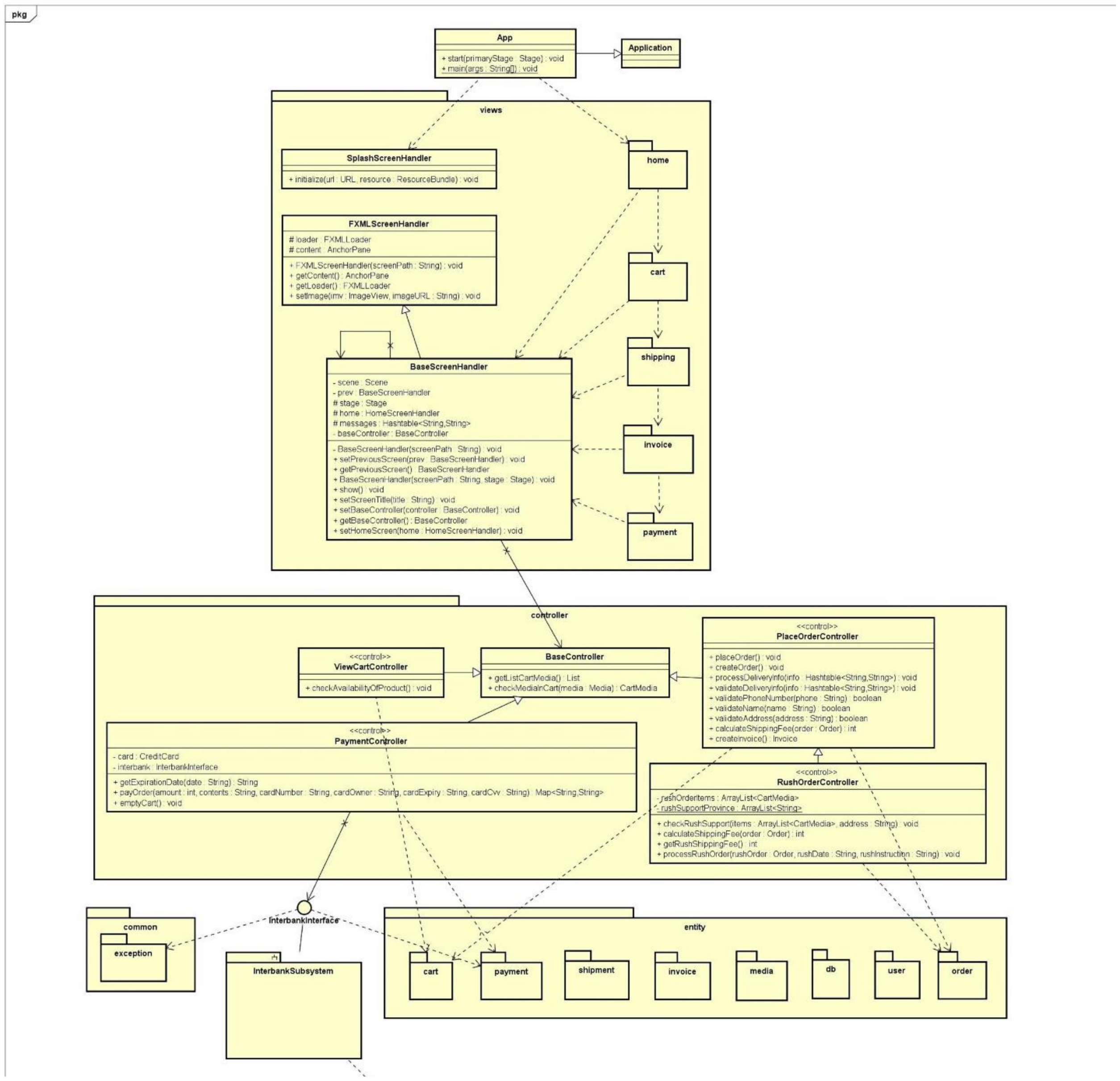
Lab 10
Cohesion and Coupling

1. Coupling


pkg
App
+ start(primaryStage : Stage) : void
+ main(args : String[]) : void
Application
views
SplashScreenHandler
+ initialize(url : URL, resource : ResourceBundle) : void
FXMLScreenHandler
# loader : FXMLLoader
# content : AnchorPane
+ FXMLScreenHandler(screenPath : String) : void
+ getContent() : AnchorPane
+ getLoader() : FXMLLoader
+ setImage(imv : ImageView, imageURL : String) : void
BaseScreenHandler
- scene : Scene
- prev : BaseScreenHandler
# stage : Stage
# home : HomeScreenHandler
# messages : Hashtable<String,String>
- baseController : BaseController
- BaseScreenHandler(screenPath : String) : void
+ setPreviousScreen(prev : BaseScreenHandler) : void
+ getPreviousScreen() : BaseScreenHandler
+ BaseScreenHandler(screenPath : String, stage : Stage) : void
+ show() : void
+ setScreenTitle(title : String) : void
+ setBaseController(controller : BaseController) : void
+ getBaseController() : BaseController
+ setHomeScreen(home : HomeScreenHandler) : void
home
cart
shipping
invoice
payment
controller
<<control>>
ViewCartController
+ checkAvailabilityOfProduct() : void
BaseController
+ getListCartMedia() : List
+ checkMediaInCart(media : Media) : CartMedia
<<control>>
PlaceOrderController
+ placeOrder() : void
+ createOrder() : void
+ processDeliveryInfo(info : Hashtable<String,String>) : void
+ validateDeliveryInfo(info : Hashtable<String,String>) : void
+ validatePhoneNumber(phone : String) : boolean
+ validateName(name : String) : boolean
+ validateAddress(address : String) : boolean
+ calculateShippingFee(order : Order) : int
+ createInvoice() : Invoice
<<control>>
PaymentController
- card : CreditCard
- interbank : InterbankInterface
+ getExpirationDate(date : String) : String
+ payOrder(amount : int, contents : String, cardNumber : String, cardOwner : String, cardExpiry : String, cardCvv : String) : Map<String,String>
+ emptyCart() : void
<<control>>
RushOrderController
- rushOrderItems : ArrayList<CartMedia>
- rushSupportProvince : ArrayList<String>
+ checkRushSupport(items : ArrayList<CartMedia>, address : String) : void
+ calculateShippingFee(order : Order) : int
+ getRushShippingFee() : int
+ processRushOrder(rushOrder : Order, rushDate : String, rushInstruction : String) : void
common
exception
InterbankInterface
InterbankSubsystem
entity
cart
payment
shipment
invoice
media
db
user
order

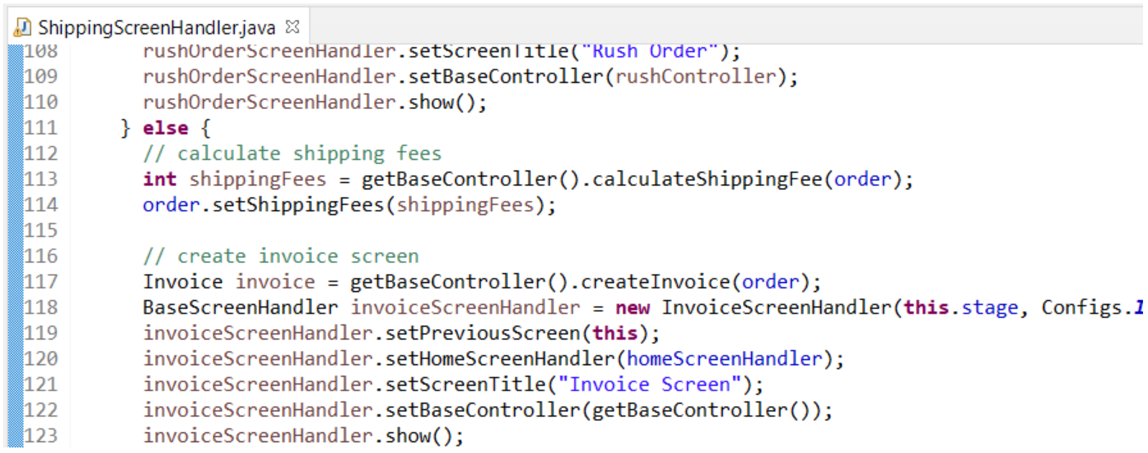
According to the design, AIMS project is modeled by MVC:

- The classes belong to some main modules: views, controller, and entity, which leads to being apparent in the tasks of classes. Therefore, this will create low dependency in classes.
- The communication among the modules has base classes (BaseController and BaseScreenHandler) undertaken. Some concrete classes are inherent in the base class, which reduces the direct call from modules.
  ➔ Preventing high because there is less connection among classes.
  ➔ Conclusion**:** data coupling.

2. Cohesion

Some problems related cohesion:

- ScreenHandler should only be responsible for receiving requests from the user interface and sending method calls to the controller for processing, but ScreenHandler is taking on the role of the controller.
- ShippingScreenHandler takes on the role of creating the Order, while it should be the responsibility of the PlaceOrderController.



ShippingScreenHandler.java

```java
            rushOrderScreenHandler.setScreenTitle("Rush Order");
            rushOrderScreenHandler.setBaseController(rushController);
            rushOrderScreenHandler.show();
        } else {
            // calculate shipping fees
            int shippingFees = getBaseController().calculateShippingFee(order);
            order.setShippingFees(shippingFees);

            // create invoice screen
            Invoice invoice = getBaseController().createInvoice(order);
            BaseScreenHandler invoiceScreenHandler = new InvoiceScreenHandler(this.stage, Configs.I
            invoiceScreenHandler.setPreviousScreen(this);
            invoiceScreenHandler.setHomeScreenHandler(homeScreenHandler);
            invoiceScreenHandler.setScreenTitle("Invoice Screen");
            invoiceScreenHandler.setBaseController(getBaseController());
            invoiceScreenHandler.show();
```

- PlaceOrderController:

- There is a createInvoice() method but it is not related to any other methods in the class.
- The PlaceOrder() method is not fully allocated tasks. Tasks are responsible for ScreenHandler.

- PaymentController:
  - The getExpirationDate(String), emptyCart() method has no data or logic binding.
- InterbankSubsystem:
  - The method refund() and payOrder() have the same input parameters and return type, and have the same implement method. They should separate the same operation into submethods and reuse them in refund() and payOrder().
- PlaceRushOrderController:
  - The getRushTableMedia method is unrelated to other functions, which can be separated into util methods.

Conclusion: Cohesion is not high.