

AIMS: An Internet Media Store



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The path to knowledge, art, and entertainment has been, is, and will always be a part of every human life, but life is not inherently easy. There will come a time when the product of creative labor cannot reach people since ones' spiritual children cannot simply provide them - artists and intellectuals - adequate living standards. Fortunately, the booming Internet age, along with the Industrial Revolution 4.0, has opened new opportunities for all of us: AIMS Project, an E-commerce system for buying media products.

In this course, we will focus on features for customers, which are related to placing orders and paying orders, instead of features such as account authentication or user management.

AIMS Project is a 24/7 platform-independent system, which allows new customers to use with ease. It is expected to serve 1000 customers at the same time without the noticeable loss of performance and to operate in an average of 300 hours without failure. The AIMS Software also can be repaired within 1 hours after any typical failure. The response time for the AIMS Software is 1 second at normal or 2 seconds during a peak load if it is not explicitly stated.

In the AIMS Project, an administrator can create, view, update, or delete any product. The administrator, however, can add or update only one product at a time, but can delete up to 10 products at once. Additionally, the administrator is not allowed to delete or update more than 30 products due to security concerns but can add an unlimited number of products in a day.

To add a product for sale, an administrator has to provide the information that the AIMS Software requires in order. For each media product, the administrator has to provide its title, category (e.g., book, CD, LP, DVD), value, and current price. The input of the value and the price must not include value-added tax (VAT) with the rate of 10 percent. Depending on the product category, some additional information is required.

- A book requires information about its authors, cover (paperback or hardcover), publisher, and publication date. In addition, page number, language, and genres (e.g. comics, picture books) are optional.
- A compact disc (CD) containing a music collection, i.e., a CD album, requires information about the names of artists, record labels, track list, and genres (e.g. K-pop, C-pop, US-UK). Besides, release date is optional.
- A long-play (LP) record requires the same information as the CD does.
- A digital video disc (DVD) requires information about its disc format (e.g., Blu-ray, HD-DVD), director, run time, studio, language, and subtitles. Additionally, the release date and its genres (e.g., comedy or action) are optional.

Currently, the AIMS Software only allows the purchase and sale of physical products of above media. For physical goods, barcodes, product descriptions (e.g. to describe about its conditions, new or second-hand), quantity, date of import, product dimensions (size and volume) are required. Physical products can be books, CDs, LPs, or DVDs.

The price of a product varies depending on its market demand, so the administrator can update the price of a product up to 02 times in a day. However, the price of a product must always be between 30% and 150% of the product value to avoid soared price or dumping.

The AIMS Software has to save information related to all creations, updates, or deletions of any products. If any action is invalid, the AIMS Software will notify the administrator, for instance, when the input for media creation violates the regulation on price and value or the datetime format.

Moreover, the administrator can manage users of the AIMS Software by blocking users, unblocking users, creating users, viewing user info, updating user info, deleting users, and resetting user password. The AIMS Software will automatically send the user an email to notify any changes of any user management from administrators.

On the side of the customer, when the AIMS Software starts, an arbitrary list of 20 products are shown per page. The customer can search for goods by using product characteristics. The AIMS Software then shows 20 products per page, related to the customer's input. Also, he or she can sort products by price (in ascending or descending order) or add any media with the corresponding quantity to the cart.

When the customer views the cart, the AIMS Software will display the information of the cart, including the subtotal before VAT, the subtotal with VAT, the list of products, and their information (i.e., media title, quantity, and price of a product). At the same time, the AIMS Software will notify the customer if the inventory quantity of any product is not enough and show the available quantity for each of those products. In case the customer changes his or her mind, he or she can edit the ordered quantity in the cart or remove the products from the cart. Additionally, there is only 1 cart for each running instance of the AIMS Software, and the cart will be empty after the customer successfully places an order.

To successfully place an order, a customer must proceed the first two steps: order placement and order payment. The main differences in these 2 steps between a customer with a signed-in account and a customer without an account are that the AIMS Software would load and save the delivery info (i.e., the receiver name, phone number, email, province/city, shipping address), card info (i.e., a card holder name, card number, issuing bank, expiration date, security code), and products in cart by using the customer account while the AIMS Software would load and save from the memory of the device in the other case.

In order placement, the customer must view the cart first, then in the cart view, the customer can request to place the order. Whenever the customer requests to place an order, the AIMS

Software always checks if the ordered quantity is greater than the quantity in inventory. It will ask the customer to update the cart if the condition is not satisfied and show the available quantity for each of those products, too. After the update, the customer must request to place the order again.

Next, the AIMS Software asks the customer to update the delivery information and delivery instructions (if need be). The customer can also choose to place a rush order. Placing a rush order allows the customer to receive the goods at a scheduled time. Currently, only addresses in Hanoi City are supported. After the customer submits the delivery form, the AIMS Software validates customer input and asks the customer to update again if a mandatory field is left blank or there exists invalid input. Then it checks if the customer has chosen to place a rush order.

In case the customer wants to place rush order, the AIMS Software checks if there is media and the shipping address that are supported to place rush order. If there is no support either from any media or the shipping address, the software would notify the customer and ask the customer to update delivery information. Or else, the software displays the screen for rush order, allowing the customer to update rush order info (i.e., delivery information for rush order, delivery instructions, and expected delivery time interval) if the shipping address and some media support placing rush order, and

- In case only some products in the order support rush order, these products will be delivered together to the delivery address for the rush order at scheduled time. Products that do not support rush order will be shipped as usual.
- If all products in the order support rush order, all of them will be shipped together to the delivery address for the rush order at scheduled time.

Then the software changes the formula to calculate the shipping fees if the input is valid, or it would ask the customer to update the input. After that, the flow continues at the step where the software calculates shipping fees.

In case the customer does not want to place a rush order, nothing is changed.

After that, the AIMS Software calculates shipping fees. The shipping fees depend on the product weight and the shipping address. More details are listed as follows.

- Shipping in AIMS Project is not taxable.
- Orders which are priced over VND 500,000 will be free shipping.
- Only charge for delivery of the product with the greatest weight.
- If the shipping address is in Hanoi or Ho Chi Minh City, the starting price for the first 3kg is VND 22,000.

- If the shipping address is in a different destination in the territory of Vietnam, the starting price for the first 0.5kg is VND 30,000.
- For each next 0.5kg, customers will have to pay an additional VND 2,500.
- In case the customer chooses to place rush order, the shipping fee is charged with VND 10,000 for each product that supports rush order.

Then the AIMS Software displays the invoice, including the list of products in the cart, their price and quantity, the subtotal before VAT, the subtotal with VAT, shipping fees, and the total amount of money to pay. After the customer confirms the invoice, the AIMS Software saves the invoice and then proceeds to the order payment. The amount of money that a customer needs to pay for an order is equal to the total price of the products with VAT plus the shipping fees. Then the software proceeds to the step of order payment.

In order payment, the customer must provide a payment method. Currently, customers can only pay by local currency (VND) through prepaid credit card (by linking to interbank). For transactions with credit cards, the customer must provide transaction info, including card info and transaction description. The response time for any transaction must not exceed 02 seconds.

After the successful payment, the AIMS Software displays the transaction ID, card holder name, the changed amount, transaction description, the balance, transaction date, and time. At the same time, it records the transaction info and the order so that the customer can review the purchase history. The order will be in the pending state, and the AIMS Software sends an email of invoice and transaction info to the customer.

In order approval, an order will be in pending state and then will be approved or rejected by an administrator. To manage orders, an administrator needs to navigate to the order management view. Then, the administrator can see 30 pending orders per page. From here, he or she can click the order ID to view order details and approve or reject the order even if there are enough products in the inventory. There are many reasons such as the goods are in an unacceptable state, the products are out of stock while the customer is paying the order, or they simply cannot be found in the warehouse. The approval of an order, however, would be denied by the AIMS Software if there are not enough products in the inventory.

In addition, the AIMS Software also allows customers to cancel orders after payment. The full amount will be refunded to the credit card(s) that the customer has used to pay for the order(s).

Note that the customer can always go back to any previous step when placing an order.

In the simulator, for simplicity, customers do not need an account to place orders and pay orders. The software has no feature allowing customers to sign up and sign in.

For our simulated system, in terms of payment method, each group will be issued a virtual credit card with the information:

- Card number: codeOfTheoryClass_groupID_2020 (e.g. 987152_group06_2020)
- Amount: VND 1,000,000 in the account by default
- Secret token: this is a secret token that will be sent separately to each group to perform operations with their virtual credit card.
- Other info: will be sent separately to each group.

To perform operations with a credit card, the AIMS Software will call a number of available APIs (which will be provided with a description) as follows:

- Deduct money API (to deposit money when make transaction)
- Add money API (to make refunds for customers)
- Reset account API (reset the original default amount of the card. This API was created to facilitate dev testing, ensuring there is always enough money for students to perform system tests)
- Check balance API (used to check credit card balance)