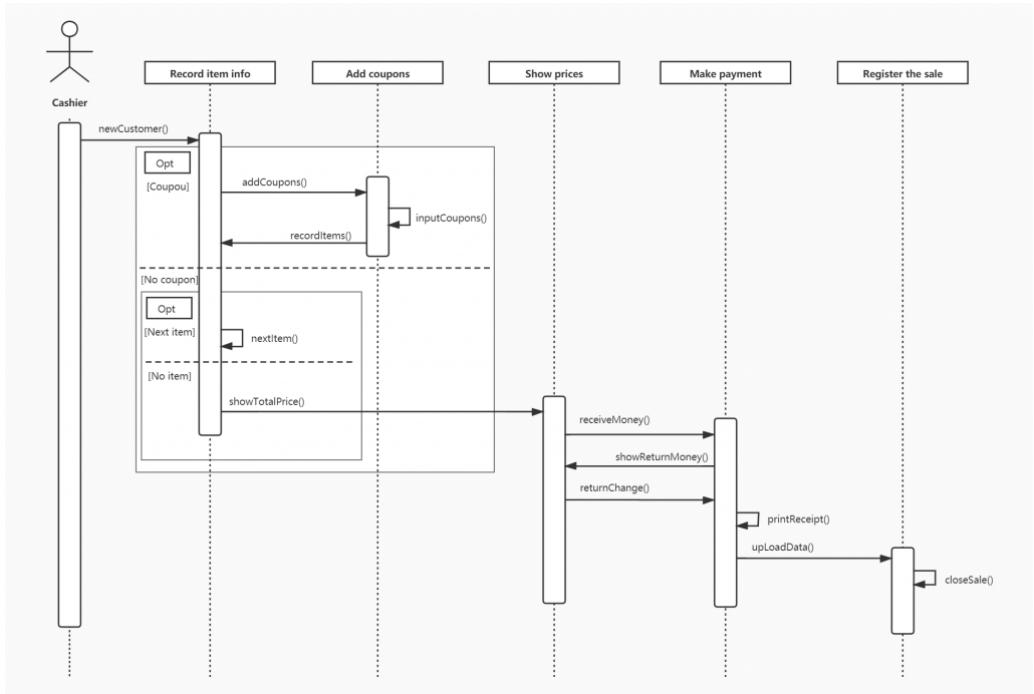
ID	3
Name	Select payment: cash
Participating actor	Cashier
Entry condition	Customer has enough money.
Exit condition	Payment success
Flow of events	<ul style="list-style-type: none"> <li>1. Cashier show the total price.</li> <li>2. Customer pay cash.</li> <li>3. Cashier take the money.</li> <li>4. Cashier indicates the currency to be returned to the customer.</li> <li>5. Cashier give the change back to Customer.</li> </ul>
Special requirements	No

ID	4
Name	Select payment: check
Participating actor	Cashier
Entry condition	Customer use a check to checkout.
Exit condition	Payment success
Flow of events	<ul style="list-style-type: none"> <li>1. Cashier show the total price.</li> <li>2. Customer give the check to Cashier.</li> <li>3. Cashier checks the creditworthiness of the customer by transmitting a request to an authorization center via the cashier;</li> </ul>
Special requirements	No

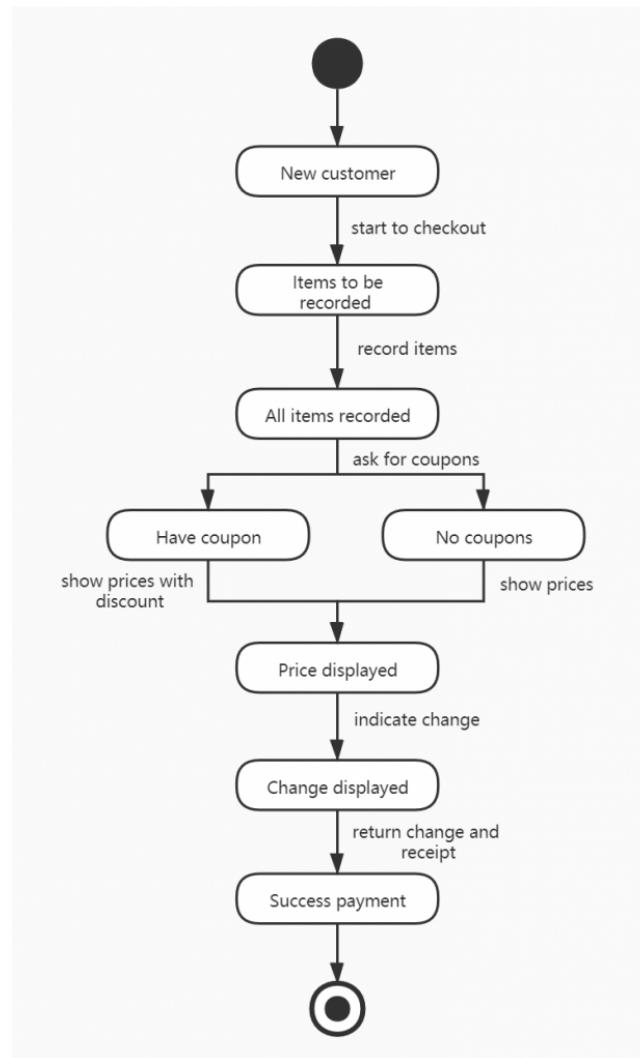
ID	5
Name	Select payment: credit card
Participating actor	Cashier
Entry condition	Customer use a credit card to checkout.
Exit condition	Payment success
Flow of events	<ul style="list-style-type: none"> <li>1. Cashier show the total price.</li> <li>2. Customer put the credit card on the bank terminal.</li> <li>3. Input the password if needed</li> <li>4. Wait for the authorization from bank.</li> </ul>
Special requirements	No

ID	6
Name	Register the sale
Participating actor	Cashier
Entry condition	The payment is completed.
Exit condition	Data transferred
Flow of events	<ul style="list-style-type: none"> <li>1. Cashier save the data of the sale.</li> <li>2. Cashier transmits data which include the number of each item sold to the inventory management system.</li> <li>3. Wait for data uploading.</li> <li>4. End the sale.</li> </ul>
Special requirements	No

**3. Write a system sequence diagram that describes the nominal scenario of the essential use case PROCESS CHECKOUT, considering only cash payment.**



**4. Show by a state diagram the forced succession of the system operations for the case of PROCESS CHECKOUT use, always considering only cash payment.**



**5. Expand the diagram in 4) by considering the different types of payment, as well as the other actions of the cashier**

