

Development Information System for Rubber Sap Processing in East Borneo

Haerudin

Mulawarman University, Samarinda, 75242, Indonesia
E-mail: haeruddin@fkip.unmul.ac.id

Alvian F. Abdulfattah, Ghaly P. Agusva and Adhie C. Sari Firdani

Polytechnic of Agricultural, Samarinda, 75242, Indonesia
E-mail: zerodragneel53@gmail.com, ghalyputra370@gmail.com, chandraadhie13@gmail.com

Received: 11 April 2022; Revised: 06 May 2022; Accepted: 23 May 2022; Published: 08 August 2022

Abstract: Information technology is a technology that is growing rapidly today. Technology has a very important role in human life. The impact of the development of information technology is the increasing need for the use of computers. The use of computers in East Borneo (Kalimantan) is also not spared. East Kalimantan is one of the provinces with rubber plantations that have begun to be developed, but unfortunately due to the lack of knowledge and knowledge of the community regarding the management of agricultural products, the sale of rubber latex in East Kalimantan has not developed. Farmers can only sell rubber latex to middlemen at prices below the market. Therefore, the people of East Kalimantan need a forum for promoting agricultural products, so that they can attract buyers from outside the area and can get prices according to the market. To help people in East Kalimantan, in terms of marketing rubber products, a Rubber Sap Processing Website was created. The purpose of this paper is to increase the knowledge of processing and selling rubber products by the farmers while at the same time helping the welfare of the farming community, especially in the East Kalimantan area. The method used is Software Development Life Cycle (SLDC), the result is a website for the introduction and processing of rubber latex in East Kalimantan. The results of this study are the creation of an information system for rubber latex processing that helps farmers sell their harvests in online platform.

Index Terms: Website, Processing, Rubber Sap, East Kalimantan.

1. Introduction

Rubber plant is one of the plantation commodities that occupies a fairly important position as a source of non-oil and gas foreign exchange for Indonesia, so it has bright prospects [1-4]. Therefore, efforts to increase the productivity of rubber farming continue to be carried out [3], especially in the field of cultivation technology [5,6]. Rubber is an annual plantation crop in the form of straight-stem trees. The first rubber tree only grew in Brazil, South America, but after repeated experiments by Wickham [7], this tree was successfully developed in Southeast Asia, where this plant is now widely developed until now in Asia as a source of natural rubber [8]. In Indonesia, Malaysia and Singapore, rubber plants were started to be cultivated in 1876. For the people of East Borneo (*Kalimantan Timur*), rubber plants are one of the livelihoods of the residents [9,10]. When compared to rice plants and vegetable crops, rubber trees are not easily affected by pests [11] and also the sap can be taken at any time but the rubber sap produced can also be influenced by weather or season, during the dry season the rubber sap that comes out of the tree will be less and less [12-14]. During the rainy season, the rubber sap will be difficult to take because the rubber tree cannot be tapped when the trunk is wet [11]. The selling price of rubber sap itself is quite high in the market and also rubber plants do not really need care like other plants. Lack of knowledge about the management of rubber sap [13], then farmers are forced to sell rubber sap to middlemen at a selling price below the market price [15,16], it will be very detrimental to the farmers [17]. Based on that, an application program was created to help farmers, especially rubber farmers in East Kalimantan regarding better sales of rubber latex so that they can get prices that are according to the market, by creating a website-based program for information systems processing rubber latex in East Kalimantan Province. Based on the description of rubber in East Kalimantan, a system or application is needed that aims to assist rubber farmers in processing agricultural products that can be known to the public. The purpose of this research is to provide a processing system about the results of rubber farmers in East Kalimantan that can be known to the public. So that the discussion is focused and does not deviate, this research is limited by several things, this system only focuses on processing the results of rubber farmers in East

Kalimantan, this system does not handle payment activities or payment accounting, and this system is only run by managers, farmers are not directly involved in the system as a whole.

2. Methodology

This study uses several methods of data collection that can be used as information materials that can support this writing, the methods used are:

2.1. Data Collection Phase The data collection methods used in this study are as follows:

Literature review. By collecting the necessary data through book literature and the internet as a reference source that supports the making of this application.

2.2 System Design Phase the system design method used is the System Development Life Cycle (SDLC). The following are the stages of the SDLC system:

Planning. The stage is to determine the purpose of designing a website-based rubber latex processing system in East Kalimantan. Analysis Stages analyze the system to be built, what is needed to achieve the specified goals [18,19]. Design Phase to do the design of this application. There are three stages: interface design, content design, and program flow design. Implementation this stage is carried out by implementing the designs and designs that have been made, so that at this stage they produce the required software. Trial The stage of conducting a test or trial of the system that has been built.

3. Results and Discussion

3.1 System Planning

System design is designing or designing a good system whose contents are operating steps in the data processing process and process procedures to support system operation.

3.2. Navigation Structure

The navigation structure is made to describe the outline of the contents of the entire program form and also describes how the relationship between the programs forms. The navigation structure for the promotion, management and rubber program in East Kalimantan uses a mixed navigation structure. Through the navigation structure of this program, the content and structure of a program can be seen as a whole. Making this navigation structure is very helpful later when designing the entire program form. A good program navigation structure is a navigation structure that is able to provide clear information to program users. The navigation structure is used to describe all program pages that can be accessed, while the program navigation structure can be seen in Fig 1.

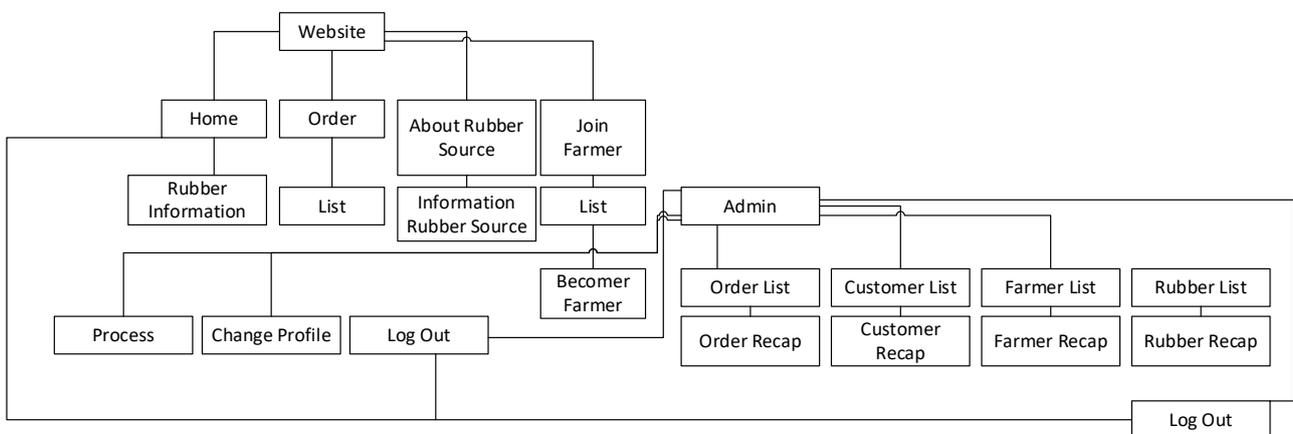


Fig.1. System navigation structure design

3.3 Data Flow Diagram (DFD)

Making DFD is used to model the system as a network of processes and functions that are connected to one another. DFD describes in detail the sequence of steps of each process depicted in the data flow diagram.

3.4 Context Diagram

Context diagrams describe all processes contained within a system, all external entities shown in the following context diagrams of the main data flows to and from the system. Diagram contains absolutely no data storage and looks simple to create, as shown in Fig 2. The user visits the site and then if the user is interested in becoming a farmer member or becoming a customer, the farmer or customer must fill in data to register as a farmer or to place an order on the site and it will be received and checked by the admin.

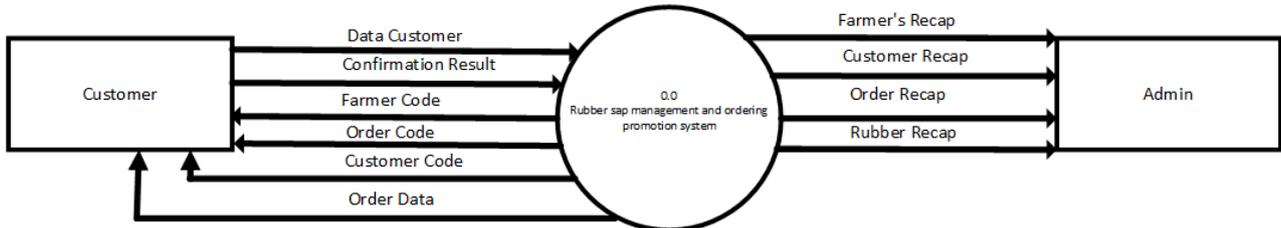


Fig.2. Context diagram design.

3.5 DFD Level 1

Level 1 diagram describes the main process as a whole, which consists of terminators, processes, data flows, as shown in Fig 3.

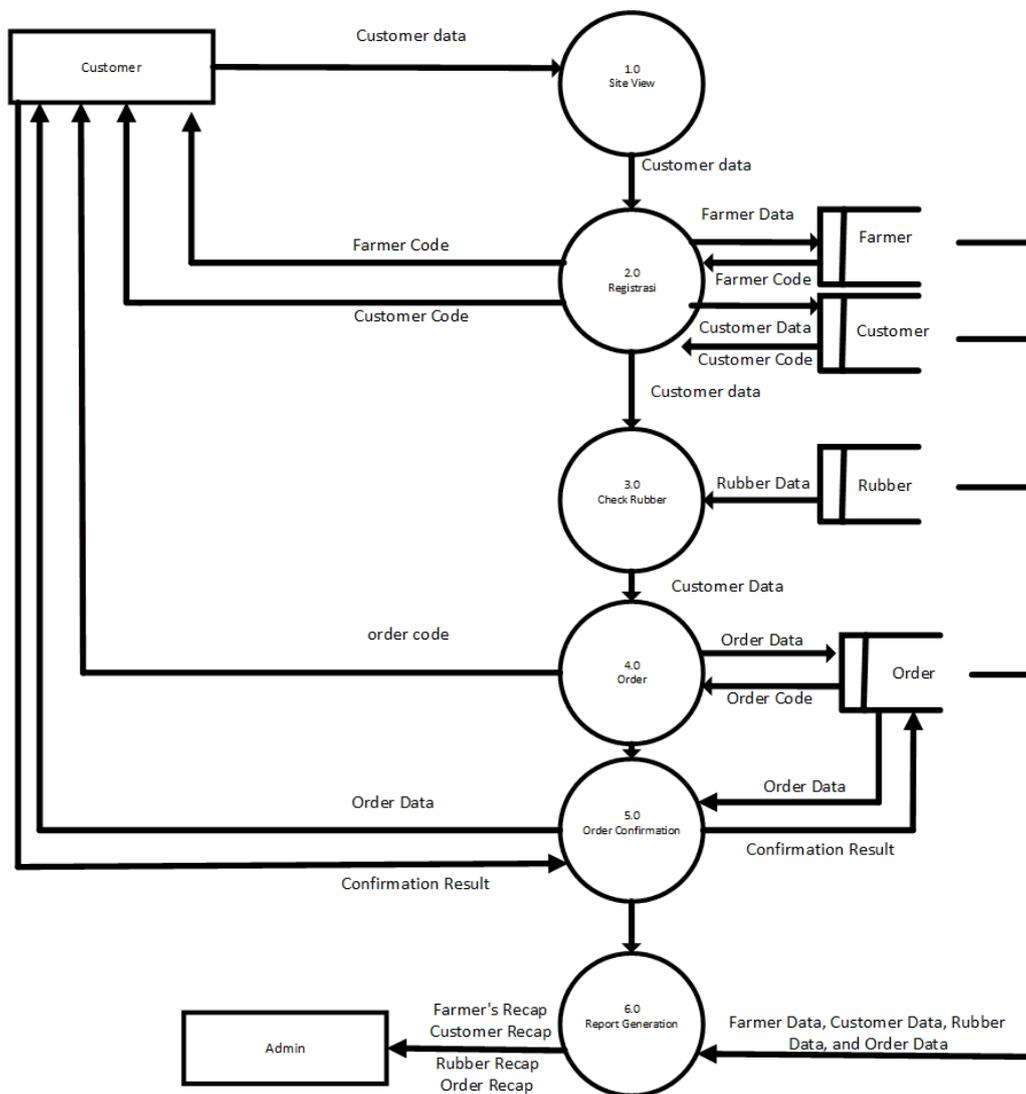


Fig.3. Level 1 diagram design

3.6 Database Design

Database design is the process of determining the content and arrangement of data needed to support various system designs. Database design is done by designing Entity Relationship Diagram (ERD) and normalizing each table in the database.

3.7 Entity Relationship Diagram (ERD)

ERD is a model to explain the relationship between data in the database based on basic data objects that have relationships between relationships. ERD is used to model the data structure and the relationship between data, to describe it, several notations and symbols are used, as shown in Fig 4.

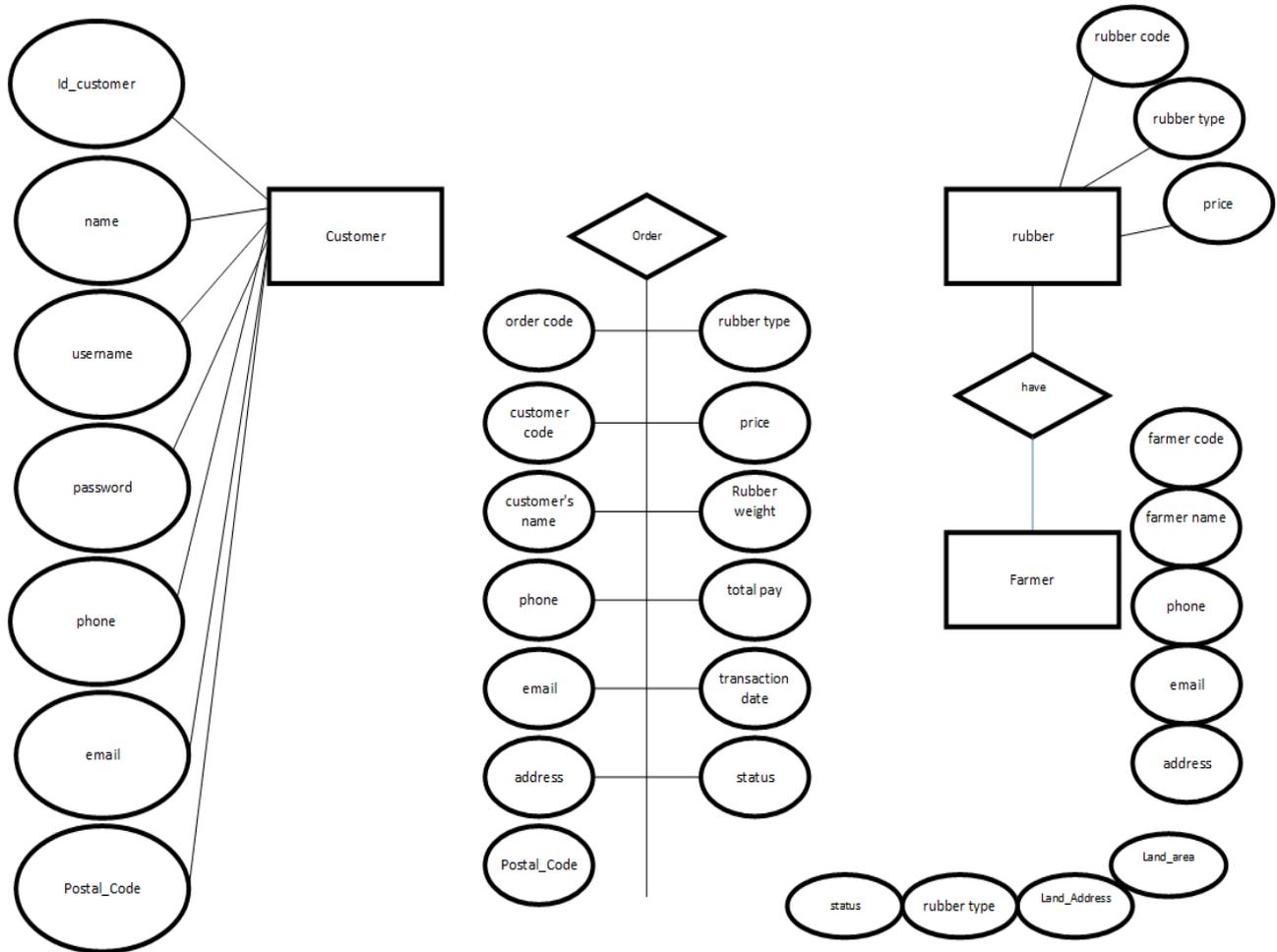


Fig.4. The design of the entity relationship diagram.

3.8 Normalization

Normalization is the process of changing a relation that has a certain problem into two or more relations so that there is no problem. In the 2NF Normalization form, all the attributes in the table will depend on the primary key in the table itself and form a relationship between the key attributes (Primary Key) and functional attributes (Foreign Key). The following form of normalization 2NF = 3NF.

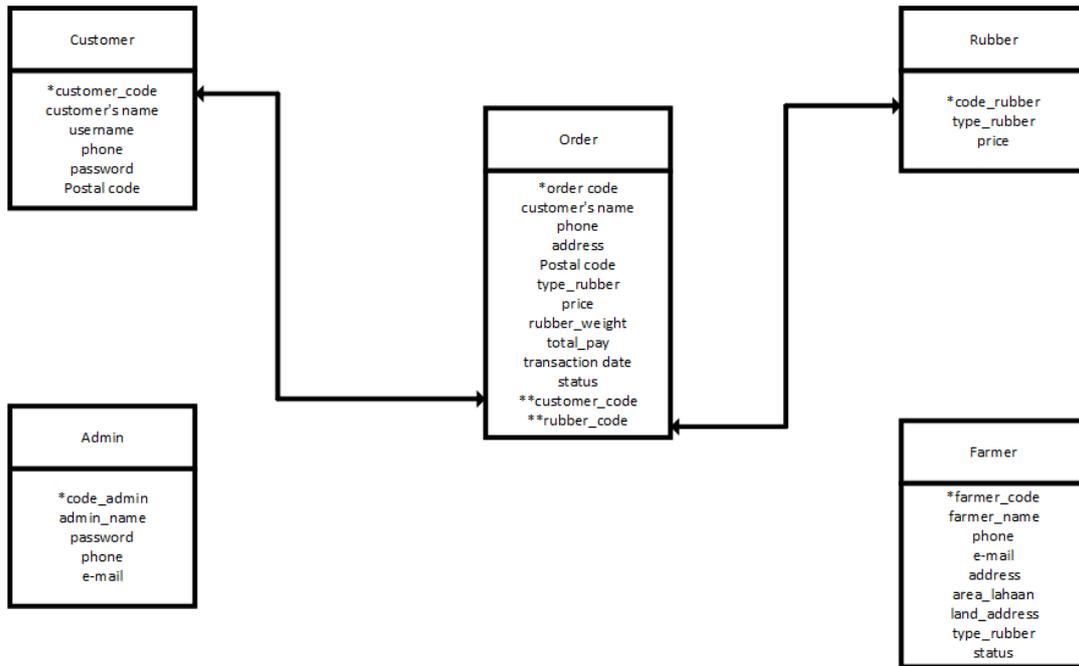


Fig.5. Normal form normalization design (2NF=3NF).

3.9 View All Website Pages

The display of all website pages is the display of the process on the website which consists of all admin pages and all user pages.

a. Login Page View

Admin The admin login page is the first page for admins when accessing the website, admins can login by entering a username and password, it as shown in Fig 6.



Fig.6. Display of the admin login page.

b. Menu Display on Admin Page and Order List Page Display

On the admin page, there are several menus that function to view transaction data that occurs on the main page. The order list page is the first page that will appear on the admin page, the order list page is a recap of all orders what happens on the website, it as shown in Fig 7. In this page administrator can access customer list, farmer list, and rubber list.



Fig.7. Menu display on the admin page and Order list page display.

4. Conclusion

Based on the results of research conducted from the rubber latex processing information system in East Kalimantan, a website has been created that can store all customer data, orders and farmers. The display of web pages can run well on web browsers such as Google Chrome and Mozilla Firefox, but is not perfect when run on the Internet Explore web browser. This website is controlled by several admins. It is hoped that the Website-based Rubber Sap Processing Application Program in East Kalimantan can be introduced to the wider public in order to attract more customers and help more rubber farmers in East Kalimantan.

References

- [1] L. Valentini and M. Angel Lopez Manchado, "High-Performance Elastomeric Materials Reinforced by Nano-Carbons: Multifunctional Properties and Industrial Applications," 2020.
- [2] M. Alexander, "applications of cardanol in rubber processing," 2008.
- [3] Y. Lin *et al.*, "Water-use efficiency and its relationship with environmental and biological factors in a rubber plantation," 2018. [Online]. Available: <http://www.elsevier.com/open-access/userlicense/1.0/2>
- [4] S. Buaphuean *et al.*, "Advisory Board Universitas Tamansiswa Palembang, Indonesia," 2018.
- [5] T. Kombusadee and J. Kurukodt, "Development of a Training Manual for Reducing Use of Pesticides by Para Rubber Farmers at Bueng Khan Province, Thailand," *Journal of Education and Learning*, vol. 10, no. 3, p. 48, Apr. 2021, doi: 10.5539/jel.v10n3p48.
- [6] "Comparative Study of Large-scale Investment in Plantation in Least Developed Countries Applying the Investment Profitability Analysis model."
- [7] Wickham, H. A. (2014). *Rough Notes of a Journey through the Wilderness, from Trinidad to Pará, Brazil*. Cambridge University Press.
- [8] P. A. Okuneye, A. B. Aromolaran, M. T. Adetunji, T. A. Arowolo, K. Adebayo, and I. A. Ayinde, "Environmental impacts of cocoa and rubber cultivation in Nigeria," 2003.
- [9] I. Satra Nugraha, ; Aprizal, and A. ; Sahuri, "Effort to increase rubber farmers' income when rubber low prices."
- [10] S. Manohar Das, "Toxicity of rubber wood processing effluent exposed to fresh water fish *Poecilia reticulata*," 2014. [Online]. Available: www.entomoljournal.com
- [11] A. Wibowo, M. Mustangin, A. Safi'I, and D. I. Pratiwi, "A Rapid Dry Rubber Content Measurement Device Based on Photoelectric Sensors," in *IOP Conference Series: Earth and Environmental Science*, Mar. 2021, vol. 662, no. 1. doi: 10.1088/1755-1315/662/1/012028.
- [12] E. Simanjuntak, "Akta Agrosia The Effect of Local Organic Fertilizer from Rubber Processing Waste on the Yield of Rubber Plants," vol. 21, no. 1, pp. 25–28, 2018.
- [13] Tamrin, S. Leny, and Eddiyanto, "Preparation and characterization of liquid natural rubber through oxidative degradation with phenyl hydrazine and benzoyl peroxide-oxygen," *IOP Conference Series: Earth and Environmental Science*, vol. 912, no. 1, p. 012098, Nov. 2021, doi: 10.1088/1755-1315/912/1/012098.
- [14] E. Abraham, B. M. Cherian, E. P. A, L. A. Pothen, and S. Thomas, *Editors: A. Fainleib and O. Grigoryeva 2. Recent advances in the recycling of rubber waste*, vol. 37, no. 2. 2011.

- [15] Suyanto and J. Munte, "Implementation of sobel method to detect the seed rubber plant leaves," in *Journal of Physics: Conference Series*, Apr. 2018, vol. 983, no. 1. doi: 10.1088/1742-6596/983/1/012128.
- [16] N. Parlinah *et al.*, "Valuation of rubber farming business in support of food security: a case study in Pulang Pisau Regency," *IOP Conference Series: Earth and Environmental Science*, vol. 917, no. 1, p. 012030, Nov. 2021, doi: 10.1088/1755-1315/917/1/012030.
- [17] S. B. Akinfenwa *et al.*, "investigation of the use of cowpea chaff as an additive for natural rubber."
- [18] Y. Ludang, "Potential Development of Sheet Rubber as an Economic Commodity in Central Kalimantan," *International Journal of Management (IJM)*, vol. 11, no. 4, pp. 62–67, 2020, [Online]. Available: <http://www.iaeme.com/IJM/index.asp62http://www.iaeme.com/ijm/issues.asp?JType=IJM&VType=11&IType=4JournalImpactFactor>
- [19] S. M. Khan, A. Chughtai, A. Sattar, M. A. Butt, and T. Jamil, "synthesis, characterization, and properties of rubber latices; a review," 2019.

Authors' Profiles



Dr. Haerudin, M.Si, Graduated from Bachelor of Mathematics Education in 1991 at Makassar State University, Master of Degree in Mathematics Concentration in Statistics at Gadjah Mada University in 1998 and Doctoral Degree in Education Management at Mulawarman University, now a lecturer in the Computer Education Study Program at Mulawarman University until now.



Alvia Fajar Abdulfattah, born in Samarinda on July 21, 1998. He grew up in Balikpapan. I took his school education in Balikpapan, and then went to Samarinda to study at the Samarinda State Polytechnic. His hobby is disassembling the computer, and also playing games on the computer. I aspire to be a reliable programmer.



Adhie Chandra Sari Firdani. Born in Samarinda, 19-04-2001 and now 20 years old. He studied at SMKN 8 Samarinda and is now studying at the Samarinda State Agricultural Polytechnic. Hobbies are playing futsal and playing games. His favorite club is PSG and likes to play PUBG and Mobile Legend games. In the past, his dream was to become a professional soccer player, but when he grew up he wanted to be a successful businessman and make his parents and those around them proud. He is a very quiet person and rarely likes to interact with the people around him. Children who work hard on Sundays.



Ghaly Putra Agusva. born in Samarinda, 07-05-2001. Last education at SMAN 6 Balikpapan and is currently studying at the Samarinda State Agricultural Polytechnic. His hobby is fishing. his favorite food is chicken noodle and crab sauce.

How to cite this paper: Haerudin, Alvia F. Abdulfattah, Ghaly P. Agusva, Adhie C. Sari Firdani, "Development Information System for Rubber Sap Processing in East Borneo", *International Journal of Information Engineering and Electronic Business(IJIEEB)*, Vol.14, No.4, pp. 21-27, 2022. DOI:10.5815/ijieeb.2022.04.03