

# Sales Information System in Clothing Stores Using the Rational Unified Process Method

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**Abstract:** Clothing stores are one of the needs of the community to meet the needs of clothing. However, along with technological developments, the sales system in clothing stores must adapt to developing technology to increase sales, moreover, many customers have used the internet to communicate and find information. Some stores selling clothing experienced problems in their business processes, such as store promotions which were only limited to store banners. Another problem faced by the owner is the collection of goods and recording of sales history which is relatively long because it is still done manually by recording in a book. Based on the problems that occur, it is necessary to create a system that utilizes technology and the internet such as an online store, making it easier for owners to manage and control their business and expand the range of promotions. The purpose of this study is to design and determine the needs of the clothing store system using the Rational Unified Process method. This software is programmed using the PHP programming language. This software is built based on a website, with the hope that the device can be a solution to existing problems and be able to simplify the business processes that run at the clothing store. The results of this study are twofold. First, the system architecture design is in the early and elaboration stages. Second, system implementation and testing at the construction and transition stages.

**Keywords:** PHP; Rational Unified Process; System; Clothing Store; Websites

## INTRODUCTION

At this time technology is very reliable to facilitate human work. Technology is now often used to facilitate existing business processes to be more efficient and effective. The technology that is currently being used by business people and small business actors is an internet. Internet technology can be used for small business management, either for business purposes or for other purposes to empower small businesses in the form of an e-marketing portal managed by government agencies and small business associations. Internet marketing such as email marketing makes it easy for customers who use online shopping systems and positively influences customers' shopping interest in the products offered (Harto, Sulistya, Pratiwi, Utomo, & Rahmawati, 2019). On the internet, people can create websites to market their products. Website is also a medium electronic publication consisting of linked web pages each other via a link Placed in text or image. This website was created by Team Bamers Lee in 1990. Creating a website using HTML language, Use HTTP communication protocol is in the application layer OSI layer reference. The website page you visited Use apps that use the application called an internet browser (Feri Efendi, 2017). The website acts as a medium for promotion, transactions, and management to run a business. With website promotions that are carried out more widely, transactions that run are more practical and effective, and control over stores related to products is easier. With the many benefits offered by the website, it is not surprising that many business people have used it. This can be seen from the number of e-commerce that have been established and started online business. Some small shops have started using websites to make it easier to control and manage their stores.

One of the shops that still use a manual system in the buying and selling process is the Irfan Jaya shop. The shop was founded in 2011 and is located in the city of Timika, Papua Province. After running the business for many years, Irfan Jaya's shop began to encounter several problems that slowed down the business processes in the store. The problem faced by Toko Irfan Jaya in its business process is that it still uses manual or conventional systems until now. Starting from the promotion system which is only through shop banners or the delivery of information by word of mouth, the existing stock of goods is not counted in detail and clearly, recording sales history is still manual using pens and books. On the other hand, the problem faced by clients is that the

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transaction process and product information are still manual so customers have to come to the store to buy or just see prices and stock of goods.

From the above problems, it is necessary to evaluate the sales system by creating a website based on the needs of the store. So, from that, the author takes the title "Sales Information System in Clothing Stores Using the Rational Unified Process Method". Related to the RUP method there is a study entitled "a comparison between two software engineering processes, RUP and waterfall models" that compares the features and drawbacks of two software development models, namely RUP and waterfall. Advantages of The RUP model is more flexible when the user wants to do changes at each stage of development, while the waterfall model can not be too much make revisions or changes. Weaknesses of RUP is the process that could be too much because changes are possible, while waterfall uses definite stages so that easy to use (Endang Anjarwani, 2020). The language used to program the website is PHP and MySQL which are used as data storage media. Then for system testing, tested based on the web application testing theory proposed by Roger S. Pressman. The purpose of this research is to find out the system requirements at Irfan Jaya's shop using the Rational Unified Process method. It is hoped that the results of the system analysis can be a solution to the problems that occur in Irfan Jaya's shop.

### LITERATURE REVIEW

In previous research (Kurniawan, Hayuhardhika, Putra, & Purnomo, 2019) there are still some shortcomings such as content management features that need further development, the need for evaluation of the algorithm, data source code, and interface of the system.

In other studies (Hidayatullah, Hendrakusma Wardani, & Rachmadi, 2018) also has the same method as this research, conducting the analysis process in stages, starting from system requirements analysis to system architecture. Testing on the research can still be continued so that the website continues to grow following the needs or input from the user.

Other research (Siregar, Nasution, & Haramaini, 2021) create a junior high school learning web that will be used by the school's students. However, there are still shortcomings in the database backup and update process that cannot run automatically. If anyone wants to be updated, the update is done by installing manually.

Further research (Deddy Supriatna, Destiani, Fatimah, & Nurrohman, 2022) done by going through each stage of the Rational Unified Process method except the transition stage. Testing is done using black box testing. The results of the research are in the form of web sales data services at optical shops. Weaknesses in the research are the need to add some features such as features of transactions, interactions, and inventory.

Subsequent research conducted by (Widianingsih, Agitha, & Afwani, n.d.) usability and suitability tests are carried out. The results of the usability test obtained a value of 89.7% which means the system is feasible. Meanwhile, the suitability test results obtained a value of 1 which means the system is running well. Usability testing in the research needs to be done again by adding at least twenty respondents, where some of the respondents are from the IT expert profession. In this way, a statistically correct value can be obtained.

Further research conducted (Ariyanti et al., 2021) produce applications that can detect plagiarism. However, the results of the system analysis have not been verified validated so the compatibility between the system design and the user's wishes is not yet known.

### METHOD

At the time of wanting to conduct research, the author requires research procedures so that the steps or stages carried out are sequential and continuous with each other. The following is a chart image of the procedures or stages of the research that has been compiled by the author:

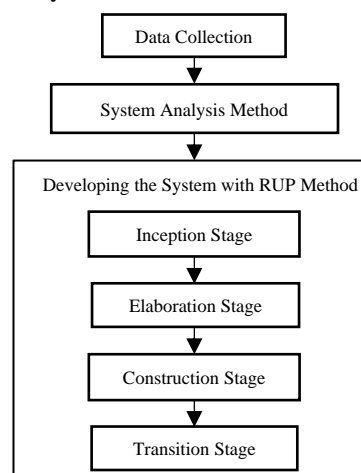


Fig. 1 Research Stages

### Data Collection

\*name of corresponding author



The data needed for the research were collected by using observation and interview techniques. Observation is used by the author to identify problems that occur in the object. Meanwhile, interviews were conducted to find out what kind of system is needed for a clothing sales information system at the Irfan Jaya store..

**System Analysis Method**

In the process of system analysis, a special method or framework is needed that can help the author analyze the system. In this study, the authors use RUP (Rational Unified Process) as a method to develop the system required by Toko Irfan Jaya.

RUP is a well-defined and well-structured software development process. RUP provides a good definition for the software project life flow. RUP was developed by Rational Software which was acquired by IBM in February 2003 (Hakim & Rizky, 2018).

RUP as one of the methodologies for developing information systems provides guidelines for determining roles and responsibilities in developing organizational systems. it aims to produce high-quality information systems according to user requirements, schedules, and costs (Tamami, Mursityo, & Pradana, 2019). The advantage of RUP is that it is flexible if the user wants to make changes at any stage of development. Regarding the guarantee of success, RUP has a high guarantee of success. In terms of testing, the RUP model is tested at the end of all iterations. The RUP method has four stages or phases, Here is an explanation for each RUP phase:

**Inception Stage** - This stage is more about modeling the required business processes (Business Modeling) and defining the requirements for the system to be created (Requirements) as well as analysis and design (Analysis and Design).

**Elaboration Stage** - This stage is focused on planning the system architecture. So that it can be detected whether the desired system architecture can be made or not and the risks that may occur from the architecture created. The activities carried out at this stage are more on system analysis and design as well as system implementation that focuses on system prototypes (prototypes).

**Construction Stage** - The development of system components and features is carried out at this stage. This stage is more on system implementation that focuses on software and program code. The Construction phase produces software products that are a requirement of the Initial Operational Capability Milestone or initial operational capability limits/milestones.

**Transition Stage** - This stage is more on deployment or system installation so that the application created can be understood and used by the user (Endang Anjarwani, n.d.) .

RUP has several processes at each stage, namely Business Modeling, Requirements, Analysis and Design, Implementation, Test, Deployment, Configuration and Change Management, Project Management, and Environment.

**Test** - Testing is the process of running a web application with the aim of finding and fixing bugs. Testing is important because web applications run on different networks, operating systems, or browsers (Ericsson, n.d.). "You don't have to wait until your project is finished to be tested. Start testing before writing a single line of code. Continuous and effective testing helps you develop a more resilient site."

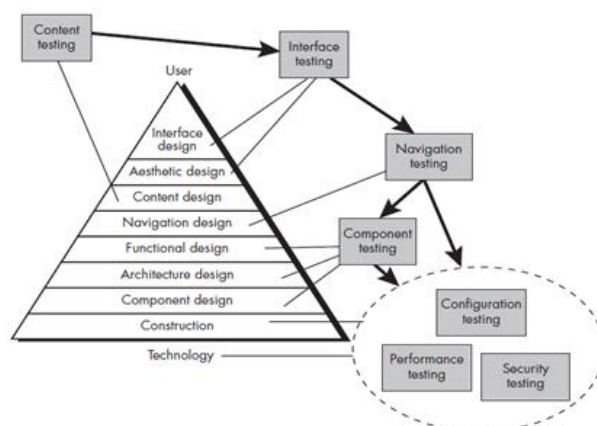
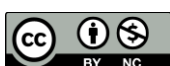


Fig. 2 testing proposed (Pressman & Lowe, 2009).

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**RESULT**

In the results and discussion section, an analysis of the system will be carried out using the Rational Unified Process (RUP) method. This section also carried out system implementation and testing using the procedure introduced by Roger S. Pressman.

**Developing a System Using the RUP Method  
Inception Stage**

At this stage, the author will work on three processes, namely business modeling, requirements, and analysis and design. Business modeling is used to model the business processes that run at the Irfan Jaya store so that they can benefit. The requirements process will produce functional and non-functional requirements of the system at the Irfan Jaya store. While analysis and design is a process where the author analyzes and designs the system from Irfan Jaya's shop.

**Business Modeling**

Business processes running at Irfan Jaya's shop were identified to find problems that occurred. Problems found in the process of buying, promotion, and reporting. When customers want to see or buy a product, they have to come to the store and take their time. Another problem with store promotions is limited to store banners. While in the report, the problem is in the manual recording process. Based on the business processes analyzed by the author, the authors suggest a new business process. In the Business Modeling process, researchers use the Business Model Canvas or commonly abbreviated as BMC to model the business processes that occur at the Irfan Jaya store. Below is the proposed BMC or business process for Irfan Jaya's shop.

Table 1  
Business Model Canvas for Irfan Jaya's Shop

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
-Producers or Convection -Cargo Services -Similar clothing stores -Package Delivery Service	-Order products from distributors or convection that produce directly the products needed by the Irfan Jaya shop -Promoting through websites, social media, and store banners -Maintain good communication with customers	Irfan Jaya shop is a shop that sells various types of clothes with Papuan motifs. Unlike other shops, this shop sells clothes that are designed and produced by themselves, but not just clothes, backpacks, umbrellas, and noken with patterns and values that are well known to residents in Papua. This store also has discounts if you buy products in large quantities. The clothes offered are also available in various sizes for children to adults	-Chat via Whatsapp -Communicate directly when consumers are shopping -Store info via social media	-male or female -15-50 years old -middle to the upper-class economic community -work professionally or self-employed -Behave cheerfully, like to travel, and love the beauty and culture of Papua -local and foreign tourists
	<b>Key Resources</b> -Capital for ordering one dozen products -Experienced designer domiciled in Papua to design the product to be ordered -Convection or		<b>Channels</b> -Social media as promotion media or product introduction -Website as a broad promotion media and more efficient sales in today's technological	

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	distributor of clothing, backpacks, and others.		era -Irfan Jaya type of shop that promotes Irfan Jaya to its customers -Banners on the shop -Google maps	
<b>Cost Structure</b>			<b>Revenue Streams</b>	
-Cost of goods production -The cost of shipping products from the manufacturer to the store -Monthly designer salary -Packaging costs -Banner fee -Website hosting and domain costs			Stores earn funds through sales of: -Shirt -Sweaters -Backpack -Umbrella -Noken -Cap	

Fig. 3 Business model canvas for Irfan Jaya's shop

**Requirement**

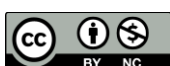
Requirements for an information system are divided into two in the software development process, namely functional and non-functional requirements. Functional requirements describe the functionality of the system to be developed or built. Based on the results of the researcher's analysis of the system, here are the functional and non-functional requirements at the Irfan Jaya store that need to be realized later.

Table 1  
Functional Requirements Table

Functional Needs	Actor
Payment confirmation	Admin
Upload product data	Admin
Clear product data	Admin
Edit product data	Admin
Download report	Admin
Registration	Customer
Product search feature	Customer
Upload proof of payment	Customer
Cart features	Customer
Booking feature	Customer

The functionality of this system is the expected solution desired by stakeholders. Based on table 1 above, ten functional requirements need to be realized in the system to be built. There are five functional requirements for the admin, namely payment confirmation, report downloading, uploading, deleting, and editing products. This functionality is needed by admins to verify when there is a payment, get purchase reports, and manage products to be sold. There are five customer functional requirements. First, registration is carried out in the registration process. This is useful for storing customer biodata at the Irfan Jaya store so that they can make the purchase process at the store because it has been verified as a user or member of the store. Second, is the product search feature. This feature makes it easier for customers when they want to find more specific products without the need to see products one by one. Third, upload the proof of payment feature. As the name suggests, this feature is useful for uploading proof of payment made by customers so that the payment process can be validated through the uploaded proof. Fourth, the basket feature accommodates products that have been selected by customers so that customers can purchase more than one product at the Irfan Jaya store. Fifth, the ordering feature, is useful for sending customer order details to the admin. In this feature, the customer will select and fill in the order details. Those are the ten functionality needed on the system from the author's analysis results.

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**Analysis and Design**

The analysis carried out at the inception stage is described and defined using a Use case diagram as shown in Figure 4. Based on the use case in Figure 4, it can be seen that two actors are interacting with the system. The two actors here are the customer and the admin. Features that only customers can access our product select, payment, and shopping history. While the features that can only be accessed by admins are product management. Among the features contained in the use case, some features can be accessed by customers and admins. These features are login and logout.

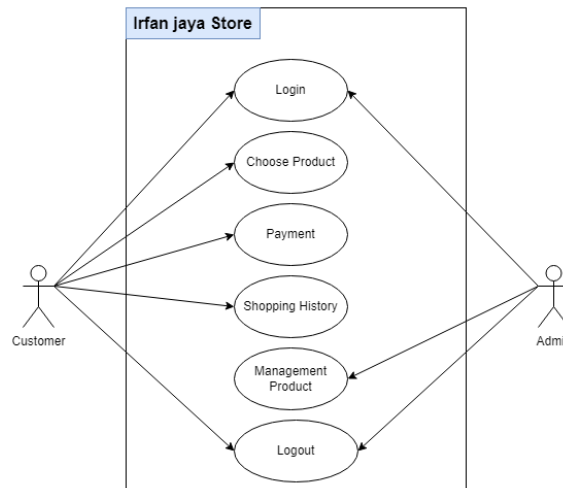


Fig. 4 Use Case Diagram at Irfan Jaya Store.

**Elaboration Stage**

At the elaboration stage, the analysis and design process is carried out to create a system architecture design and test the designs that have been made.

**Analysis and Design**

In this process, the author analyzes the system design which will later be implemented in the web form at the Irfan Jaya store. The activity Diagram is used by the author to design a system architecture that is useful as a prototype.

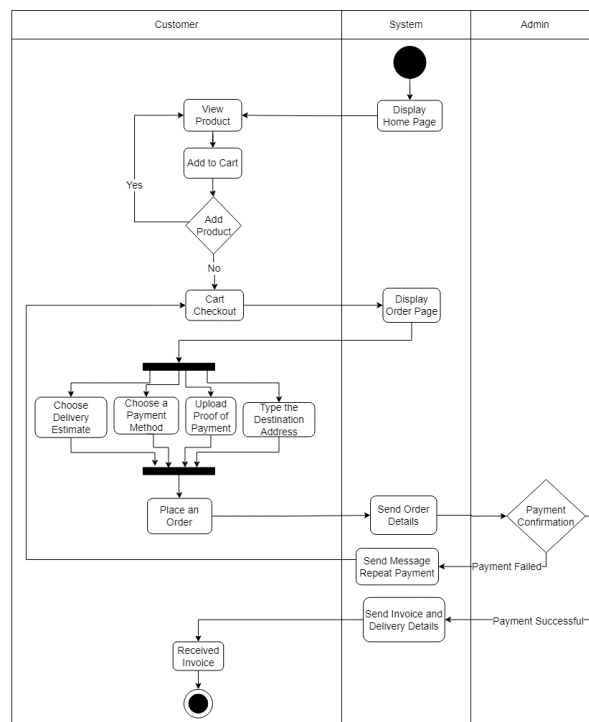


Fig. 5 Activity Diagram of the Ordering Process.

\*name of corresponding author



Figure 5 is an activity diagram that has been designed for the ordering and payment process that occurs on the Irfan Jaya store website. When the customer has logged in and entered the website, based on picture no. 8 the system will display the products offered by the Irfan Jaya store. customers can directly view and select the desired product. The product that has been selected by the customer will enter the cart feature and then the order can be placed immediately. However, if the customer wants to add a product, the product can still be selected again. After finishing selecting the product, the customer can checkout or place an order on the product that has been added to the cart. Then the system will take the user to the order page. On the order page, the customer is asked to fill in useful data such as shipping and payment information. Data that must be filled in include address, payment method, estimated delivery, and proof of payment. After completing all the required data, the customer can place an order. Orders made will be sent to the admin dashboard. Next, the admin will verify the payment from the order made by the customer. If the payment is successful, the admin will send a message in the form of a shopping invoice. However, if the payment failed, the admin will send a "repeat payment" message. Then customers can reorder on the cart feature by pressing the checkout button. After that, the customer goes through the ordering process as before. Verification is carried out as confirmation of payments made by customers.

Use case diagrams that have been made in the previous inception stage have additional features. The changes can be seen in the following image.

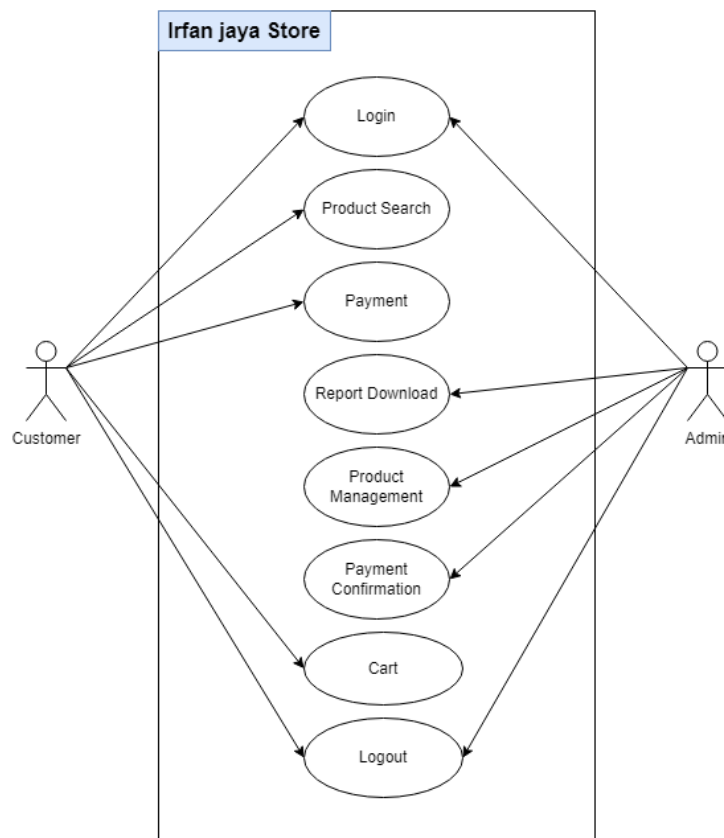


Fig. 6 Additions to Use Case Diagrams

Based on the Figure 6 we know that there are features added, namely Payment Confirmation and Cart. Payment Confirmation can only be accessed by the admin. The feature is used for payment verification. So, after the user makes a payment, the admin will check the proof of payment. If the payment made by the customer is successful, the admin will send a payment invoice using the payment confirmation feature. The Cart feature can only be accessed by customers, this feature is useful to make it easier for customers to find the desired product.

*Test*

The following tests are carried out on the use case that has been designed. Testing is carried out to validate whether the designed use case is in accordance with the user's needs or not. results are presented in table 2, it shows that all the features or use asses that have been made match the user's needs.

\*name of corresponding author

Table 2  
Use Case Suitability With Users Testing

Actor	Feature	Test result
Customer	search product	Suitable
	cart	Suitable
	Payment	Suitable
Admin	Manage Product	Suitable
	Payment Confirmation	Suitable
Customers and Admin	Login	Suitable
	Logout	Suitable
	Shopping history	Suitable

### Construction Stage

In this stage, the implementation of the system will be carried out. The author will run three processes, namely script implementation, interface implementation, and database implementation.

### Script Implementation

In the process of implementing a sales website at the Irfan Jaya store, the author uses visual studio code as a code editor with the PHP programming language to build a system that has been designed in the previous stage. PHP is a programming language used to build a website. PHP is dynamic and can be operated on Windows, Linux, and Mac Os. The database used by PHP is MySQL (Saed Novendri et al., 2019). PHP is called server-side programming. This is because the whole process runs on the server, not on the client.

PHP has five advantages, namely the script does not compile when used, development is easier because it is assisted by developers, easy to learn because of many references, supported by many web servers, and open source (Septia Nagara & Nurhayati, 2021).

### Interface Implementation

In the implementation of the interface, the author displays the added product features that are intended for admins. Where there are fields related to information or details of the product that will be displayed on the website home page. Admin will be asked to fill in fields such as the name, size, and color of the product.

### Database Implementation

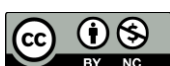
The database used in making this Irfan Jaya shop website is MySQL. MySQL is an open-source database management system. The MySQL database system supports features such as multi-threading, multi-user, and SQL database management system (DBMS). MySQL is a multi-user database that uses Structured Query Language (SQL) (Syah Putra & Novembrianto, 2021). MySQL itself has the advantage that it is more popular than other databases. MySQL has 8 advantages, namely free, stable, flexible, secure, fast development, supports transactions, is easy in database management, and has been supported by many communities (Solichin, 2016).

### Program Testing

Program testing ensures that no errors occur in the program. Testing using black box techniques. The test is also based on the theory put forward by Roger S. Pressman. Below are the test results of the program.

Table 3  
System Testing

\*name of corresponding author



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No	Testing	Question	Answer
1	Content	Is information on the web current and correct?	Yes
		Is the information displayed short and clear?	Yes
		Is the content layout easy to understand and understand?	Yes
		Is information embedded in the link is easy to find?	Yes
		Does the content present have the potential to offend certain parties?	No
2	Interface	Is the menu easy to find?	Yes
		Does the color use look distracting?	No
		Is the font used easily to read?	Yes
		Does the icon used to match the content?	Yes
3	Navigation	Is there a title for each web page?	Yes
		Does the whole link or links work?	Yes
		Is there a link label that doesn't suit its purpose?	No
		Does the search feature work as it should?	Yes
4	Component	Is there a feature that is not working properly?	No
		Are the existing buttons working properly?	Yes
		Are the pages accessed according to the user level?	Yes
5	Configuration	Is the web accessible through a browser?	Yes
		Is the web accessible on the operating system used?	Yes
		Can the web run on the network used?	Yes
6	Security and Performance	Is there user validation when logging in?	Yes
		Whether the customers can access pages that are not authorized?	No
		Is there any encryption action on user data?	Yes

### Transition Stage

At the transition stage, the activities carried out focus more on the installation and deployment process of applications that have been made so that applications can understand and be used by the system

### DISCUSSIONS

This research was conducted using the Rational Unified Process method to analyze and design an information system at the Irfan Jaya store. The reason the author uses this method is that it is flexible in making changes at each stage or phase. After doing the research, the results were divided into four stages as follows.

#### Inception Stage

at this stage, it produces a business process at the Irfan Jaya shop which is useful for seeing the business processes running on the system that will be created later. This stage also produces functional requirements and use cases. this is useful as an initial foundation in designing the structure of the system so that it fits its needs.

#### Elaboration Stage

at this stage generate activity diagrams, use case updates, and use case testing so that the system structure is more perfect than in the previous stage.

#### Construction Stage

The activities carried out at this stage result in the implementation of the system from the previously designed structure. starting with implementing the script code, interface, and database, according to the structure that has been designed. if the web application has been completed, then testing is carried out on the application. based on the tests that have been carried out at the construction stage, it can be said that the application is suitable for use by the user.

#### Transition Stage

the transition stage produces applications that are ready to be used by the user and their deployment so that the user gets to experience using the application.

### CONCLUSION

Based on the results obtained from the research, it can be concluded that application development using the Rational Unified Process method has high success. because there are tests performed at each iteration or stage. therefore RUP is referred to as a flexible web application development method. The process that occurs at the RUP is carried out in stages and sequentially to reduce the occurrence of errors in the structure and system. RUP method focuses more on structural analysis and system testing. the benefits obtained from the research is a system that is following the needs of the Irfan Jaya shop so that it solves the problems experienced by the object of research.

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Suggestions from the author if there is further research, add the automatic payment confirmation feature, the canceled purchase feature, and the address mapping feature.

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