CPT203

Coursework 1

2024/2025 Semester 1

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Part 1: System requirements modelling (50 marks and no page limits)

1. Produce a use-case description for “Stock Receiving” and “Pack Order” use cases. (10 marks)

STOCK RECEIVING

Condition Type	Description
Case	Stock Receiving
Applier	Warehouse Clerk
Precondition	The warehouse clerk has logged in to the system and has permission to receive inventory.
Postcondition	The inventory information is updated, and the system records the new inventory status.

【OA】：

The specific description of the implementation of the inventory receiving function of the system is as follows: first, the warehouse staff needs to select the function of inventory acceptance; The system is then prompted to enter the accepted book information; The warehouse clerk enters the information of the book he wants to select and confirms; The system to verify that the information entered is true and valid. If the information entered is valid, the system adds the book information to our inventory. The system updates the inventory status and generates an acceptance record. After receiving the confirmation from the system, the warehouse staff completes all operations.

PS:【If the information entered during the operation is invalid, the system will prompt an error and ask the warehouse staff to re-enter the information, and if there is an exception during the acceptance process, the system will also record and notify the warehouse staff】

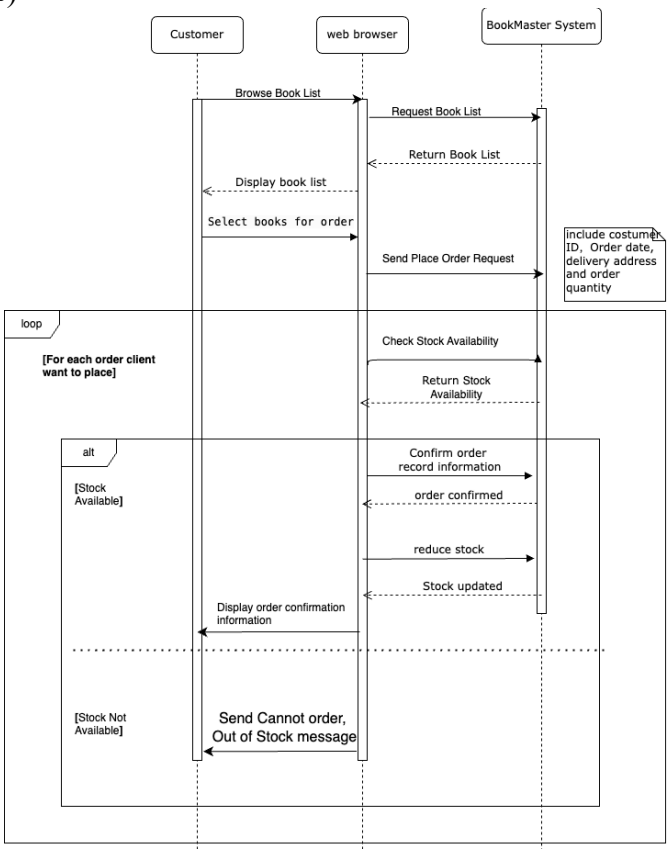
Pack Order

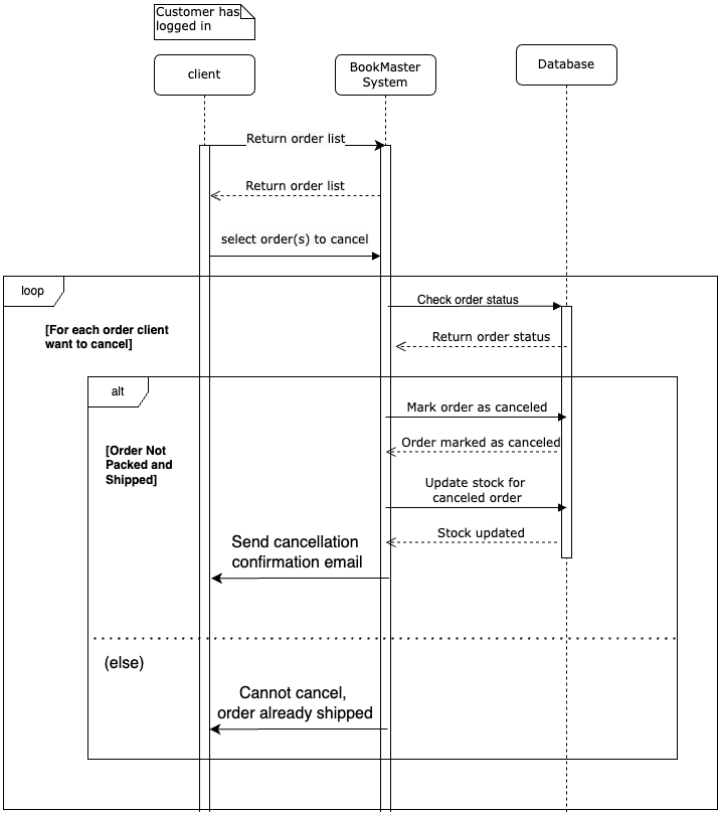
Use Case Name	Packing Orders
Participants	Warehouse Clerk
Precondition	The warehouse clerk has logged into the system and has permission to perform packing operations.
Postcondition	The order status is updated to "Packaged" and ready for shipment.

【OA】

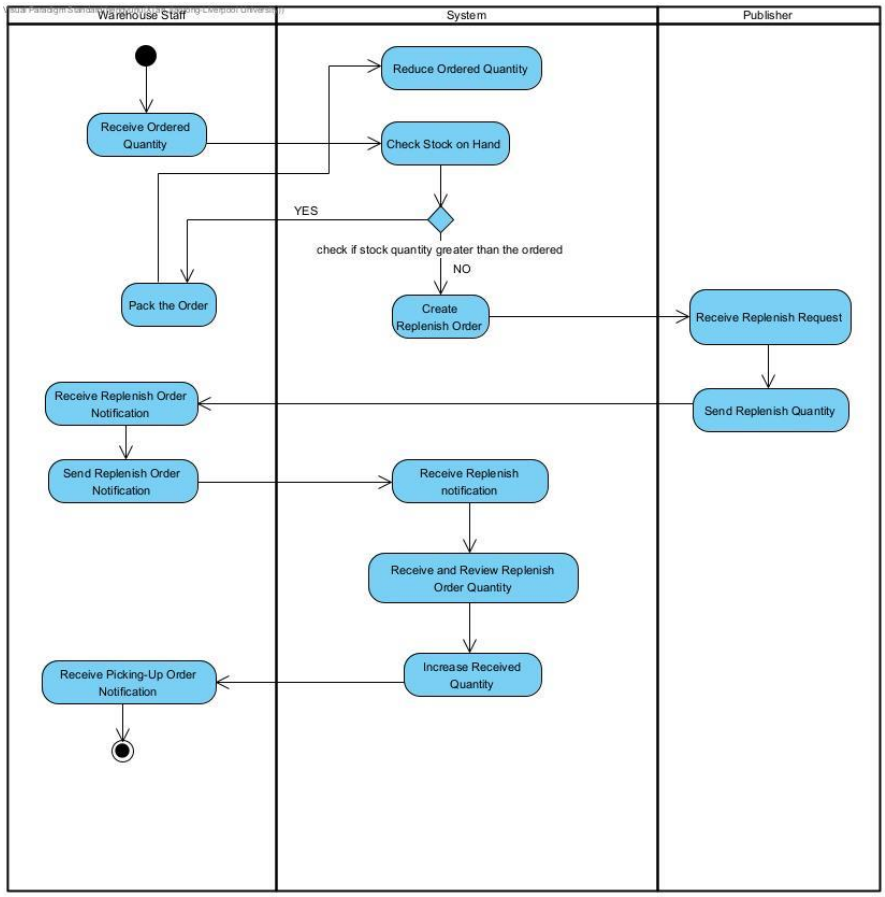
The warehouse clerk selects the function of packing orders in the system, and the system displays a list of orders to be packed. The warehouse clerk selects an order to pack. The system displays the details of the order to be packed to the warehouse clerk. The warehouse staff confirms the packing information and starts packing. The system updates the order status to "Packed". The warehouse clerk receives a confirmation message and the process is complete.

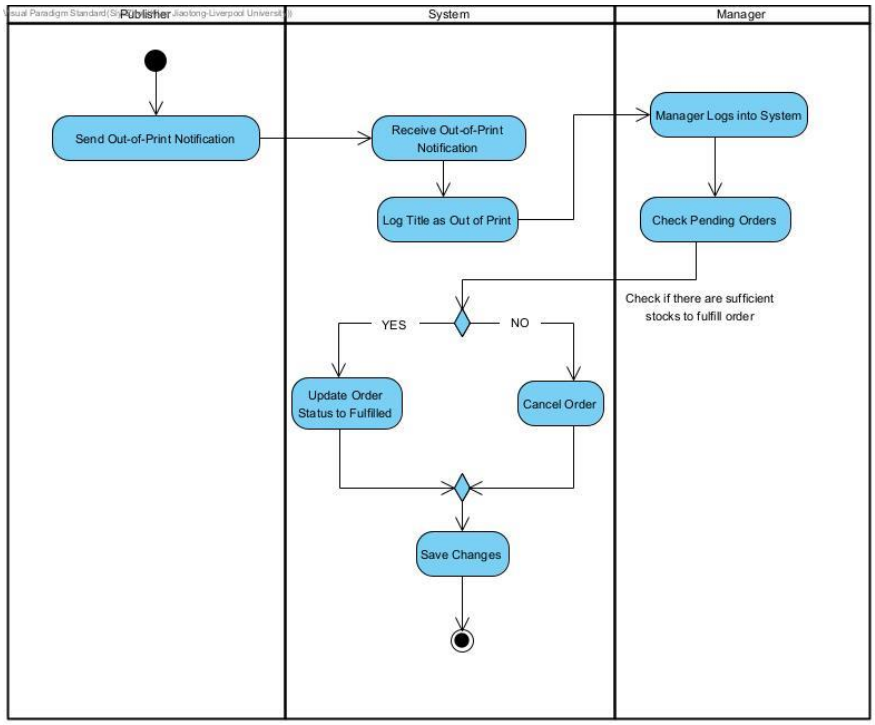
2. Draw a sequence diagram for the ‘Place Order’, and ‘Cancel Order’ use cases. (10 marks)



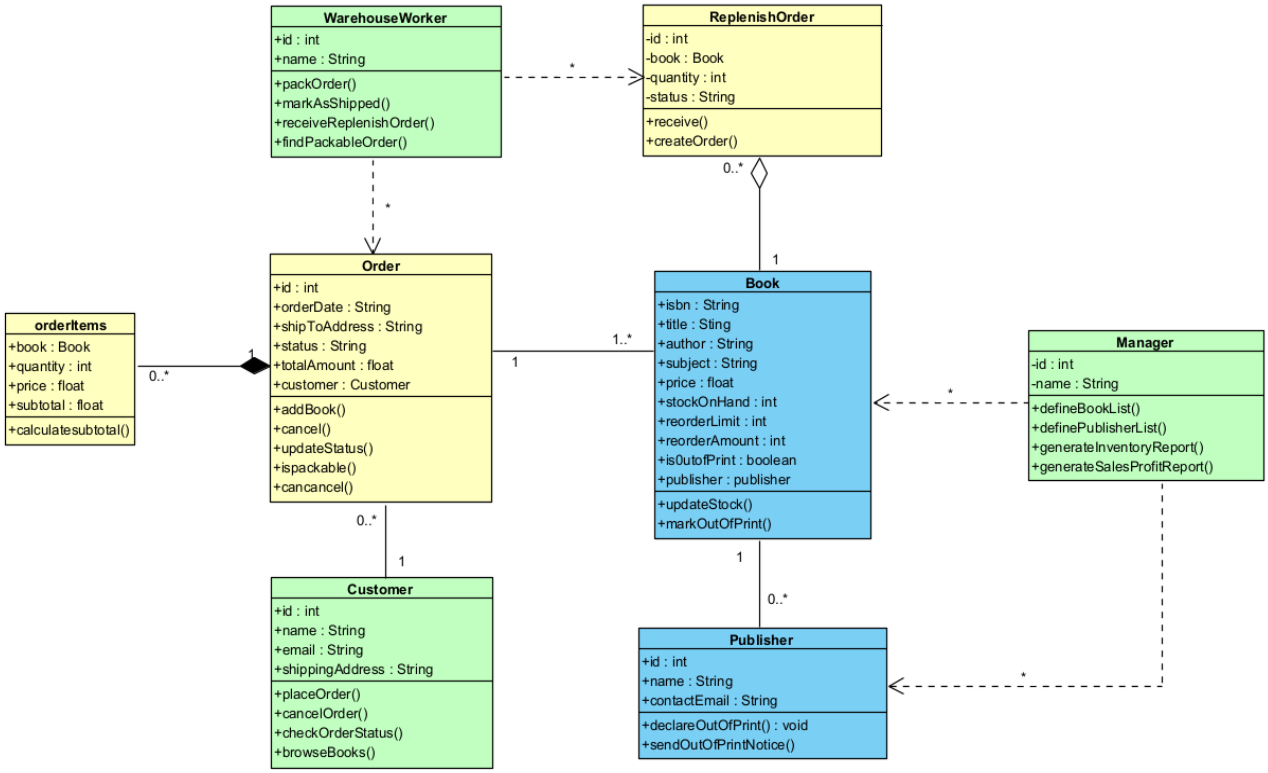


3. Draw an activity diagram for the ‘Stock Receiving’ and ‘Manage Out-of-Print’ use case. (10 marks)

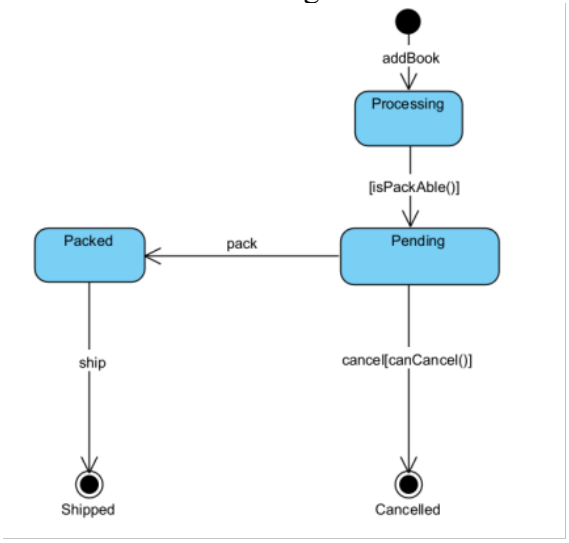


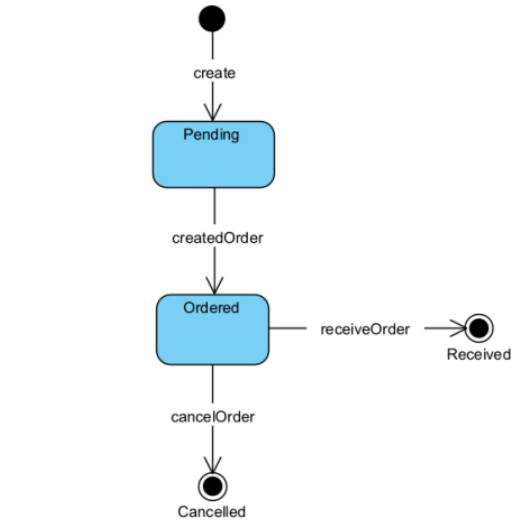


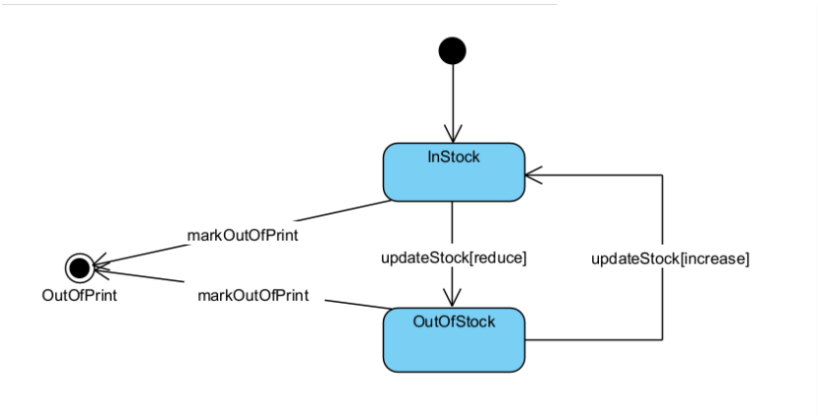
4. Draw a class diagram for the system. (10 marks)



5. From the class diagram, identify the classes with potentially complex states. Draw state machine diagrams for these classes. (10 mark







Part 2: Software engineering analysis (50 marks and max 3 pages)

1. Which software process is most suitable for the project described in the case? Justify your answer. (10 marks)

The incremental model is particularly effective for the BookMaster project because it emphasizes early delivery of core features, responsiveness to user feedback, adaptability in deployment, and efficient assessment on plan.

- **Early Delivery of Core Features**

By allowing the release of basic BookMaster functionalities, such as order processing, inventory management, and book browsing, in the initial stages, the incremental model facilitates user interaction with the system before it is fully completed. This early interaction enables users to evaluate the initial version and provide valuable feedback, supporting refinement in subsequent iterations and helping to tailor the system more precisely to user needs.

- **Supports User Feedback and Ongoing Enhancement**

The BookMaster system includes a range of user roles—customers, warehouse staff, and managers—each with unique needs. By using incremental versions, the development team can collect feedback from each group after updates and incorporate adjustments based on real user experiences. This iterative feedback loop enhances the usability and functionality of each version, optimizing the system to meet the diverse needs of users.

- **Adaptability to Future Expansion**

The incremental structure allows for the gradual integration of additional features, such as customer management, partial orders, and various payment options, which may not be present in the initial version of BookMaster. Each new feature, such as handling partial orders or processing refunds, can be smoothly integrated into the existing system framework, thereby minimizing disruptions to fundamental functions like inventory management and order processing. This gradual expansion also allows the team to address specific user needs over time, maintaining system stability while enhancing its functionality.

- **Shorter Planning Cycles with Clear Milestones and Deliverables**

With each update focusing on key functions such as order processing, browsing, and inventory control, planning becomes more manageable and concise. The addition of new features, such as customer management and refunds, improves the accuracy of resource allocation and time estimation. Each increment is associated with clear deliverables such as the inventory system as a primary phase, closely aligned with user needs, and supports straightforward progress tracking. This structured approach allows for timely adjustments based on user input, thereby ensuring a more responsive development cycle.

2. Identify and analyze ethical concerns for the case study and make reasoned ethical choices. (10 marks)

- **Data security and privacy**
  - **Ethical concerns:** Data security and privacy are susceptible to misuse from a security and privacy perspective simply because people have access to sensitive information or personally identifiable information of other customers and employees, which is why ethical issues may arise. In the case of the BookMaster system, it involves making sure that there can be no misuse or unauthorized disclosure of the personal data of customers. Moreover, customers must know how their data is used and what rights they possess.
  - **Ethical choices:** Strict access control to prevent intermediate access to sensitive data. Simultaneously, create a clear privacy policy that explains to customers why their data is being tracked and how long it will be stored, and offer options for data deletion or modification to respect the privacy rights of the customers.

- **Employee benefits**
  - **Ethical concerns:** Wages, decent work conditions, health and safety fall under employee benefits. The physical and mental toll taken by improper management of heavy workloads during manual packing and loading of BookMaster's warehouse employees would generally put them at risk.
  - **Ethical choices:** Warehouse employees have working hours to follow and sufficient time to recuperate from their work; offer a safe working environment with the right equipment, especially to avoid injuries. The company can also periodically assess how busy employees are and hire more staff to ensure that overloading of employees does not take place. Do the respect of the physical and mental health of employees and provide psychological support and career development.
- **Natural obligations**
  - **Ethical concerns:** BookMaster may coordinate and bundle printing books, and this processing approach may have implications for the environment, including carbon footprint and waste.
  - **Ethical choices:** Reduce the use of non-degradable materials such as paper or plastic, and research recyclable or compostable packaging options.

3. What are the non-functional requirements that might impact the system, and how might they do so? (10 marks)

- **Performance**

The system should process orders quickly enough to ensure that warehouse staff do not encounter delays when selecting and confirming orders. If the system response is slow, it may cause employees to wait for too long, thereby reducing work efficiency and slowing down the entire project process.

- **Usability**

The design of the system interface should be simple and easy to use so that users can quickly find the functions of packaging orders and operate them proficiently. If the UI design of the interface is complex or not intuitive, it may lead to user errors or increase the learning curve, making the overall experience of the product worse, and gradually reducing the user stickiness of the product over time.

- **Reliability**

The system should be able to operate reliably under high load conditions, ensuring that there will be no crashes or data loss during the packaging process. If the system is unreliable, it may lead to delayed order processing, affecting customer satisfaction, causing a sharp decline in future order volume, and impacting future market development.

- **Security**

The system needs to protect sensitive data (such as order information) from unauthorized access. If the security measures are insufficient, it may lead to data leakage, affecting the legitimacy and reputation of the business. In the packaging process, the probability of system errors should also be considered to increase the stability of system operation.

4. What challenges might arise when working in collaboration, and what do you propose to overcome these challenges? (10 marks)

- **Communication Barriers in Remote Collaboration**
  - **Challenge:** Team members may interpret requirements or expectations differently, which can cause miscommunications, particularly in teams with language differences and cultural diversity.
  - **Solution:** Organize timely and frequent check-in meetings and make thorough documentation available to all participants. To ensure the team is aware of the most recent information, use platforms like shared project boards.

- **Coordination of Tasks and Due Dates**
  - **Challenge:** When several people are working together on interdependent tasks, it can be difficult to coordinate progress and deadlines.
  - **Solution:** Clearly define roles, responsibilities, and task-related timelines early on. Dependencies between tasks can be tracked with the use of project management tools such as Jira, which allows team members to work together efficiently and modify deadlines as necessary.
- **Differences in Skill Levels and Expertise**
  - **Challenge:** Team members may differ in their technical proficiency or familiarity with particular technologies, which could result in unequal contributions or workload distribution.
  - **Solution:** Create a system for task accountability, and provide frequent updates on progress. Assign work according to each person's strengths. To ensure that everyone contributes equally, skill gaps can be filled with the aid of online learning and shared knowledge resources.
- **Conflicts in Decision-Making**
  - **Challenge:** Team members may disagree on priorities, design choices, or implementation strategies.
  - **Solution:** Establish a fair decision-making process, such as group voting or allocating decision-making authority according to expertise, and begin by collaboratively determining task priorities.

5. What measures can BookMaster take to ensure that the warehouse interface is user-friendly for employees of all backgrounds, including those with different levels of technical proficiency? (10 marks)

- **Simple and intuitive design**

Make the interface simpler by using icons instead of text to reduce the use of text. And give some tutorials or guides to tell you what each button does. For example, add some hover prompts or generate some pop-up instructions to help employees understand what each button or field does.

- **Effective operational feedback and error prevention**

Each operation of the employee is given operational feedback, such as some operation success prompts, and each operation is added an error prevention mechanism, such as some special operation confirmation prompts. Just like:" Are you sure you want to mark this order as shipped?" Using red for errors and green for tasks completed, these color prompts are clear and easy to understand for all employees.

- **Simplified processes and fast operations**

Some task steps can be reduced or combined to simplify the workflow. For example, packaging and marking orders can combined into "Ready to ship". Also create shortcut buttons or shortcuts for common operations, which can save a lot of time.

- **Feedback mechanisms and continuous improvement**

Provide employees with simple and easy-to-find ways to submit problems or suggestions for improvement, such as feedback buttons or feedback hotlines. At the same time, some questionnaires are often sent to collect the ideas and opinions of each employee, and some user tests are conducted to ensure that the revised version meets the expectations and is suitable for the majority of users.

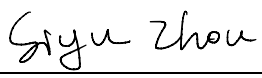
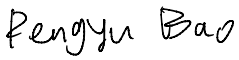
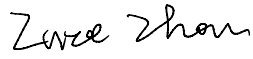
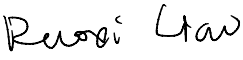
- **Accessibility function design**

Add accessibility features and accessibility features such as font size adjustment, voice assistant, or compatibility across devices. These features are more user-friendly for a wide variety of groups and make it easier for everyone to use the system.

Section 5. Peer review form template

CPT203 Coursework
Peer review
Individual Contribution for Group Report

Group Number: <5>

Name	**ID Number**	**Contribution (%)** Please enter an integer, for example 15% contribution, please enter 15. The sum of this column should be 100	**Signature**
1. Runze.Zhang	2252881	20	
2.Siyu.Zhou	2257056	20	
3. Pengyu.Bao	2252520	20	
4. Enze.Zhou	2254411	20	
5. Ruoxi.Liao	2254637	20	

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