**SUBSYSTEM ELEMENTS SPECIFICATION**

**1. class VNPayDisplay**

1.1 Class description

This class acts as an interface facilitating payment transactions between customers and VNPay. It manages communication with VNPay, ensuring customers provide necessary information for successful transactions.

1.2 Attribute definition

- payOrderManager : PayOrderManager

1.3 Operation definiton

+ sendPayOrder(queryURL : String) : void

+ displayURL(url : String) : void

+ displayURL(vnp\_returnURL\_with\_response : String) : void

+ checkURLChange() : void

+ close() : void

1.1 Operation description

1.1.1 sendPayOrder(queryURL : String)

/\*\*

\* Iinitiate a payment order given the queryURL.

\* @param queryURL The URL containing transaction information.

\*/

1.1.2 displayURL(url : String)

/\*\*

\* Displays the payment interface for interaction with VNPay

\* @param url The URL to be displayed

\*/

1.1.3 displayURL(vnp\_returnURL\_with\_response : String)

/\*\*

\* Displays the payment interface for interaction with VNPay

\* @param vnp\_returnURL\_with\_response The URL to be displayed

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1.1.4 checkURLChange()

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\* Checks for changes in the URL, indicating completion of a transaction.

\* If the URL changes, the payment interface is closed.

\*/

1.1.5 close()

/\*\*

\* Closes the payment interface.

\*/

**2. class Request**

2.1 Class description

This class encapsulates payment details for an order. It includes methods to construct a query URL for VNPayDisplay, facilitating payment processing with VNPay.

2.2 Attribute definition

- amount : double

- orderInfo : String

2.3 Operation definiton

+ Request(amount : double, orderInfo : String) : Request

+ buildQueryURL() : String

2.4 Operation description

2.4.1 Request(amount : double, orderInfo : String)

/\*\*

\* Constructs a new Request object with the specified amount and order information.

\* @param amount The total amount to be paid for the order.

\* @param orderInfo Information about the order being paid for. This can include details

such as items purchased, quantities, prices, shipping information, etc.

\*/

2.4.2 buildQueryURL()

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\* Constructs and returns a query URL based on the request details.

\* The query URL is formatted to be sent to the VNPayDisplay class for payment processing.

\* @return A string representing the constructed query URL.

\*/

**3. class Response**

3.1 Class description

This class encapsulates the response received from a payment transaction. It contains methods to parse the query string provided during initialization and handle error codes.

3.2 Attribute definition

- responseCode : int

3.3 Operation definiton

+ Response(queryString : String) : Response

+ parseQueryString() : void

+ handleErrorCode() : void

3.4 Operation description

3.4.1 Response(queryString : String)

/\*\*

\* Constructs a new Response object by parsing the provided query string

\* @param queryString The query string containing response data from the payment transaction.

\* @throws PaymentException if the error code in the response is non-zero.

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3.4.2 parseQueryString()

/\*\*

\* Parses the query string to extract response attributes.

\*/

3.4.3 handleErrorCode()

/\*\*

\* Handles the error code extracted from the response attributes.

\* If the error code is non-zero, indicating an unsuccessful transaction, an appropriate exception is thrown based on the error code.

\* @throws PaymentException If the error code in the response indicates an unsuccessful transaction, with the specific type of exception thrown based on the error code.

\*/

**4. class PayOrderManager**

4.1 Class description

This class acts as an intermediary, coordinating the activities of the entire subsytem to perform order payment activities.

4.2 Attribute definition

- vnpayDisplay : VNPayDisplay

- client : Client

4.3 Operation definiton

+ payOrder(amount : double, orderInfo : String, client : Client) : void

+ processResponse(queryString : String) : void

4.4 Operation description

4.4.1 payOrder(amount : double, orderInfo : String, client : Client)

/\*\*

\* Processes a payment transaction for the specified order.

\* @param amount The total amount to be paid for the order.

\* @param orderInfo Information about the order being paid for. This can include details

such as items purchased, quantities, prices, shipping information, etc.

\* @param client The client class initiating the payment.

\*/

4.4.2 processResponse(queryString : String)

/\*\*

\* Processes response from VNPay.

\* @param queryString The query string containing the response data.

\*/

**5. public class Client**

5.1 Class description

This class serves as a base class for controller classes. It utilizes subsystem services to perform payment transactions and encapsulates functionality related to updating transaction status based on success or failure events.

5.2 Attribute definition

- payment : IPayment

5.3 Operation definiton

+ updateTransactionOnFailure(exception : PaymentException) : void

+ updateTransactionOnSuccess(trans : TransactionInfo) : void

5.4 Operation description

5.4.1 updateTransactionOnFailure(exception : PaymentException)

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\* Updates the transaction status when a payment failure occurs.

\* @param exception The PaymentException indicating the reason for the payment failure.

\*/

5.4.2 updateTransactionOnSuccess(trans : TransactionInfo)

/\*\*

\* Updates the transaction status upon successful completion of a payment transaction.

\* @param trans The TransactionInfo containing information about the completed payment transaction.

\*/

**6. public class TransactionInfo**

6.1 Class description

This class represents information about a completed payment transaction. It is created based on a successful response instance from a payment transaction. It encapsulates details such as transaction ID, payment amount, timestamp, and any other relevant information pertaining to the transaction.

6.2 Attribute definition

- transactionID : String

- transactionContent : String

- transactionDate : LocalDateTime

- amount : double

6.3 Operation definiton

+ TransactionInfo(response : Response)

6.4 Operation description

6.4.1 TransactionInfo(response : Response)

/\*\*

\* Constructs a new TransactionInfo object based on the provided response instance.

\* @param response The response instance containing information about the completed payment transaction.

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