

# 商场促销系统

需求分析文档 (PROPOSED VERSION)

ARVIN SI.CHUAN/邱依强

# 目录

1	介绍	1
1.1	目的	1
1.2	范围	1
1.3	定义, 缩写词	1
1.4	参考资料	1
1.5	内容概览	1
1.5.1	身份验证模块	1
1.5.2	结算模块	1
1.5.3	促销规则匹配模块	2
1.5.4	支付模块	2
1.5.5	分级管理模块	2
1.5.6	外部系统支持	2
1.5.7	开发策略和环境	2
2	需求分析过程表示方法	2
2.1	活动图 (activity diagram)	2
2.2	用例图 (Use case diagram)	3
3	促销系统所要达成的目标和限制	3
3.1	目标	3
3.2	限制	3
3.2.1	经费与时间的限制	3
3.2.2	安全性限制	3
3.2.3	性能与稳定性限制	3
4	开发策略与环境	4
4.1	开发策略	4
4.2	开发环境	4
5	需求分析详细过程	4
5.1	Requirements Model Overview diagram	4
5.2	Functional Requirements	4
5.2.1	Functional Requirements diagram	5
5.2.2	Features	5
6	通过活动图分析系统流程	6
6.1	activity diagrams	6
6.1.1	admins side	6
6.1.2	admins manage market diagram	6
6.1.3	cashier side	7
6.1.4	cashier do checkout diagram	7
6.1.5	customers side	8
6.1.6	market side	10
7	通过用例图分析系统功能点	11
7.1	use case diagrams	11

7.2 Use Case Model Overview diagram.....	11
7.2.1 Actors.....	12
7.2.2 Primary Use Cases .....	13
8 结语 .....	31

# 1 介绍

## 1.1 目的

本文档是商场促销系统的需求分析报告，从活动图的角度分析商场促销的整个流程，而后根据活动图中的流程，从用例图的角度全面地阐述了整个系统的功能点，目的在于在客户和分析员、编程人员之间建立起一道关于整个促销系统的桥梁。

## 1.2 范围

本文档从整个商场的销售环境入手，一点点分析确定边界，最后将注意力集中在促销系统中，其中的主要部分为：促销部分、收银部分、付款部分、身份验证部分和管理部分。

## 1.3 定义，缩写词

促销系统：商场促销系统

## 1.4 参考资料

百度百科：活动图、用例图；  
《面向对象软件工程》[ISBN: 9787302448884]  
《软件工程案例教程》[ISBN: 9787302305149]

## 1.5 内容概览

### 1.5.1 身份验证模块

在用户开始使用系统时，以及一段时间没进行操作使得身份状态超时时，需要验证身份信息。

### 1.5.2 结算模块

顾客在挑选完商品后要进行商品的结算，包括对商品的逐一扫描、促销的自动处理和金额的显示。

### 1.5.3 促销规则匹配模块

这是促销系统的核心部分，需要在大量的商品、顾客信息、日期等信息中进行匹配并得出符合的促销规则，对订单进行促销处理。

### 1.5.4 支付模块

用户结算完成后进行支付，主要涉及到支付接口设计。

### 1.5.5 分级管理模块

促销系统在商场中可能存在多种的管理层级，同时促销规则本身也是需要管理的部分，本模块主要负责这样的内容。

### 1.5.6 外部系统支持

促销系统只负责促销规则的处理、面向顾客的收银员侧系统和管理模块，对于雇员信息、顾客信息和商品信息，不属于促销系统的责任范围。

### 1.5.7 开发策略和环境

开发策略是本次项目所遵循的总体开发思路，如采用的架构等等；开发环境是指项目运行起来所需要的基本环境。

## 2 需求分析过程表示方法

### 2.1 活动图（activity diagram）

活动图（activity diagram，动态图）是阐明了业务用例实现的工作流程。业务工作流程说明了业务为向所服务的业务主角提供其所需的价值而必须完成的工作。业务用例由一系列活动组成，它们共同为业务主角生成某些工件。工作流程通常包括一个基本工作流程和一个或多个备选工作流程。工作流程的结构使用活动图来进行说明。

## 2.2 用例图 (Use case diagram)

用例图是指由参与者 (Actor)、用例 (Use Case)，边界以及它们之间的关系构成的用于描述系统功能的视图。用例图 (User Case) 是被称为参与者的外部用户所能观察到的系统功能的模型图，呈现了一些参与者和一些用例，以及它们之间的关系，主要用于对系统、子系统或类的功能行为进行建模。

# 3 促销系统所要达成的目标和限制

## 3.1 目标

系统在收银的时候能够快速录入商品信息、自动匹配符合的促销规则并得出单价与总金额，能够再次之后提供给顾客多种的付款方式。  
管理侧能够简单有效地对系统各个功能进行管理，能够分级地实现管理目标。

## 3.2 限制

### 3.2.1 经费与时间的限制

本项目的经费限制为：0 元  
本项目的时间限制为：2017 年#月#号

### 3.2.2 安全性限制

在没有操作的情况下，用户登录身份会在一定时间内过期，使用系统需要重新验证身份。客户与管理员的操作界面要分离，但其登录系统一致。管理员只能处理其权限范围以内的对象。

### 3.2.3 性能与稳定性限制

## 4 开发策略与环境

### 4.1 开发策略

促销系统的开发主要采用 Web 方式, 使用 SpringFramework 进行 MVC 三层结构的设计, 系统运行时需要使用 Chrome 浏览器或其兼容的浏览器。

### 4.2 开发环境

本项目的开发使用 Java jdk1.8, 采用的 SpringFramework 版本为 4.3.8 RELEASE, 使用 Oracle 12c 数据库。

## 5 需求分析详细过程

### 5.1 Requirements Model Overview diagram

Custom diagram in package 'Requirements'

Requirements Model Overview

Version 1.0

邱依强 created on 2017/5/8. Last modified 2017/5/14

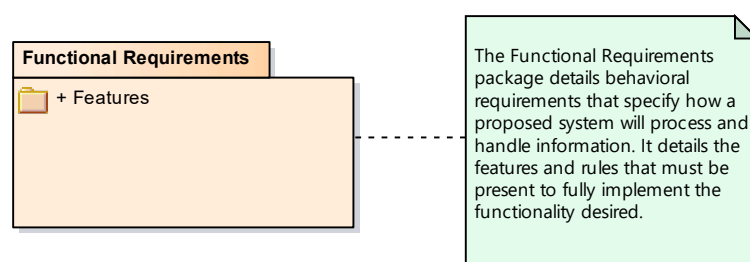


Figure 1: Requirements Model Overview

### 5.2 Functional Requirements

Package in package 'Requirements'

## 5.2.1 Functional Requirements diagram

Custom diagram in package 'Functional Requirements'

Functional Requirements  
Version 1.0  
邱依强 created on 2017/5/8. Last modified 2017/5/14

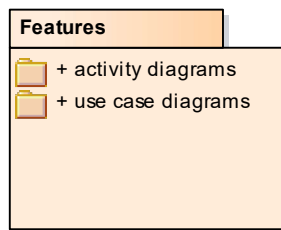


Figure 2: Functional Requirements

## 5.2.2 Features

Package in package 'Functional Requirements'

The Features package contains

Features  
Version 1.0 Phase 1.0 Proposed  
created on 2017/5/8. Last modified 2017/5/8



## 6 通过活动图分析系统流程

### 6.1 activity diagrams

Package in package 'Features'

activity diagrams

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/9. Last modified 2017/5/9

#### 6.1.1 admins side

Package in package 'activity diagrams'

admins side

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/9. Last modified 2017/5/9

#### 6.1.2 admins manage market diagram

Activity diagram in package 'admins side'

admins manage market

Version 1.0

邱依强 created on 2017/5/9. Last modified 2017/5/9

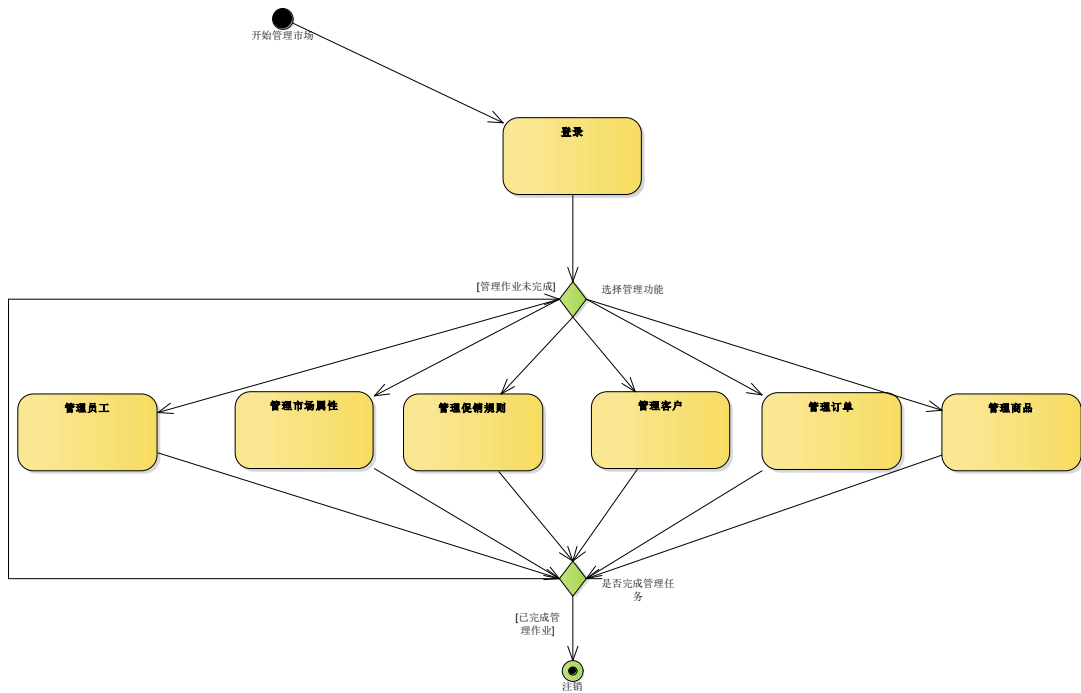


Figure 3: admins manage market

### 6.1.3 cashier side

Package in package 'activity diagrams'

cashier side

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/9. Last modified 2017/5/9

Alias 收银员侧

### 6.1.4 cashier do checkout diagram

Activity diagram in package 'cashier side'

cashier do checkout

Version 1.0

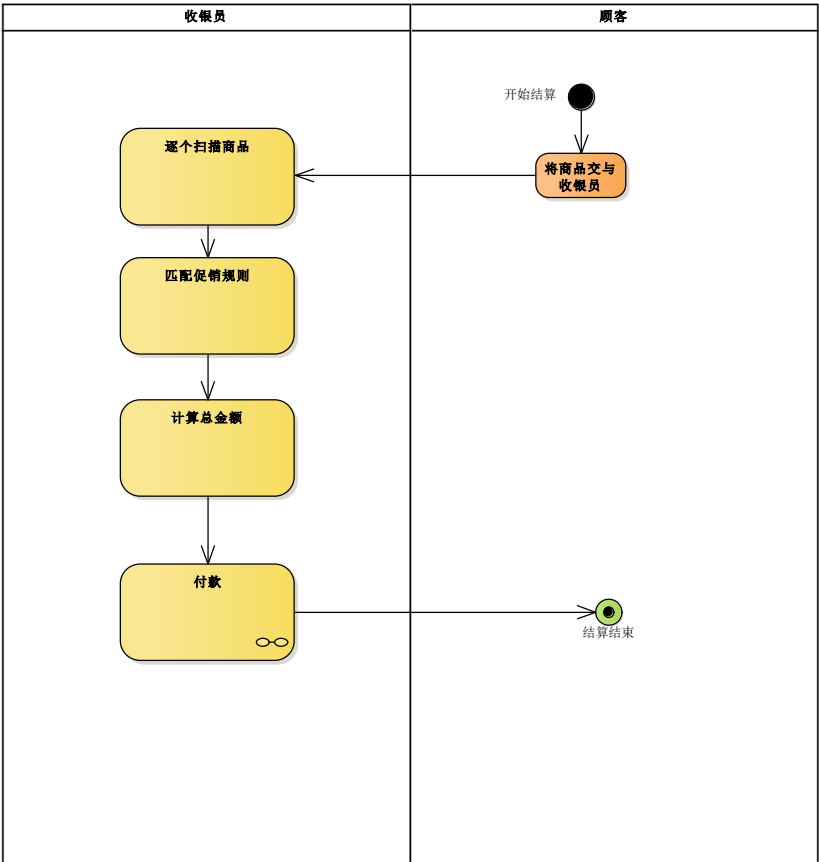


Figure 4: cashier do checkout

6.1.5 customers side

Package in package 'activity diagrams'

customers side

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/8. Last modified 2017/5/9

CustomerBuySth diagram

Activity diagram in package 'customers side'

CustomerBuySth

Version 1.0

邱依强 created on 2017/5/8. Last modified 2017/5/9

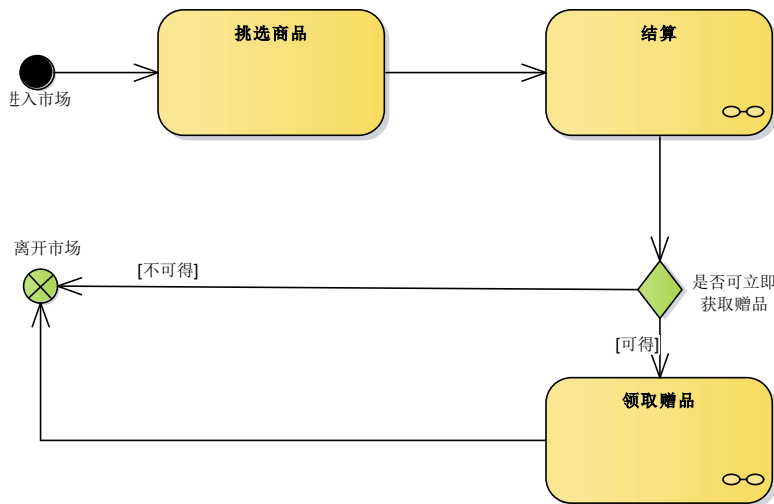


Figure 5: CustomerBuySth

exchange salers side

Package in package 'activity diagrams'

exchange salers side

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/9. Last modified 2017/5/9

exchange salers do exchange diagram

Activity diagram in package 'exchange salers side'

exchange salers do exchange

Version 1.0

邱依强 created on 2017/5/9. Last modified 2017/5/9

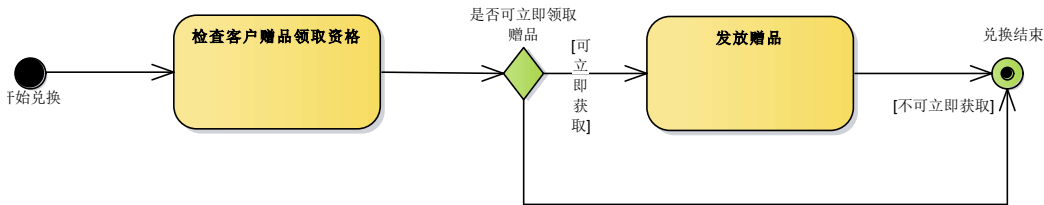


Figure 6: exchange salers do exchange

6.1.6 market side

Package in package 'activity diagrams'

market side

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/9. Last modified 2017/5/9

market side - customer oreinted diagram

Activity diagram in package 'market side'

market side - customer oreinted

Version 1.0

邱依强 created on 2017/5/9. Last modified 2017/5/9

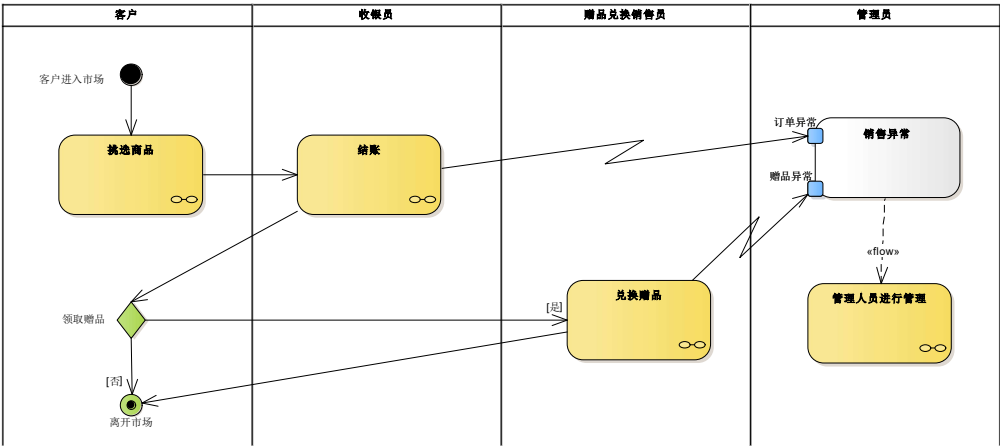


Figure 7: market side - customer oreinted

## 7 通过用例图分析系统功能点

### 7.1 use case diagrams

Package in package 'Features'

use case diagrams  
Version Phase 1.0 Proposed  
created on 2017/5/9. Last modified 2017/5/9

### 7.2 Use Case Model Overview diagram

Use Case diagram in package 'use case diagrams'

Use Case Model Overview  
Version 1.0  
邱依强 created on 2017/5/9. Last modified 2017/5/10

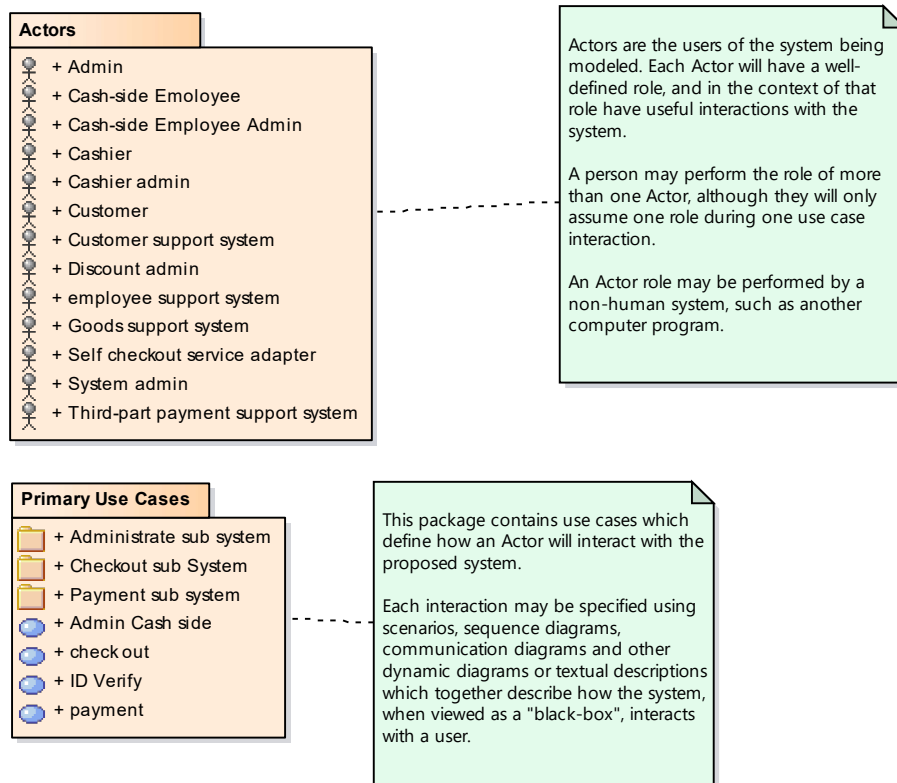


Figure 8: Use Case Model Overview

## 7.2.1 Actors

Package in package 'use case diagrams'

Actors

Version 1.0 Phase 1.0 Proposed  
created on 2017/5/9. Last modified 2017/5/9

### Actors diagram

Use Case diagram in package 'Actors'

Actors

Version 1.0

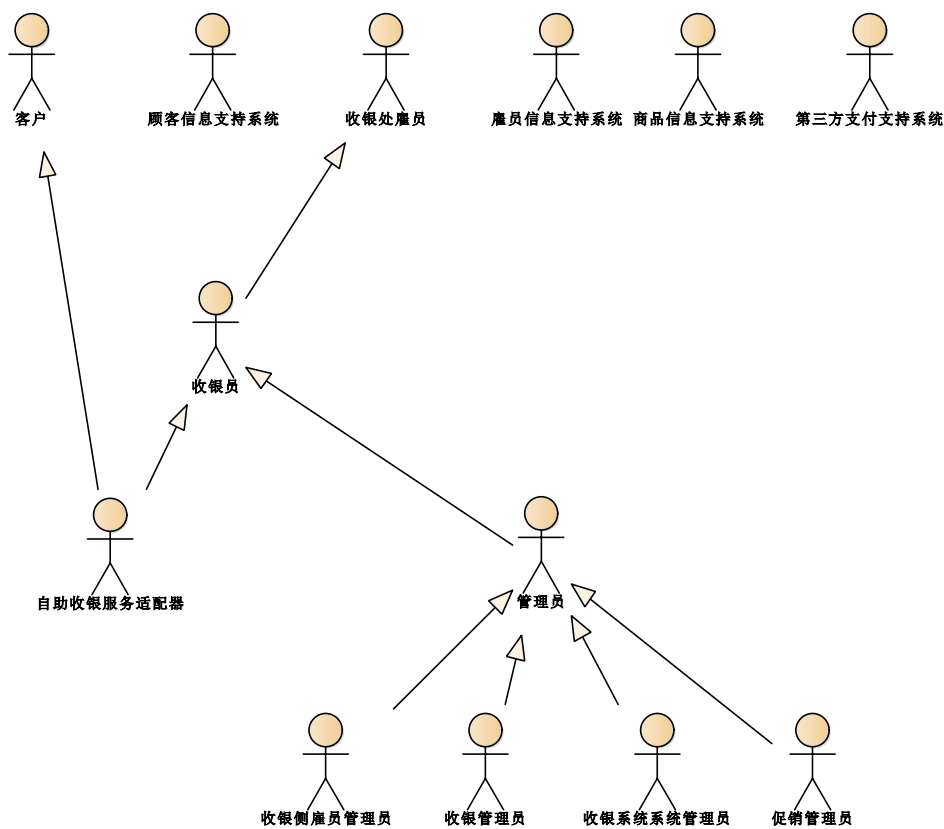


Figure 9: Actors

### 7.2.2 Primary Use Cases

Package in package 'use case diagrams'

Primary Use Cases  
Version 1.0 Phase 1.0 Proposed  
created on 2017/5/9. Last modified 2017/5/9



Cash-side system diagram

Use Case diagram in package 'Primary Use Cases'

Cash-side system

Version 1.0

邱依强 created on 2017/5/10. Last modified 2017/5/14

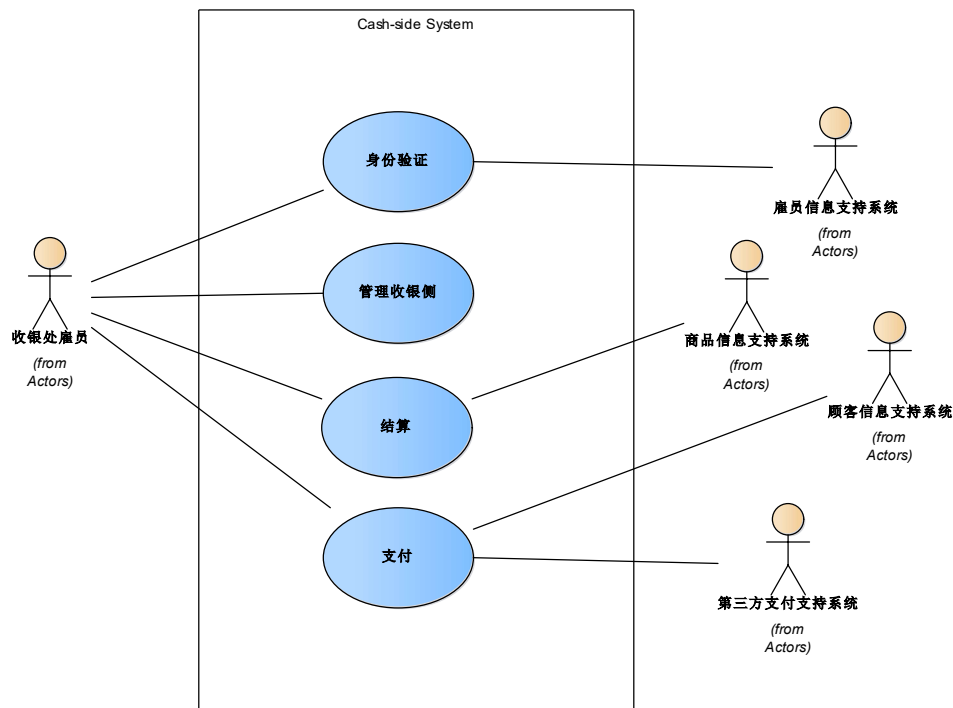


Figure 10: Cash-side system

Administrate sub system

Package in package 'Primary Use Cases'

Administrate sub system

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Administrate sub system diagram

Use Case diagram in package 'Administrate sub system'

Administrate sub system

Version 1.0

邱依强 created on 2017/5/10. Last modified 2017/5/11

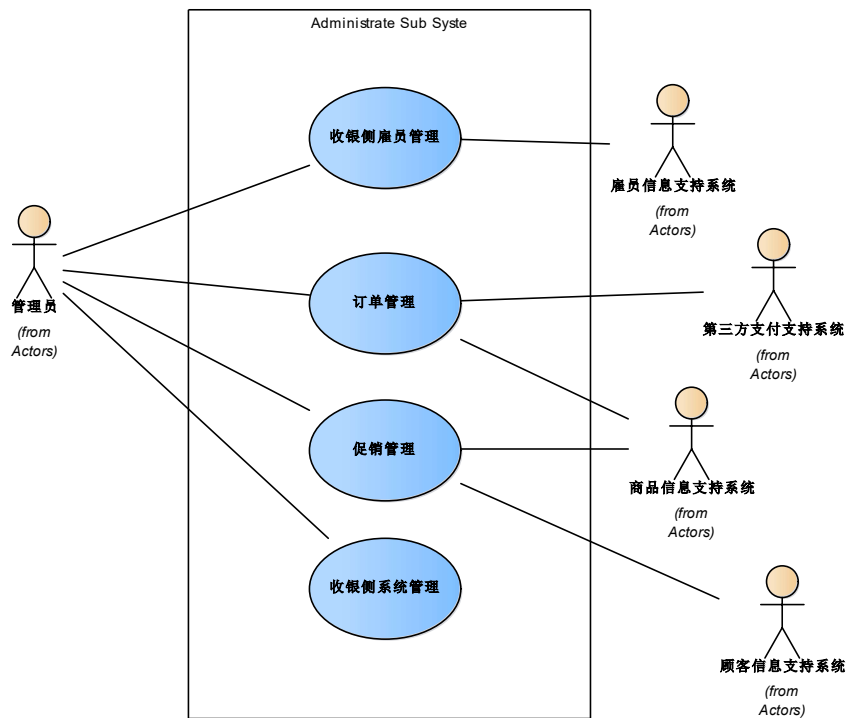


Figure 11: Administrate sub system

Cash side system management

UseCase in package 'Administrate sub system'

Cash side system management

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 收银侧系统管理

## Oder management

UseCase in package 'Administrate sub system'

Oder management

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 订单管理

## cash side employee management

UseCase in package 'Administrate sub system'

cash side employee management

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 收银侧雇员管理

## discount management

UseCase in package 'Administrate sub system'

discount management

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 促销管理

## discount management diagram

Interaction diagram in package 'Administrate sub system'

discount management

Version 1.0

邱依强 created on 2017/5/13. Last modified 2017/5/13

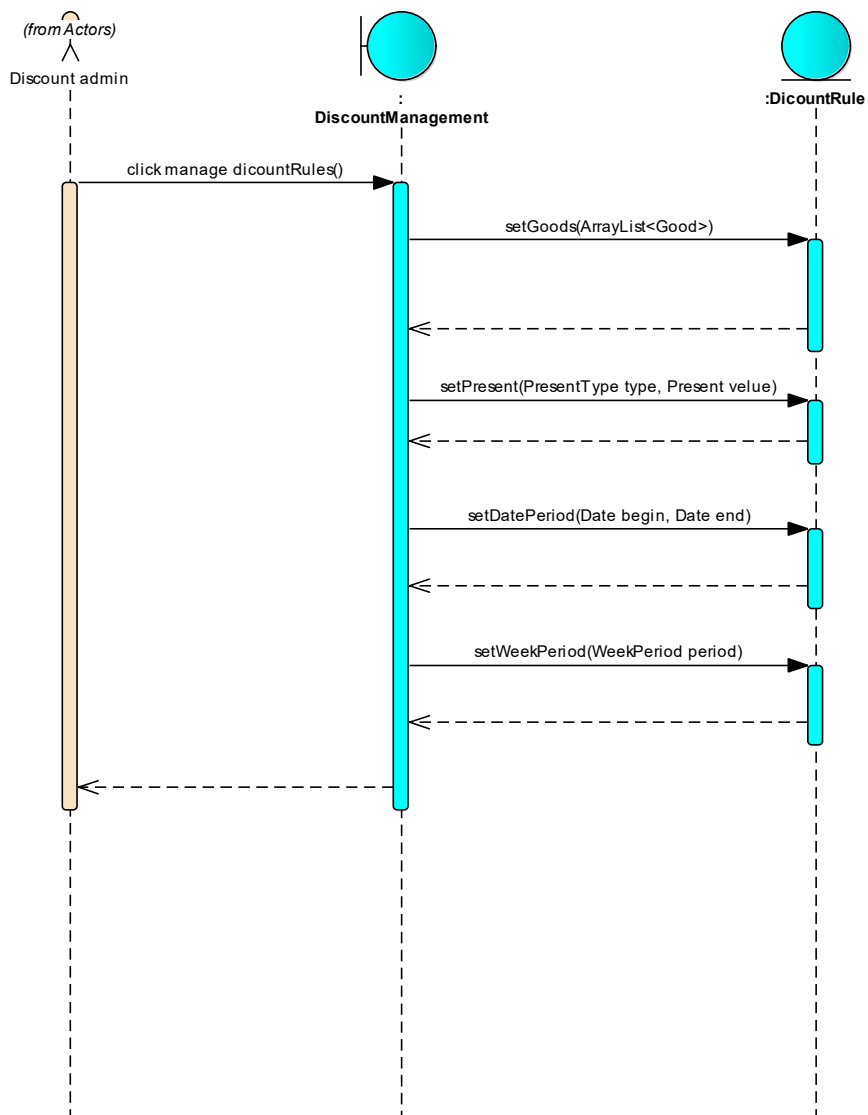


Figure 12: discount management

## Checkout sub System

Package in package 'Primary Use Cases'

Checkout sub System

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 结算子系统

Checkout system diagram

Activity diagram in package 'Checkout sub System'

Checkout system

Version 1.0

邱依强 created on 2017/5/10. Last modified 2017/5/14

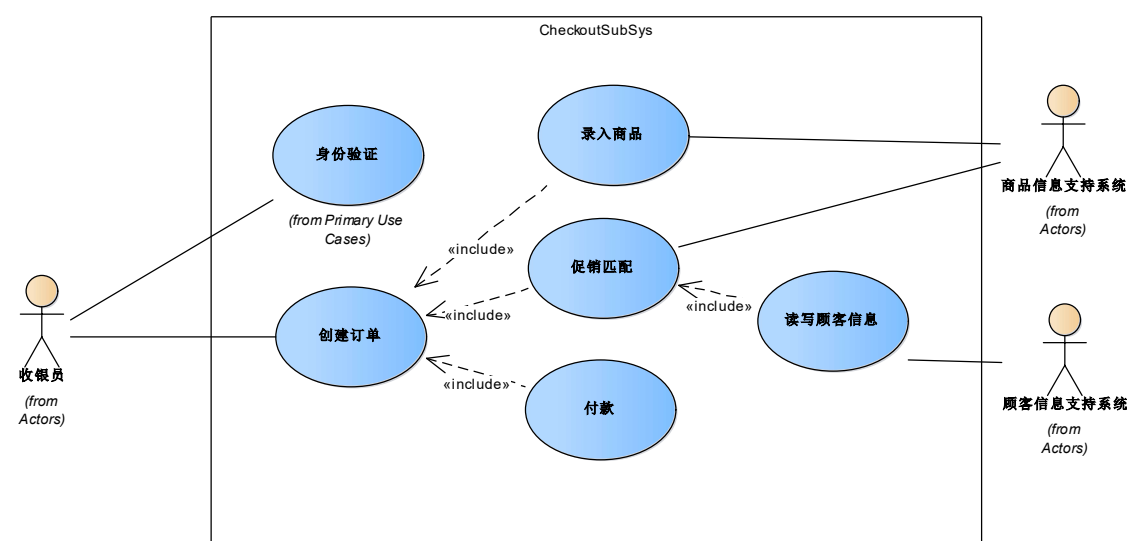


Figure 13: Checkout system

Create Oder

UseCase in package 'Checkout sub System'


Create Oder

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 创建订单

## SCENARIOS

 Basic Path. Basic Path

Network down

1. Input the goods

Uses:

Input goods

Exception: 1a. customer cancels buying

2. Match discount rules

Uses:

Discount match

3. calculate every amount


Uses:

Calculate amount

4. pay for the order

Uses:

Pay

 Exception. customer cancels buying

1. remove goods NOT to buy

Uses:




Input goods

## CONSTRAINTS

 Pre-condition. Already verified identity

Cashier or its generalization child has already verified his identity.

[ Proposed, Weight is 0. ]

CONNECTORS		
	Include «include»	Source -> Destination
From:	Discount match : UseCase, Public	
To:	Create Oder : UseCase, Public	
	Include «include»	Source -> Destination
From:	Input goods : UseCase, Public	
To:	Create Oder : UseCase, Public	
	Include «include»	Source -> Destination
From:	Pay : UseCase, Public	
To:	Create Oder : UseCase, Public	

## Customer INFO I/O


UseCase in package 'Checkout sub System'

Customer INFO I/O

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/11

Alias 读写顾客信息

CONNECTORS		
	Include «include»	Source -> Destination
From:	Customer INFO I/O : UseCase, Public	
To:	Discount match : UseCase, Public	

## Discount match

UseCase in package 'Checkout sub System'



Discount match

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 促销匹配

ELEMENTS OWNED BY Discount match	
	<anonymous> : Instance

CONNECTORS	
	Include «include» Source -> Destination From: Discount match : UseCase, Public To: Create Oder : UseCase, Public
	Include «include» Source -> Destination From: Customer INFO I/O : UseCase, Public To: Discount match : UseCase, Public

## Discount match diagram

Interaction diagram in package 'Checkout sub System'

Discount match

Version 1.0

邱依强 created on 2017/5/11. Last modified 2017/5/14



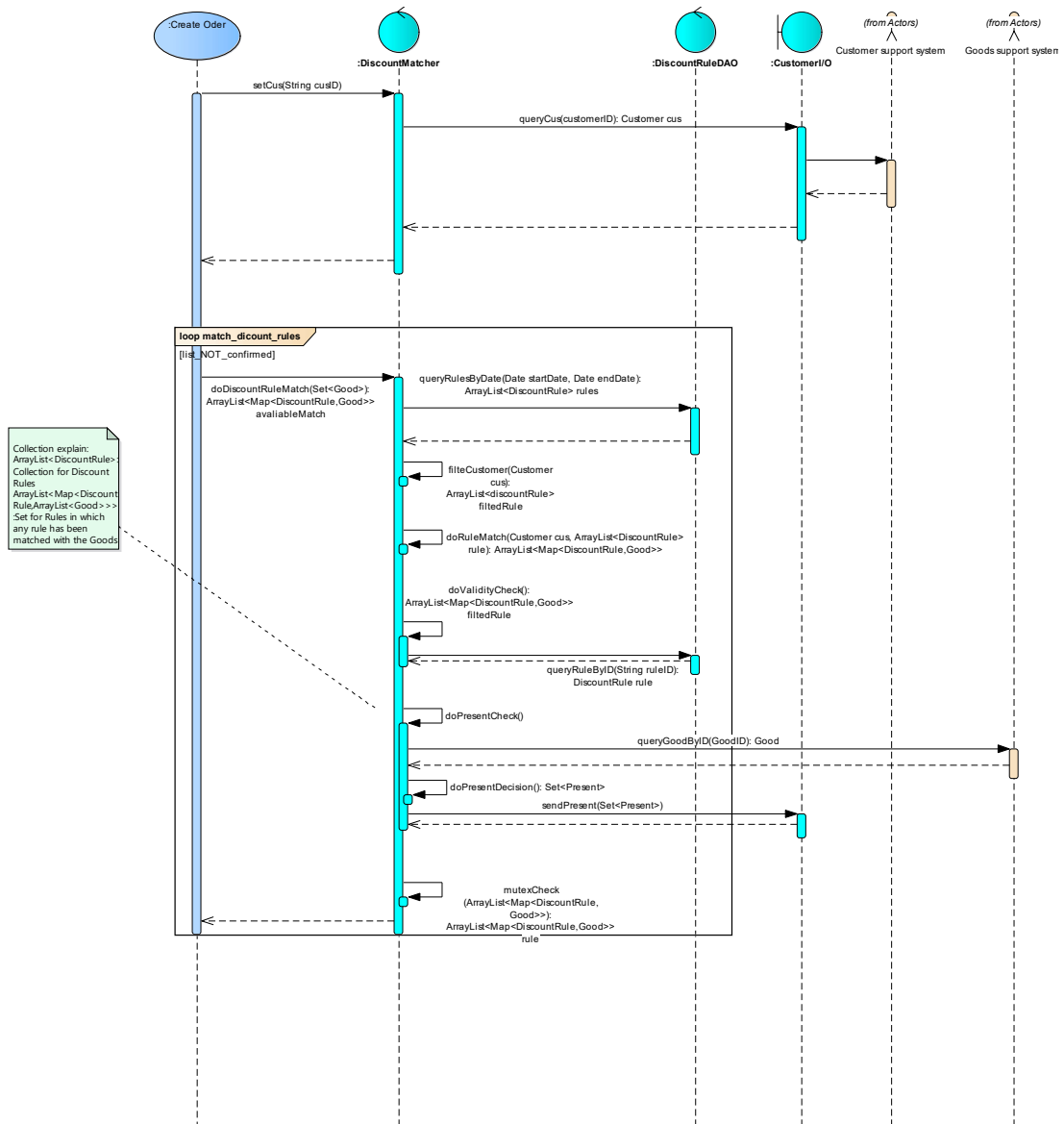


Figure 14: Discount match

## Input goods

UseCase in package 'Checkout sub System'


Input goods

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 录入商品

## CONNECTORS

 Include «include» Source -> Destination

From: Input goods : UseCase, Public

To: Create Oder : UseCase, Public

## Pay

UseCase in package 'Checkout sub System'


Pay

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/12


Alias 付款

## SCENARIOS

 Basic Path. Basic Path

[Payment sub system](#)

## CONNECTORS

 Include «include» Source -> Destination

From: Pay : UseCase, Public

To: Create Oder : UseCase, Public

Payment sub system

Package in package 'Primary Use Cases'

Payment sub system  
Version Phase 1.0 Proposed  
created on 2017/5/10. Last modified 2017/5/10

Payment sub system diagram

Use Case diagram in package 'Payment sub system'

Payment sub system  
Version 1.0  
邱依强 created on 2017/5/10. Last modified 2017/5/10

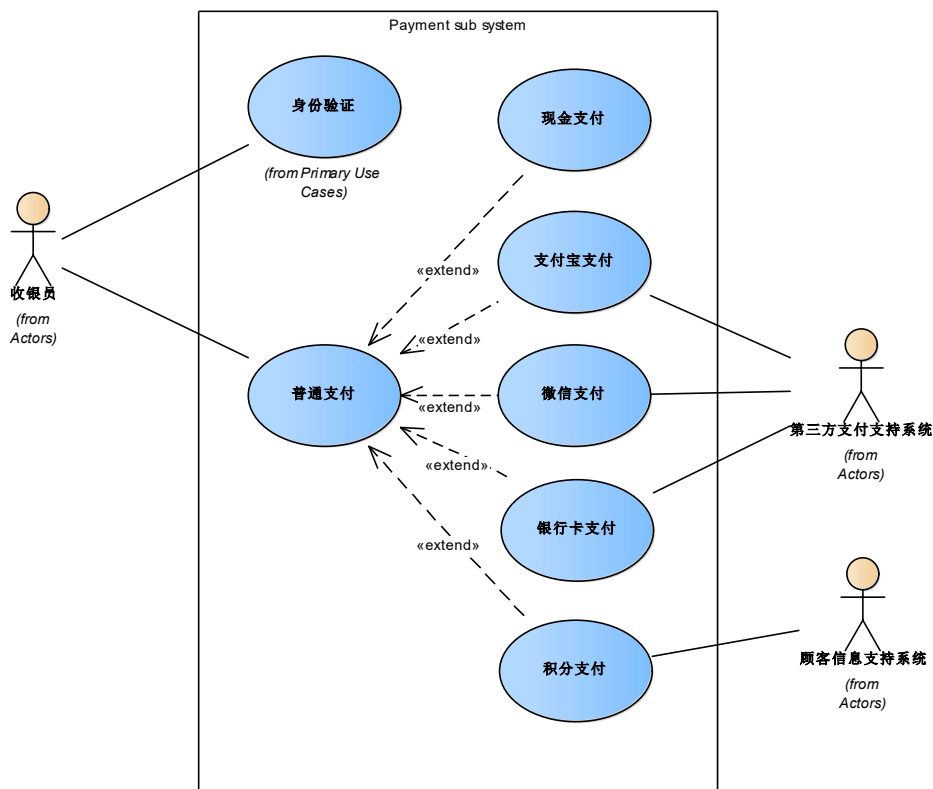


Figure 15: Payment sub system

## Alipay

UseCase in package 'Payment sub system'

Alipay

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 支付宝支付

### CONNECTORS

 Extend «extend» Source -> Destination

From: Alipay : UseCase, Public

To: Normal payment : UseCase, Public

## Cash

UseCase in package 'Payment sub system'

Cash

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 现金支付

### CONNECTORS

 Extend «extend» Source -> Destination

From: Cash : UseCase, Public

To: Normal payment : UseCase, Public

## Normal payment






UseCase in package 'Payment sub system'

Normal payment

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 普通支付

CONNECTORS	
	Extend «extend» Source -> Destination From: Wechat : UseCase, Public To: Normal payment : UseCase, Public
	Extend «extend» Source -> Destination From: credit : UseCase, Public To: Normal payment : UseCase, Public
	Extend «extend» Source -> Destination From: Alipay : UseCase, Public To: Normal payment : UseCase, Public
	Extend «extend» Source -> Destination From: Cash : UseCase, Public To: Normal payment : UseCase, Public
	Extend «extend» Source -> Destination From: card : UseCase, Public To: Normal payment : UseCase, Public

## Normal payment diagram

Interaction diagram in package 'Payment sub system'

Normal payment

Version 1.0

邱依强 created on 2017/5/12. Last modified 2017/5/13

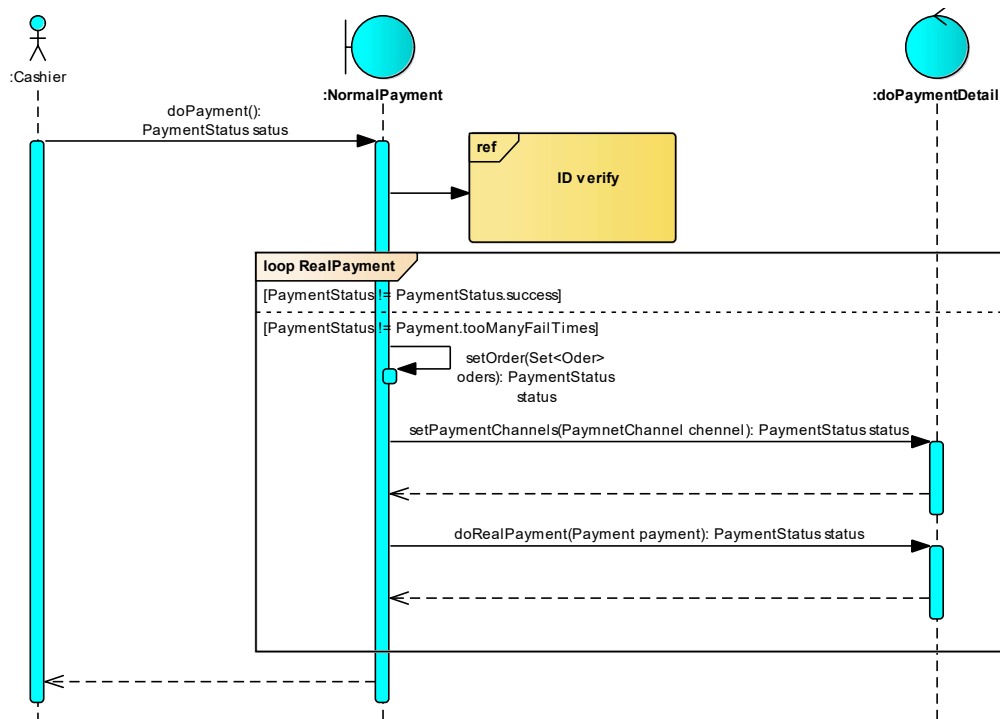


Figure 16: Normal payment

## Wechat

UseCase in package 'Payment sub system'

Wechat

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 微信支付

### CONNECTORS

 Extend «extend» Source -> Destination

From: Wechat : UseCase, Public

To: Normal payment : UseCase, Public

## card

UseCase in package 'Payment sub system'


card

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 银行卡支付

### CONNECTORS

 Extend «extend» Source -> Destination

From: card : UseCase, Public

To: Normal payment : UseCase, Public

## credit

UseCase in package 'Payment sub system'

credit

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/14

Alias 积分支付

### CONNECTORS

 Extend «extend» Source -> Destination

From: credit : UseCase, Public

To: Normal payment : UseCase, Public

## Admin Cash side

UseCase in package 'Primary Use Cases'


Admin Cash side

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/12

Alias 管理收银侧

## SCENARIOS

 Basic Path. Basic Path

[Administrate sub system](#)

## ID Verify

UseCase in package 'Primary Use Cases'


ID Verify

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/10

Alias 身份验证

## SCENARIOS


 Basic Path. Basic Path

1. input username

Exception: 1a. username illegal

2. input password

3. click verify ID

 Exception. username illegal

1. Notice user username illegal



check out

UseCase in package 'Primary Use Cases'

check out

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/12

Alias 结算

SCENARIOS
<div> Basic Path. Basic Path</div> <div><a href="#">Checkout sub System</a></div>

payment

UseCase in package 'Primary Use Cases'

payment

Version 1.0 Phase 1.0 Proposed

邱依强 created on 2017/5/10. Last modified 2017/5/12

Alias 支付

SCENARIOS
<div> Basic Path. Basic Path</div> <div><a href="#">Payment sub system</a></div>

## 8 结语

通过使用 UML 技术,用活动图逐步深入了解促销系统在整个商场系统中的位置以及其自身应当扮演的角色、为了达成促销系统目标应当执行的步骤;用用例图在活动图的基础上,强化系统边界、得出系统用例、明确系统参与者,为下一步编码操作提供基础,同时也为简化了与用户之间的沟通。