

E-ISSN : 2541-2019
P-ISSN : 2541-044X

Sinkron

INFORMATICS ENGINEERING JOURNALS & RESEARCH

Volume 7 | Number 3 | July 2022

Dipublikasi oleh :

POLITEKNIK
GANESHA
Medan

[Home](#) / Editorial Team

Editorial Team

Editor in Chief



Muhammad Khoiruddin Harahap (*Politeknik Ganesha, Indonesia*)

Department: Informatics Engineering of Ganesha Polytechnic, North Sumatera, Indonesia.

Interest: Cryptography, Digital Image Processing, Decision Support System



Associate Editor

Rahmat Widya Sembiring (*Politeknik Negeri Medan, Indonesia*)

Department: Informatics Management of Medan State Polytechnic, North Sumatera, Indonesia

Interest: Data Mining, Information System



Dedy Hartama (*STIKOM Tunas Bangsa, Indonesia*)

Department: Informatics Engineering of Stikom Tunas Bangsa, North Sumatera, Indonesia

Interest: Data Mining, Big Data, Cryptography



Editor Board Member

Siti Mutrofin (*Universitas 17 Agustus 1945 Surabaya, Indonesia*)

Interest : Artificial Intelligence, Data Mining, Machine Learning



Nasir Abdul Jalil (*Sunway University Business School, Malaysia*)

Department: Business Analytics of Sunway University, Malaysia

Interest: Business Intelligence, ERP System, Business Analytics, Business Statistics, Big Data



Mohammed Saad Talib (*University of Babylon, Iraq*)

Department: Information Networks of University of Babylon, Iraq

Interest: Vehicular Communication, Wireless Communication, ITS, VANETs, MANETs, WSNs and IoT



Ali Abdul Jabbar Mohammed (*Technical University of Malaysia Malacca*)

Department: Computer System & Communication of Technical University of Malaysia, Malaysia

Interest: Data Mining, IoT, Smart City



Mario di Nardo (*Università degli studi di Napoli "Federico II", Italy*)

Department: Materials Engineering and Operations Management, D.I.C. Ma.Pi
Università degli Studi di Napoli, Italy.

Interest: Applied Sciences, Communications in Computer and Information Science, Production and Manufacturing



Dirja Nur Ilham (*Politeknik Aceh Selatan Indonesia*)

Department: Informatics Engineering of Politeknik Aceh Selatan Indonesia.

Interest: Artificial Intelligence, Neural Network, Decision Support System, Internet of Things



Ghaida Muttashar Abdulsahib ([University of Technology- Iraq, Baghdad, Iraq](#))

Department of Computer Engineering, University of Technology_

Interest: Computer Engineering



Madonna Marianna (*Italian Workers' Compensation Authority (INAIL), Italy*)

Department of Computer Engineering, University of Technology_

Interest: Computer Engineering



Accredited by Ristekdikti



CONTACT US



EDITORIAL BOARD



AIMS & SCOPE



COPYRIGHT & LICENSE



REVIEWER



FACEBOOK FANPAGE



AUTHOR PROCESSING CHARGE



OPEN ACCESS POLICY



TEMPLATE



PEER REVIEW PROCESS



PUBLICATION ETHICS



STATISTIC VIEWER



E-BOOK VERSION



ARCHIVING



CROSSMARK POLICY



FREQUENCY



PLAGIARISM POLICY



AUTHOR GUIDELINES



HISTORY



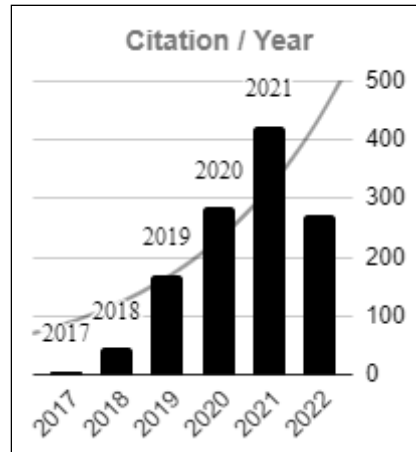
CALL REVIEWER

SinkrOn Citation : SinkrOn Cited

Cited Information

	Semua	Sejak 2017
Kutipan	1219	1213
indeks-h	16	16
indeks-i10	32	32

Citation Graphic / Year



SinkrOn Cited

>
<

Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

[Visit Counting](#)



[Visit Counting](#)

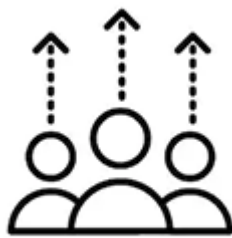
[OJS Statistic](#)

Contact Support :

[Muhammad Khoiruddin harahap](#)



BROWSE BY



AUTHORS



ISSUES

Information

[For Readers](#)

[For Authors](#)

[For Librarians](#)



 Google Scholar

 Moraref

 PKP Index

 Garuda Ristekdikti

 Indonesia OneSearch

 OCLC Worldcat

 Dimensions

 Index Copernicus

 Scilit

Lens.org

MEMBER OF





Current Issue

ATOM 1.0

RSS 2.0

RSS 1.0

[Make a Submission](#)

[Open Journal Systems](#)

Language

[English](#)

[Bahasa Indonesia](#)

This Journal Managed by

Politeknik Ganesha Medan

Teknik Informatika Department

Jl. Veteran No. 194, Pasar VI, Labuhan Deli, Deli Serdang

North Sumatera, Indonesia

Platform &
workflow '
OJS / P.

[Home](#) / [Archives](#) / Vol. 7 No. 3 (2022): Article Research Volume 7 Number 3, July 2022

Vol. 7 No. 3 (2022): Article Research Volume 7 Number 3, July 2022

DOI: <https://doi.org/10.33395/sinkron.v7i3>

Published: 2022-07-01

Articles

Learning Fuzzy Neural Networks by Using Improved Conjugate Gradient Techniques

Hisham M. Khudhur, Khalil K. Abbo

767-776



DOI : [10.33395/sinkron.v7i3.11442](https://doi.org/10.33395/sinkron.v7i3.11442)



Abstract views: 108

Detection of Room Cleanliness Based on Digital Image Processing using SVM and NN Algorithm

Suparni suparni, Hilda Rachmi, Ahmad Al Kaafi

777-783



DOI : [10.33395/sinkron.v7i3.11479](https://doi.org/10.33395/sinkron.v7i3.11479)



Abstract views: 90

Arduino Implementation for Development Digital Capacitance Meters as Laboratory Measurement Devices

Denny Hardiyanto, Prabakti Endramawan, Ridho Nur Taufiqul Manan, Dyah Anggun Sartika

784-790



DOI : [10.33395/sinkron.v7i3.11456](https://doi.org/10.33395/sinkron.v7i3.11456)



Abstract views: 72

Multiple Linear Regression Analysis on Factors that Influence Employees Work Motivation

Gracia Theofani, Eko Sedyono

791-798



DOI : [10.33395/sinkron.v7i3.11453](https://doi.org/10.33395/sinkron.v7i3.11453)



Abstract views: 100

Information System Audit Using COBIT and ITIL Framework: Literature Review

Arif Rusman, Reny Nadlifatin, Apol Pribadi Subriadi

799-810



DOI : [10.33395/sinkron.v7i3.11476](https://doi.org/10.33395/sinkron.v7i3.11476)



Abstract views: 128

Internet of Things-based Gas Leak Detection with Alerts Via SMS and Blynk App

Revy Muhammad Yusuf, Ari Purno Wahyu W

811-816



DOI : [10.33395/sinkron.v7i3.11477](https://doi.org/10.33395/sinkron.v7i3.11477)



Abstract views: 80

Perfomance analysis of Naive Bayes method with data weighting

Afdhaluzzikri Afdhaluzzikri, Herman Mawengkang, Opim Salim Sitompul

817-821



DOI : [10.33395/sinkron.v7i3.11516](https://doi.org/10.33395/sinkron.v7i3.11516)



Abstract views: 47

Application of Hot Fit Model to Analyze Information Technology Ams (Academic Management System)

Elmayati Elmayati, Bunga Intan, Deni Nurdiansyah, Aprilsa Milenia, Yogi Kelpin

822-833



DOI : [10.33395/sinkron.v7i3.11462](https://doi.org/10.33395/sinkron.v7i3.11462)



Abstract views: 29

Mobile Positioning Data Based-Application for Medan Tourism Objects

Vedi Yordan, Wilsen Polfan, Khavitanjali Khavitanjali, Paskah Kurniawan Gari, Saut Dohot Siregar
834-845



DOI : [10.33395/sinkron.v7i3.11464](https://doi.org/10.33395/sinkron.v7i3.11464)



Abstract views: 109

Internet of Things-based Agricultural Land Monitoring

Andrew Andrew, Haryono Haryono
846-852



DOI : [10.33395/sinkron.v7i3.11416](https://doi.org/10.33395/sinkron.v7i3.11416)



Abstract views: 158

K-NN Based Air Classification as Indicator of the Index of Air Quality in Palembang

Ahmad Sanmorino, Juhaini Alie, Nining Ariati, Sanza Vittria Wulanda
853-859



DOI : [10.33395/sinkron.v7i3.11469](https://doi.org/10.33395/sinkron.v7i3.11469)



Abstract views: 47

Code Mixing and Switching Used in Breakout Music Program of Net TV

Syahrul Efendi Lubis, Dicky Hendrawan
860-873



DOI : [10.33395/sinkron.v7i3.11472](https://doi.org/10.33395/sinkron.v7i3.11472)



Abstract views: 15

Development of Android-Based Early Reading Learning Media

Estuning Dewi Hapsari, Yoga Prisma Yuda, Yoga Akmal Mubarak
874-882



DOI : [10.33395/sinkron.v7i3.11549](https://doi.org/10.33395/sinkron.v7i3.11549)



Abstract views: 58

Optimization of Transaction Database Design with MySQL and MongoDB

Hani Atun Mumtahana

883-890

DOI : [10.33395/sinkron.v7i3.11528](https://doi.org/10.33395/sinkron.v7i3.11528)

Abstract views: 47

Superior Class to Improve Student Achievement Using the K-Means Algorithm

Yopi Hendro Syahputra, Juniar Hutagalung

891-899

DOI : [10.33395/sinkron.v7i3.11458](https://doi.org/10.33395/sinkron.v7i3.11458)

Abstract views: 91

Sentiment Analysis About COVID-19 Booster Vaccine on Twitter Using Deep Learning

Elly Indrayuni, Achmad Nurhadi

900-905

DOI : [10.33395/sinkron.v7i3.11485](https://doi.org/10.33395/sinkron.v7i3.11485)

Abstract views: 71

The application of online practicum in assisting learning process of database courses using Waterfall method

Andri Suryadi, Unggul Utan Sufandi, Dian Nurdiana

906-914

DOI : [10.33395/sinkron.v7i3.11486](https://doi.org/10.33395/sinkron.v7i3.11486)

Abstract views: 49

Explanatory Data Analysis to Evaluate Keyword Searches for Educational Videos on YouTube with a Machine Learning Approach

Mambang Mambang, Ahmad Hidayat, Johan Wahyudi, Finki Dona Marleny

915-922

DOI : [10.33395/sinkron.v7i3.11502](https://doi.org/10.33395/sinkron.v7i3.11502)

Abstract views: 87

Analyze application Building Management of The Bank Indonesia representative office West Java

Robby Rohman Sukarya, Ade Yuliana, Yudi Taryana, Hizkia Samuel, Ferlin Firdaus Turnip
923-934



DOI : [10.33395/sinkron.v7i3.11443](https://doi.org/10.33395/sinkron.v7i3.11443)



Abstract views: 94

Detection Malaria Base Microscope Digital Image with Convolutional Neural Network

Meida Cahyo Untoro, Muhammad Muttaqin
935-943



DOI : [10.33395/sinkron.v7i3.11488](https://doi.org/10.33395/sinkron.v7i3.11488)



Abstract views: 63

Performance Comparison of K-Means and DBScan Algorithms for Text Clustering Product Reviews

Fitri Andriyani, Yan Puspitarani
944-949



DOI : [10.33395/sinkron.v7i3.11569](https://doi.org/10.33395/sinkron.v7i3.11569)



Abstract views: 25

Case Study: Improved Round Robin Algorithm

Tri Dharma Putra, Rakhmat Purnomo
950-956



DOI : [10.33395/sinkron.v7i3.11530](https://doi.org/10.33395/sinkron.v7i3.11530)



Abstract views: 59

Product Recommendation System Application Using Web-Based Equivalence Class Transformation (Eclat) algorithm

Mochzen Gito Resmi, Teguh Iman Hermanto, Miftah Al Ghozali
957-961



DOI : [10.33395/sinkron.v7i3.11454](https://doi.org/10.33395/sinkron.v7i3.11454)



Abstract views: 33

UI/UX Design of Ineffable Psychological Counseling Mobile Application Using Design Thinking Method

Meriska Defriani, Lintang Nuril Islami, Teguh Iman Hermanto

962-973



DOI : [10.33395/sinkron.v7i3.11582](https://doi.org/10.33395/sinkron.v7i3.11582)



Abstract views: 63

The prototype of IOT-Based weight scale and calorie tracking application

Dita Ayu Chairunnisa, Ahmad Taqwa, Irma Salamah

974-983

DOI : [10.33395/sinkron.v7i3.11580](https://doi.org/10.33395/sinkron.v7i3.11580)



Abstract views: 22

Forecasting of Health Sector Stock Prices During Covid-19 Pandemic Using Arima And Winter Methods

Tamamudin, Wilda Yulia Rusyida

984-994



DOI : [10.33395/sinkron.v7i3.11572](https://doi.org/10.33395/sinkron.v7i3.11572)



Abstract views: 58

Tiktok Social Media Sentiment Analysis Using the Nave Bayes Classifier Algorithm

Putri Suci Rahmadani, Fenny Chintya Tampubolon, Adelia Nurfattul Jannah, Novia Lucky Halen Hutabarat, Allwin M. Simarmata

995-999



DOI : [10.33395/sinkron.v7i3.11579](https://doi.org/10.33395/sinkron.v7i3.11579)



Abstract views: 21

Application of Huffman Algorithm and Unary Codes for Text File Compression

Bayu Angga Wijaya, Sarwando Siboro, Mahendra Brutu, Yelita Kristiani Lase

1000-1007



DOI : [10.33395/sinkron.v7i3.11567](https://doi.org/10.33395/sinkron.v7i3.11567)



Abstract views: 25

Api Service Infrastructure Using Kubernetes And Terraform Based On Microservices Ngoorder.Id

Azwar Riza Habibi

1008-1016



DOI : [10.33395/sinkron.v7i3.11522](https://doi.org/10.33395/sinkron.v7i3.11522)



Abstract views: 11

Analysis of e-Service quality performance at BKPSDM Lubuklinggau web-based using E-Govqual and Importance Performance Analysis (IPA) methods

Tri Puja Astuti, Elmayati Elmayati, Tri Hasanah

1017-1027



DOI : [10.33395/sinkron.v7i3.11444](https://doi.org/10.33395/sinkron.v7i3.11444)



Abstract views: 23

Comparison of Drug Type Classification Performance Using KNN Algorithm

Febri Aldi, Irohito Nozomi, Soeheri

1028-1034



DOI : [10.33395/sinkron.v7i3.11487](https://doi.org/10.33395/sinkron.v7i3.11487)



Abstract views: 44

Customer Profile Prediction model based on classification through approach Support Vector Machine (SVM)

Ogiana Kiro, Herman Mawengkang , Elviawaty Muisa Zamzami

1035-1043



DOI : [10.33395/sinkron.v7i3.11608](https://doi.org/10.33395/sinkron.v7i3.11608)



Abstract views: 9

UI/UX Design for Language Learning Mobile Application Chob Learn Thai Using the Design Thinking Method

Ayumas Aura Krishnavarty, Meriska Defriani, Teguh Iman Hermanto

1044-1053



DOI : [10.33395/sinkron.v7i3.11585](https://doi.org/10.33395/sinkron.v7i3.11585)



Abstract views: 8

Edge Detection Of Potato Leaf Damage With Laplacian Of Gaussian Algorithm

Mawaddah Harahap, Adrian Christian Wijaya, Samuel Henock Hasangapon Pasaribu, Giovan Sembiring, Kenjiro Christian Ginting
1054-1058



DOI : [10.33395/sinkron.v7i3.11583](https://doi.org/10.33395/sinkron.v7i3.11583)



Abstract views: 18

Supervised Model for Sentiment Analysis Based on Hotel Review Clusters using RapidMiner

Revin Novian Juliadi, Yan Puspitarani
1059-1066



DOI : [10.33395/sinkron.v7i3.11564](https://doi.org/10.33395/sinkron.v7i3.11564)



Abstract views: 31

Comparative Analysis of SAW and TOPSIS on Best Employee Decision Support System

Arizona Firdonsyah, Budi Warsito, Adi Wibowo
1067-1077



DOI : [10.33395/sinkron.v7i3.11475](https://doi.org/10.33395/sinkron.v7i3.11475)



Abstract views: 25

Analysis of Air Quality Measuring Device Using Internet of Things-Based MQ-135 Sensor

Delima Sitanggang, Chris Samuel Sitompul, Jao Han Suyanto, Sharen Kumar, Evta Indra
1078-1084



DOI : [10.33395/sinkron.v7i3.11618](https://doi.org/10.33395/sinkron.v7i3.11618)



Abstract views: 7

Classification of Covid-19 Patient Spread Rate By Age and Region With K-Means Algorithm

Adya Zizwan Putra, Ryan Wijaya Pinem, Sehat Silalahi, Fendianu Gulo, Juan Antonio Adityo Liukhoto
1085-1989



DOI : [10.33395/sinkron.v7i3.11603](https://doi.org/10.33395/sinkron.v7i3.11603)



Abstract views: 9

E-government in the public health sector: kansei engineering method for redesigning website

Candra Zonyfar, Maharina
1990-1997



DOI : [10.33395/sinkron.v7i3.11648](https://doi.org/10.33395/sinkron.v7i3.11648)



Abstract views: 18

Combination Grouping Techniques and Association Rules For Marketing Analysis based Customer Segmentation

Amir Mahmud Husein, Dodi Setiawan, Andika Rahmad Kolose Sumangunsong, Andreas Simatupang, Shela Aura Yasmin
1998-2007



DOI : [10.33395/sinkron.v7i3.11571](https://doi.org/10.33395/sinkron.v7i3.11571)



Abstract views: 5

Rice Plants Disease Identification Using Deep Learning with Convolutional Neural Network Method

Sunu Jatmika, Danang Eka Saputra
2008-2016



DOI : [10.33395/sinkron.v7i3.11540](https://doi.org/10.33395/sinkron.v7i3.11540)



Abstract views: 13

Accredited by Ristekdikti



CONTACT US



EDITORIAL BOARD



AIMS & SCOPE



COPYRIGHT & LICENSE



REVIEWER



FACEBOOK FANPAGE



AUTHOR PROCESSING CHARGE



OPEN ACCESS POLICY



TEMPLATE



PEER REVIEW PROCESS



PUBLICATION ETHICS



STATISTIC VIEWER



E-BOOK VERSION



ARCHIVING



CROSSMARK POLICY



FREQUENCY



PLAGIARISM POLICY





AUTHOR GUIDELINES



HISTORY



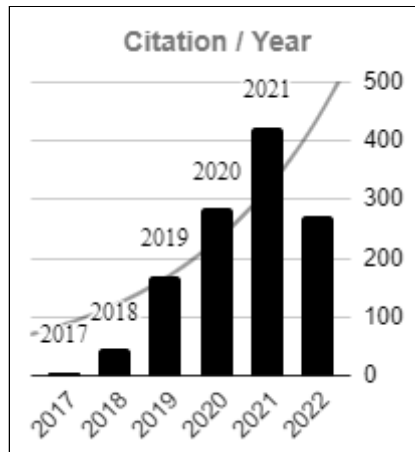
CALL REVIEWER

SinkrOn Citation : SinkrOn Cited

Cited Information

	Semua	Sejak 2017
Kutipan	1219	1213
indeks-h	16	16
indeks-i10	32	32

Citation Graphic / Year



SinkrOn Cited

>
<



Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Visit Counting



Visit Counting

OJS Statistic

Contact Support :

Muhammad Khoiruddin harahap



BROWSE BY



AUTHORS



ISSUES

Information

[For Readers](#)

[For Authors](#)

[For Librarians](#)



 Google Scholar

 Moraref

 PKP Index

 Garuda Ristekdikti

 Indonesia OneSearch



OCLC Worldcat



Dimensions



Index Copernicus



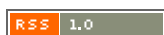
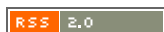
Scilit

[Lens.org](https://lens.org)

MEMBER OF



Current Issue



[Make a Submission](#)

[Open Journal Systems](#)

Language

[English](#)

[Bahasa Indonesia](#)

This Journal Managed by

Politeknik Ganesha Medan

Teknik Informatika Department

Jl. Veteran No. 194, Pasar VI, Labuhan Deli, Deli Serdang

North Sumatera, Indonesia

Platform &
workflow by
OJS / PKP

Case Study: Improved Round Robin Algorithm

Tri Dharma Putra¹, Rakhmat Purnomo^{2*}
^{1,2}Universitas Bhayangkara Jakarta Raya
rakhmat.purnomo@dsn.ubharajaya.ac.id*

Submitted : July 7, 2022 | **Accepted** : July 23, 2022 | **Published** : July 26, 2022

Abstract: In this journal, discussion is given to analyse the improved round robin algorithm more thoroughly. Round robin algorithm plays a significant role to be used in embedded systems. Round robin algorithm usually applied in real-time systems. Here, three case studies are given, and also the analysis of each case study. Comparisons are given about the average turn around time and average waiting time, also number of context switching between the three case studies. Improved round robin algorithm, is a modification from the generic round robin algorithm. In improved round robin algorithm if the remaining burst time is less than the time slice that is allocated, then the currently running process is continue to be executed. Then finish the currently running process from ready queue and execute the next ready queue. Three case studies are given with three different time quantum, which are 3, 4, and 5 ms. The result of this case study analysis is that, the efficiency of the quantum 5 ms is the most effective one. There is an increase of 50% context switching from quantum 3 to quantum 5. And for average turn around time we get 13.13% reduction in efficiency. While in average waiting time we get reduction 12.08% efficiency.

Keywords: Average Turn Around Time, Average Waiting Time, Context Switching, Improved Round Robin Algorithm, Quantum

INTRODUCTION

Process scheduling is crucial in the operations of OS (operating system). OS functions as an interface between computer hardware and its user. OS help user to use the computer more easily, so that, the user does not need to know the hardware behind the systems (Purnomo & Putra, 2022) (Putra & Purnomo, 2021). All application is installed to the operating system's API. OS handles the system in a convenient manner (Paul et al., 2019). Today, in modern operating systems, the systems become more complex. System can handle multitasking program by switching between processes. In this way, the user can interact with computer. OS performs major functions like resource management, process scheduling, and memory management (Indusree & Prabadevi, 2017).

The main duty of operating systems is to manage resources of computer systems. Operating systems is known as a resource manager. Process scheduling is the most important and one fundamental idea. Scheduling defines a set of policies, rules, and mechanism that govern the order in which resources are allocated to various processes and the work is to be done (Putra, 2022) (Putra, 2020). There is methodology of process scheduling to manage many queues of processes in order to make performance optimal and the delay to be minimum in the system. There are a scheduler in operating system that implements the scheduling policies.

Round robin algorithm is used as a real-time scheduling algorithm in operating system. The solution is to use static and dynamic time slice or quantum, so that operating systems can be operated more effectively. The improved round robin algorithm is a modification of simple round robin algorithm with the idea to make the scheduling more effective. With lower average turn-around time and lower average waiting time. Also reduce the context switching. Simple round robin architecture is difficult to be implemented in real-time operating systems because of high context switch rate, longer respons time and longer waiting time (Yaashuwanth & R. Ramesh, 2010). The generic round robin scheduling algorithm is used especially for time sharing system. Each task is given a time slice or quantum (Sharma, 2015) (Putra & Fadriya, 2021), which is a time interval.

Neha and Ankita Jiyani proposed an improved round robin algorithm. What proposed by Neha And Ankita Jiyani, is an improvement which was more simple from the researches before. The basic idea to continue executing the currently running process if the remaining burst time is below the quantum time, was proved in their experiments with this algorithm improved the efficiency. Instead of using shortest job first algorithm

*Corresponding author

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



proposed by Manish Kumar and Rashid, and other algorithms discussed below. Neha and Ankita Jiyani's proposal proved to be more simple. Simplicity in this algorithm is a great idea from the previous researches.

LITERATURE REVIEW

In his journal, Dhruv, defined a new modification of this generic algorithm. Burst time of processes are organized in rising order. This algorithm uses dynamic time quantum which is based on the remaining shortest burst time. And time quantum of this algorithm is important. Round robin is pretty much similar with FCFS (First Come First Serve). Time quantum is important and plays a significant role in the performance of round robin algorithm. Too many context switchings will occur if time quantum of given algorithm is short (Dhruv, 2019).

In his journal, Lipika Datta, gave proposal, to modify the algorithm by arranging the quantum (time slices) of different rounds based on the remaining CPU burst of the processes that currently running and considering their waiting times until that round in respect of the other processes waiting times. From their experimental analysis, it is concluded that their algorithm produces fewer number of context switching and better average waiting time, better average turnaround time than standard algorithms (Datta, 2015).

In their journal, Govind Prasad Arya, Kumar Nilay, Devendra Prasad, gave proposal to define a new algorithm that categorizes available processes based on process with priorities, which are low priority and high priority. This algorithm proved to reduce the average waiting time of process that have high priority in all cases. And in not all but some cases of processes with low priority. On the basis of set of processes considered, he overall waiting time changes (Arya et al., 2018).

In their journal, Manish Kumar Mishra and Faizur Rashid, gave a proposal about a modification round robin CPU scheduling algorithm which enhancing performance of CPU. Their idea is by using the features of shortest job first (SJF) and round robin algorithms based on varying time quantum. This algorithm, was proven better than simple round robin, based on their experiments (Kumar Mishra & Rashid, 2014).

In their journal, M. Laxmi Jeevani, T.S.P. Madhuri, and Y. Sarada Devi, gave proposal to use an algorithm by using a few steps. a) By allocating process to CPU which has arrived first, giving an initial time quantum (k units). b) The scheduler will check the queue for processes which have arrived by the time of completion of first process execution with initial time quantum, after the completion of first process initial execution. Afterwards, among the multiple processes that have arrived in the queue by using the k units of time. The process will be allocated to the CPU is with the minimum burst time. If the first process has completed its execution, it is removed from the queue. And again, a chance is provided to it. And at last, for the complete execution of all processes, systems have to repeat the same (m. LaxmiJeevani, T.S.P. Madhuri, 2018).

In their journal, Neha and Ankita Jiyani, gave proposal about an improved round robin algorithm (Neha, 2018). The first process in the ready queue is executed until the allocated time slice, afterwards, the algorithm has to check the remaining burst time of the running process. If the remaining burst time is less than the allocated time slice, then the running process is executed again until it is finished. Afterwards, the next process in the ready queue will be executed. Only if the remaining burst time of the currently running process is bigger than the allocated time slice.

METHODS

Five chapters are presented here. Introduction is given in the first chapter. In this chapter, discussions about the idea about round robin algorithm. In the second chapter, literature surveys did by researcher before are given. Then, in the third chapter. The discussion is about methodology. In this case the improved round robin algorithm which is the modification of generic round robin algorithm, that were given by some researchers. Also in this chapter discussion is about conceptualization behind the improved round robin algorithm. Then, the fourth chapter is about result. Here three case studies are discussed, which uses different quantum, namely 3, 4, and 5 ms. The fifth chapter is chapter is about discussion of the result analysis from case studies in the fourth chapter. And again, in this chapter, comparisons are given with table, about average turn around time, average waiting time, and number of context switching. The last chapter is conclusion and future works.

The basic idea about round robin algorithm is using context switching or time slice, or sometimes it is called time quantum. Each process is assigned a time interval. Round robin is a preemptive algorithm. If the time slice finishes, and the processes are still executing, then, afterwards, the algorithm will force the next queue to preempt the process and keep it at the end of the ready queue. This is the basic concept about improved round robin algorithm. It is critical in this algorithm to choose of how big the time slice is, because the size of time slice gives great effect on the performance of this algorithm.

Neha and Ankita Jiyani (Neha, 2018), proposed an improved round robin algorithm with basic idea as follows:

*Corresponding author



This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

- Execute the first process in the ready queue and execute it until the allocated time quantum, afterwards, check the remaining burst time of the running process.
- If the remaining burst time of the running process is below than the allocated time quantum then the execution continues.
- If the remaining burst time of the running process is more than the allocated time quantum, then the next process in ready queue is executed.
- Then remove the running process from the ready queue and afterwards, put it at the tail of the ready queue.

We can discuss the idea of this algorithm by example. Let say, there are two processes T1 and T2. T1 with 8 ms burst time and T2 with 7 ms burst time. And time quantum is 5 ms. Let say, the first quantum is executed, the remaining of T1 is 3 ms. Since 5 ms is executed. Then because the remaining, the 3 ms is below then the quantum (which is 5 ms), then 3 ms continues to be executed, this will not be preempted because the remaining of T1 is 3 which is below the quantum 5 ms. Then the process of T1 continues until finish. Afterwards, T2 is executed which makes the remaining of T2 is 2 ms, since $7-5 = 2$. This process will not be preempted because the remaining of the process is 2 ms for T2. Which is below the quantum, which is 5 ms. So T2 is executed until finish, because the remaining time is less than the quantum. As we can see in the gantt chart of Figure 1. below:

T1 = 8 ms, T2 = 7 ms, Quantum = 5 ms

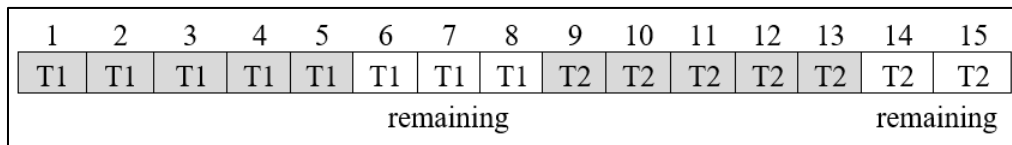


Figure 1. Gantt Chart of basic concept improved round robin with quantum 5 ms.

RESULTS

Below is the analysis of the case studies. We discuss three case studies with different quantum, but with the same processes and burst time. The first with quantum =3, the second with quantum = 4, the last one is with quantum = 5. Then we discuss the comparison analysis of the three case studies for evaluation, which one is more efficient than the others.

Table 1. Processes with Arrival Time and Burst Time

Task ID	Arrival Time	Burst Time
T1	0	10
T2	0	14
T3	0	9
T4	0	12

Please take a look at the Table 1. The case study is with 4 tasks. T1 until T4. And the quantum are 3, 4 and 5 ms. The arrival times are zero for all. Total burst time is 45 in each of these case studies.

5.1 Case Study 1

In this case study 1, the quantum is 3. The total processes are 45 ms. Please take a look on Figure 2. below:

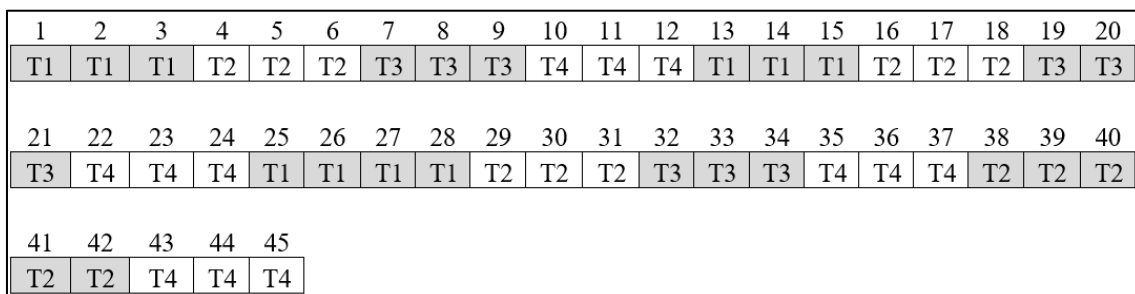


Figure 2. Gantt Chart with quantum 3.

*Corresponding author



This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Since the quantum is 3, T1 is executed for 3 ms. The remaining of T1 is 7 ms. Then afterwards, T2 is executed also 3 ms. Then T2 remains 11 ms. Then T3 is executed for 3 ms. This continues to T4, for 3 ms. At 13 ms, T1 is executed for another 3 ms, afterwards T2, T3 and T4. Now, T1 remains 4 ms, since 6 ms has been executed. Then T1 is executed for another 3 ms, since the remains of T1 is 1, which is below the quantum 3, then T1 continues to be executed by 4 ms. T1 is finished here. Then T2, T3 and T4 are executed for another 3 ms each. The remains of T2 is 5 ms. At 37 ms, T2 is executed for another 3 ms, but the remains of T2 is 2 ms. Then T2 continues to be executed from 37 ms until 42 ms. The last one is T4. T4 is left 3 ms, Then 3 ms is executed for T4 until finish at 45.

For calculation of waiting time, we get as follow:

$$T1 = 0 + (12 - 3) + (24 - 15) = 18$$

$$T2 = 3 + (15 - 6) + (28 - 18) + (37 - 31) = 28$$

$$T3 = 6 + (18 - 9) + (31 - 21) = 25$$

$$T4 = 9 + (21 - 12) + (34 - 24) = 28$$

It is concluded that for this improved round robin algorithm, the average waiting time is $99/4=24.75$ ms.

Then to calculate the turn around time. The first step is, to populate the table below for turn around time analysis, as per Table 2 below:

Table 2. Turn Around Time of Quantum 3

Process	Arrival Time	Burst Time	Start Time	Finish Time	Turn Around Time
T1	0	10	0	28	28
T2	0	14	3	42	42
T3	0	9	6	34	34
T4	0	12	9	45	45

It is concluded that the average turn around time is $=(28+42+34+45)/4=37.25$ ms

5.2 Case Study 2

In this case study 2, the quantum is 4. The total processes are the same as the case study 1, which is 45 ms. Please take a look on Figure 3. Below:

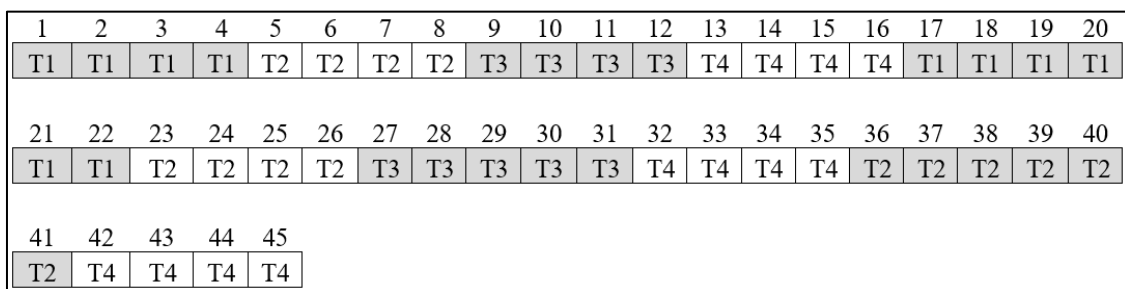


Figure 3. Gantt Chart with quantum 4.

Since the quantum is 4, Then T1, T2, T3, and T4 are executed for 4 ms each. Until 16 ms. T1 which is 10 ms, has been executed for 4 ms, which is left 6 ms. Then at 16 ms, T1 is executed for another 4 ms. But since the remaining of T1 is 2 ms, which is below the quantum 4, Then systems continue to executed T1 for another 2 ms, which is 6 ms. This is from 16 ms until time 22 ms. Afterwards T2 is executed for another 4 ms, until 26 ms. Then at 26 ms, T3 is executed for another 4 ms. Since T3 is left 5 ms, then T3 is executed from 26 until 31 ms, for 5 ms. Then T4 is executed for another 4 ms until 35 ms. Then T2 is executed afterwards. The remaining of T2 is 6 ms. Then this process, T2 continues to be executed for 4 ms and 2 ms afterwards, to be 6 ms, since T2 is left 2 ms. Then the last process is T4. T4 is left 4 ms. Then, T4 is executed for the last 4 ms until 45.

For calculation of waiting time, we get as follow:

*Corresponding author



This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

$$T1 = 0 + (16 - 4) = 12$$

$$T2 = 4 + (22 - 8) + (35 - 26) = 27$$

$$T3 = 8 + (26 - 12) = 22$$

$$T4 = 12 + (31 - 16) + (41 - 35) = 33$$

It is concluded that for this improved round robin algorithm, the average waiting time is $94/4=23.50$ ms.

Then to calculate the turn around time. The first step is, we populate the table below for turn around time analysis, as per Table 3. below:

Table 3. Turn Around Time with Quantum 4

Process	Arrival Time	Burst Time	Start Time	Finish Time	Turn Around Time
T1	0	10	0	22	22
T2	0	14	4	41	41
T3	0	9	8	31	31
T4	0	12	12	45	45

It is concluded that the average turn around time is $= (22 + 41 + 31 + 45) / 4 = 34.75$ ms

5.3 Case Study 3

In this case study 3, the quantum is 5. The total processes are the same as the case study 1 and case study 2, which is 45 ms. Please take a look on Figure 4. Below:

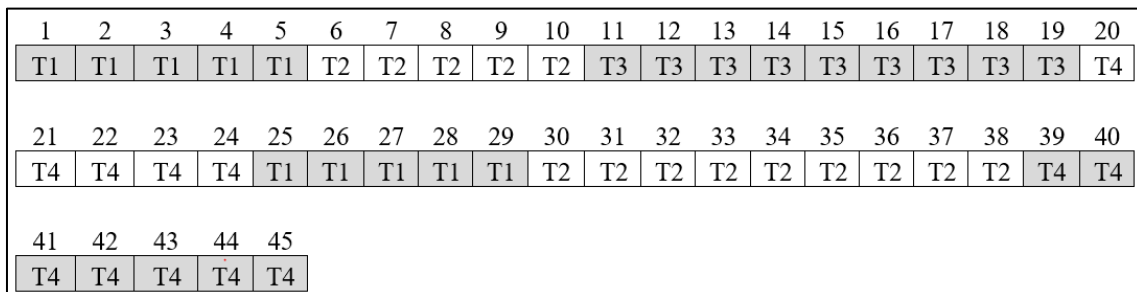


Figure 4. Gantt Chart with quantum 5.

T1 and T2 are executed for 5 ms second in a row. Namely, 5 ms for T1 and 5 ms for T2 until 10. Then, afterwards T3 is executed. The burst time of T3 is 9 ms. The first 5 ms is executed, Then T3 is left 4 ms. Then afterwards, systems continue to execute T3 for another 4 ms until 19. So that T3 is executed 9 ms in a row. Then, afterwards, T4 is executed for 5 ms. Then, T1 is executed for another 5 ms. At this point, 29 ms, T1 is finish. Then, T2 is executed. Since T2 is left 9 ms, then the systems continue to execute the 5 ms, then directly the 4 ms, since 4 ms is below the quantum, which is 5 ms. T2 is finish at 38. Then the last one is T4. T4 is left 7. Then the 5 ms of T4 is executed. The remaining of T4 is 2 ms. Then systems continue to execute T4, the last 2 ms.

For calculation of waiting time, we get as follow:

$$T1 = 0 + (24 - 5) = 19$$

$$T2 = 5 + (29 - 10) = 24$$

$$T3 = 10$$

$$T4 = 19 + (38 - 24) = 33$$

It is concluded that for this improved round robin algorithm, the average waiting time is $86/4=21.50$ ms.

Then to calculate the turn around time. The first step is, to populate the Table 4. below for turn around time analysis:

*Corresponding author



This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Table 4. Turn Around Time with Quantum 5

Process	Arrival Time	Burst Time	Start Time	Finish Time	Turn Around Time
T1	0	10	0	29	29
T2	0	14	5	38	38
T3	0	9	10	19	19
T4	0	12	19	45	45

It is concluded that the average turn around time is $= (29+38+19+45)/4=32.75$ ms

DISCUSSION

Referring to the analysis of case study above, the table below is presented for comparison of number of context switching, average waiting time, and average turn around time:

Table 5. Comparison Table

Case Study	Number of Context Switching	Average Waiting Time	Average Turn Around Time
quantum 3	14	24.75	37.25
quantum 4	10	23.50	34.75
quantum 5	7	21.50	32.75

Please take a look at the Table 5. above. For quantum 3, the number of context switching is 14, where in quantum 4 the number of context switching is 10 and in quantum 5, it is 7. In quantum 5, the context switching reduce up to 50% , which is 7, compared with the quantum 3. The average waiting time for quantum 3 is 24.75 ms, where in quantum 4, it is 23.50 and in quantum 5, it is 21.50 ms. For average turn around time, in quantum 3 is 37.25 and in quantum 4, it is 34.75, and lastly for quantum 5, it is 32.57 ms. The lower the average turn around time, the more efficient the system. We can say, in this context, that the bigger the quantum the more efficient the systems. For average waiting time from quantum 3 and quantum 5, we get reduction 13.13% of average waiting time. For turn around time for quantum 3 and quantum 5, we get reduction 12.08%.

CONCLUSION

Based on analysis above, we can conclude that improved round robin algorithm was more efficient if the quantum is bigger. As we can take a look at the comparison analysis above, that there is an increase of 50% context switching from quantum 3 to quantum 5. And for average turn around time we get 13.13% reduction in efficiency. While in average waiting time we get reduction 12.08% efficiency. For future works, the improved round robin algorithm can be modified and combine with priority scheduling like preemptive or non preemptive shortest job first algorithm. Other comparisons also can be done, like comparison between intelligent round robin and improved round robin.

REFERENCES

- Arya, G. P., Nilay, K., & Prasad, D. (2018). An improved round robin CPU scheduling algorithm based on priority of process. *International Journal of Engineering and Technology(UAE)*, 7(4), 238–241. <https://doi.org/10.14419/ijet.v7i4.5.20077>
- Datta, L. (2015). Efficient Round Robin Scheduling Algorithm with Dynamic Time Slice. *International Journal of Education and Management Engineering*, 5(2), 10–19. <https://doi.org/10.5815/ijeme.2015.02.02>
- Dhruv, R. (2019). Round robin scheduling algorithm based on dynamic time quantum. *International Journal of Engineering and Advanced Technology*, 8(6), 593–595. <https://doi.org/10.35940/ijeat.F8070.088619>
- Indusree, J. R., & Prabadevi, B. (2017). Enhanced round robin CPU scheduling with burst time based time quantum. *IOP Conference Series: Materials Science and Engineering*, 263(4). <https://doi.org/10.1088/1757-899X/263/4/042038>
- Kumar Mishra, M., & Rashid, F. (2014). An Improved Round Robin CPU Scheduling Algorithm with Varying Time Quantum. *International Journal of Computer Science, Engineering and Applications*, 4(4), 1–8. <https://doi.org/10.5121/ijcsea.2014.4401>
- m. LaxmiJeevani, T.S.P. Madhuri, Y. S. D. (2018). Improvised Round Robin Scheduling Algorithm and comparison with Existing Round Robin CPU Scheduling Algorithm. *IOSR Journal of Computer*

*Corresponding author



This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Engineering, 20(3), 1–4. <https://doi.org/10.9790/0661-2003010104>

- Neha, A. J. (2018). An Improved Round Robin CPU Scheduling Algorithm. *Iconic Research and Engineering Journal*, 1(9), 82–86.
- Paul, T., Hossain, R., & Samsuddoha, M. (2019). Improved Round Robin Scheduling Algorithm with Progressive Time Quantum. *International Journal of Computer Applications*, 178(49), 30–36. <https://doi.org/10.5120/ijca2019919419>
- Purnomo, R., & Putra, T. D. (2022). *Simulation of Preemptive Shortest Job First Algorithm*. 11(5), 1–11. <https://doi.org/10.17148/IJARCCCE.2022.11501>
- Putra, T. D. (2020). Analysis of Preemptive Shortest Job First (SJF) Algorithm in CPU Scheduling. *IJARCCCE*, 9(4), 41–45. <https://doi.org/10.17148/ijarccce.2020.9408>
- Putra, T. D. (2022). Analysis of Priority Preemptive Scheduling Algorithm: Case Study. *Ijarccce*, 11(1), 27–30. <https://doi.org/10.17148/ijarccce.2022.11105>
- Putra, T. D., & Fadriya, A. (2021). Comparison Between Simple Round Robin and Intelligent Round Robin Algorithms in CPU Scheduling. *IJARCCCE*, 10(4), 86–90. <https://doi.org/10.17148/ijarccce.2021.10413>
- Putra, T. D., & Purnomo, R. (2021). Analisis Algoritma Round Robin pada Penjadwalan CPU. *Jurnal Ilmiah Teknologi Informasi Asia*, 15(2), 85. <https://doi.org/10.32815/jitika.v15i2.481>
- Sharma, A. (2015). Analysis of Adaptive Round Robin Algorithm and Proposed Round Robin Remaining Time Algorithm. *International Journal of Computer Science and Mobile Computing*, 4(12), 139–147.
- Yaashuwanth, C., & R. Ramesh. (2010). Intelligent Time Slice for Round Robin in Real Time Operating Systems. *IJRRAS*, 2(2), 126–131.

*Corresponding author



This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



Plagiarism Checker X Originality Report

Similarity Found: 6%

Date: Friday, July 01, 2022

Statistics: 252 words Plagiarized / 4129 Total words

Remarks: Low Plagiarism Detected - Your Document needs Optional Improvement.

Case Study: **Improved Round Robin Algorithm** Tri Dharma Putra¹, Rakhmat Purnomo²
tri.dharma.putra@dsn.ubharajaya.ac.id¹ rakhmat.purnomo@dsn.ubharajaya.ac.id²
Department of Informatics, Faculty of Computer Science, **University of Bhayangkara**
Jakarta Raya, Jalan Perjuangan Bekasi Utara, West Java, Indonesia Abstract: In this
journal, discussion is given to analyse **the improved round robin algorithm** more
thoroughly.

Round robin algorithm plays a significant role to be used in embedded systems. Round robin algorithm usually applied in real time systems. Here, three case studies are given, and also the analysis of each case study. Comparisons are given about the average turn around time and average waiting time, also number of context switching between the three case studies.

Improved round robin algorithm, is a modification from the generic round robin algorithm. Improved round robin algorithm is an algorithm where if **the remaining burst time is less than the allocated time quantum then** the running process is continue to be executed. Then finish **the currently running process** from ready queue and execute the next ready queue.

Three case studies are given with three different time quantum, which are 3, 4, and 5.

Keywords: Round Robin Algorithm, **Improved Round Robin Algorithm**, Average Turn Around Time, Average Waiting Time, Context Switching

Introduction Process scheduling is a very important operations of operating system (OS). Operating system is an interface between its user and computer hardware.

OS (Operating Systems) help user to use the computer more easily, so, the user does not need to know the hardware behind the systems (Purnomo & Putra, 2022) (Putra & Purnomo, 2021). All application is installed to the operating system's API. Operating systems handle the system in a convenient manner (Tithi Paul, Rahat Hossain Faisal, 2019).

Nowadays, in modern operating systems, the systems become more complex. Multitasking program can be handled by the systems by switching between processes. This gives a means for **the user to interact with** computer. Operating system performs major functions like memory management, process scheduling and resource management (J. R. Indusree, 2017).

Operating system is known as a resource manager because its main duty is to manage the resources of computer system. Process scheduling is most important and one fundamental. Scheduling defines a set of rules, policies and mechanism that govern the order in which resources are allocated to various processes and the work is to be done (Putra, 2022) (Putra, 2020).

The scheduling is a methodology of managing many queues of processes in order to make performance optimal and the delay to be minimum in the system. There are a scheduler in operating systems that implements the scheduling policies. In operating systems, round robin algorithm uses as a real-time scheduling algorithm. Static and dynamic **time slice or quantum** is a solution so that operating systems can be operated more effectively.

The **improved round robin algorithm** is a modification of simple round robin algorithm with the idea to make the scheduling more effective. With lower average turn around time and lower average waiting time. Also reduce the context switching. Simple round robin architecture is difficult to be implemented in real time operating systems because of high context switch rate, larger waiting time and larger response time (Yaashuwanth & R. Ramesh, 2010). The standard **round robin scheduling algorithm** is designed especially **for** time sharing system.

Each task is assigned a **time slice or quantum** (Sharma, 2015) (Tri Dharma Putra, 2021), which is a time interval. LITERATURE SURVEY In his journal, Dhruv, defined a new modified algorithm. Every process is organized in rising order of burst time. The dynamic time quantum is used based on the remaining shortest burst time. And time

quantum of this algorithm is substantial.

Round robin is pretty much similar with FCFS (First Come First Serve). Time quantum is important and plays a significant role in performance of round robin algorithm. Extravagant context switching will occur if time quantum of given algorithm is short (Dhruv, 2019). In his journal, Lipika Datta, proposed, by adjusting the time slices (quantum) of different rounds depending on the remaining CPU burst of the currently running processes and considering their waiting times until that round in respect of the other processes waiting times.

It is concluded based on experimental analysis that the proposed algorithm produces better average turnaround time, average waiting time and fewer number of context switching than existing algorithm (Datta, 2015). In their journal, Govind Prasad Arya, Kumar Nilay, Devendra Prasad, gave proposal to define a new algorithm that categorizes available processes based on process with priorities, which are high priority and low priority. This algorithm reduces the average waiting time of process that have high priority in all cases.

And of process with low priority in not all but some cases. The overall waiting time changes on the basis of set of processes considered (Govind Prasad Arya, Kumar Nilay, 2018). In their journal, Manish Kumar Mishra and Faizur Rashid, gave a proposal about an improved Round Robin CPU scheduling algorithm which enhancing performance of CPU using the features of Shortest Job First (SJF) and Round Robin algorithms based on varying time quantum.

This algorithm, based on experiments, was proven better than simple round robin (Manish Kumar Mishra, 2014). In their journal, M. Laxmi Jeevani, T.S.P. Madhuri, and Y. Sarada Devi, gave proposal to use an algorithm by using a few steps. a) Allocate process to CPU which has arrived first, giving an initial time quantum (k units).

b) After the completion of first process initial execution the scheduler will check the queue for processes which have arrived by the time of completion of first process execution with initial time quantum. Subsequently, among the multiple processes that have arrived in the queue by the k units of time, the process with the minimum burst time is allocated to the CPU.

If the first process has completed its execution, it is removed from the queue or again a chance is provided to it. Lastly, for the complete execution of all processes we have to repeat the same (m. LaxmiJeevani, T.S.P. Madhuri, 2018). In their journal, Neha and Ankita Jiyani, gave proposal about an improved round robin algorithm (Neha, 2018).

Take the first process in the ready queue and execute it until the allocated time quantum, afterwards we check the remaining burst time of the running process. If the remaining burst time is less than the allocated time quantum then the running process is executed again till it finishes. But if the remaining burst time of the running process is more than the allocated time quantum, then the next process in the ready queue is executed.

What proposed by Neha And Ankita Jiyani, is a simple improvement from the researches before. The basic idea to continue the execution of the process if the remaining burst time is below the quantum time, proved by their experiments improve the efficiency. Instead of using shortest job first algorithm proposed by Manish Kumar and Rashid, and other algorithms discussed above, Neha and Ankita Jiyani proved to be more simple. Simplicity in this algorithm is a great idea from the previous researches. ORGANIZATION STRUCTURE We have six chapters here.

Introduction is given in the first chapter. In this chapter, we discuss the idea behind round robin algorithm. Then, in the second chapter. We take a look on some literature surveys about some modification of round robin algorithm, that were given by some researchers. Then, the third chapter is about organization of this journal. In the fourth chapter, discussion is about methodology of improved round robin algorithm.

In this chapter, we discuss thoroughly about the conceptualization of improved round robin algorithm. Here, one simple example is given. The fifth chapter is about case study. Three case studies are discussed. The first case study is with quantum = 3. The second case study is with quantum = 4. The third case study is with quantum = 5.

And afterwards, still in this chapter, comparisons are given with table, about average turn around time, average waiting time, and number of context switching. The last chapter is conclusion and future works. METHODOLOGY OF IMPROVED ROUND ROBIN ALGORITHM The basic idea about round robin algorithm is using time quantum, or context switching.

Each process is assigned a time interval which is called time slice or quantum. Round robin is a preemptive algorithm. If the quantum finishes, and the tasks are still executing, then, afterwards, the algorithm will force the next queue to pre-empt the task and keep it at the end of the ready queue. The choice of the quantum is critical in this algorithm, because the quantum will give great effect on performance of this algorithm.

Neha and Ankita Jiyani (Neha, 2018), proposed an improved round robin algorithm with

basic idea as follows: Execute first process in the ready queue and process it until the allocated time quantum, then check the remaining burst time of the running process. If the remaining burst time of the running process is below than the allocated time quantum then the execution continues.

If the remaining burst time of the running process is more than the allocated time quantum, then the next process in ready queue is executed. We remove the currently running process from the ready queue and put it at the tail of the ready queue. We can discuss the idea of this algorithm by example. Let say, there are two processes T1 and T2. T1 with 8 ms burst time and T2 with 7 ms burst time. And time quantum is 5 ms.

Let say, the first quantum is executed, the remaining of T1 is 3 ms. Since 5 ms is executed. Then because the remaining, the 3 ms is below then the quantum (which is 5 ms), then 3 ms continues to be executed, this will not be preempted because the remaining of T1 is 3 which is below the quantum 5 ms. Then the process of T1 continues until finish.

Afterwards, T2 is executed which makes the remaining of T2 is 2 ms, since $7 - 5 = 2$. This process will not be preempted because the remaining of the process is 2 ms for T2. Which is below the quantum, which is 5 ms. So T2 is executed until finish, because the remaining time is less than the quantum. As we can see in the gantt chart of Figure 1.

below: T1 = 8 ms, T2 = 7 ms, Quantum = 5 ms
 1_2_3_4_5_6_7_8_9_10_11_12_13_14_15__T1_T1_T1_T1_T1_T1_T1_T1_T1_T2_T2_T2_T2_T2_T2_T2_____ _remaining_____remaining__Figure 1. Gantt Chart of basic concept improved round robin with quantum 5 ms. CASE STUDY ANALYSIS Below is the analysis of the case studies. We discuss three case studies with different quantum, but with the same processes and burst time.

The first with quantum =3, the second with quantum = 4, the last one is with quantum = 5. Then we discuss the comparison analysis of the three case studies for evaluation, which one is more efficient than the others. Table 1. Processes with Arrival Time and Burst Time
 Task ID _Arrival Time _Burst Time __T1_0_10 __T2_0_14 __T3_0_9 __T4_0_12 __ Please take a look at the Table 1. The case study is with 4 tasks. T1 until T4. And the quantums are 3, 4 and 5. The arrival times are zero for all.

Total burst time is 45 in each of these case studies. 5.1 Case Study 1 In this case study 1, the quantum is 3. The total processes are 45 ms. Please take a look on Figure 2. below: 1_2_3_4_5_6_7_8_9_10_11_12_13_14_15_16_17_18_19_20__T1_T1_T1_T2_T2_T2_T3_T3_T3_T4_T4_T4_T1_T1_T1_T2_T2_T2_T3_T3_____

_____21_22_23_24_25_26_27_28_29_30_31_32_33_34_35_36_37_38_39_40_ _
 _T3_T4_T4_T4_T1_T1_T1_T1_T2_T2_T2_T3_T3_T3_T4_T4_T4_T2_T2_T2_ _ _ _ _
 _ _ _ _ _41_42_43_44_45_
 _T2_T2_T4_T4_ _ _ _ _
 T4
 Figure 2. Gantt Chart with quantum 3. Since the quantum is 3, T1 is executed for 3 ms. The remaining of T1 is 7 ms.

Then afterwards, T2 is executed also 3 ms. Then T2 remains 11 ms. Then T3 is executed for 3 ms. This continues to T4, for 3 ms. At 13 ms, T1 is executed for another 3 ms, afterwards T2, T3 and T4. Now, T1 remains 4 ms, since 6 ms has been executed. Then T1 is executed for another 3 ms, since the remains of T1 is 1, which is below the quantum 3, then T1 continues to be executed by 4 ms. T1 is finished here.

Then T2, T3 and T4 are executed for another 3 ms each. The remains of T2 is 5 ms. At 37 ms, T2 is executed for another 3 ms, but the remains of T2 is 2 ms. Then T2 continues to be executed from 37 ms until 42 ms. The last one is T4. T4 is left 3 ms, Then 3 ms is executed for T4 until finish at 45. For calculation of waiting time, we get as follow:
 $T1=0+(12-3)+(24-15)=18$ $T2=3+(15-6)+(28-18)+(37-31)=28$ $T3=6+(18-9)+(31-21)=25$
 $T4=9+(21-12)+(34-24)=28$ It is concluded that for simple round robin algorithm, **the average waiting time is** $99/4=24.75$ ms. Then we calculate the turn around time.

The first step is, **to populate the table below** for turn around time analysis, as per Table 2 below: Table 2. Turn Around Time of Quantum 3 Process

Arrival Time	Burst Time	Start Time	Finish Time	Turn Around Time
T1	10	0	28	28
T2	14	3	42	42
T3	9	6	34	34
T4	12	9	45	45

It is concluded that the average turn around time is $=(28+42+34+45)/4=37.25$ ms 5.2

Case Study 2 In this case study 2, the quantum is 4. The total processes are the same as the case study 1, which is 45 ms. **Please take a look** on Figure 3. Below: 1_2_3_4_5_6_7_8_9_10_11_12_13_14_15_16_17_18_19_20_ _T1_T1_T1_T1_T2_T2_T2_T2_T3_T3_T3_T3_T4_T4_T4_T4_T1_T1_T1_T1_ _

_____21_22_23_24_25_26_27_28_29_30_31_32_33_34_35_36_37_38_39_40_ _T1_T1_T2_T2_T2_T2_T3_T3_T3_T3_T4_T4_T4_T4_T2_T2_T2_T2_T2_ _
 _ _ _ _ _41_42_43_44_45_
 _T2_T4_T4_T4_T4_ _ _ _ _
 _

Figure 3. Gantt Chart with quantum 4.

Since the quantum is 4, Then T1, **T2, T3, and T4** are executed for 4 ms each. Until 16 ms. T1 which is 10 ms, has been executed for 4 ms, which is left 6 ms. Then at 16 ms, T1 is executed for another 4 ms. But since the remaining of T1 is 2 ms, which is below the

quantum 4, Then systems continue to executed T1 for another 2 ms, which is 6 ms.

This is from 16 ms until time 22 ms. Afterwards T2 is executed for another 4 ms, until 26 ms. Then at 26 ms, T3 is executed for another 4 ms. Since T3 is left 5 ms, then T3 is executed from 26 until 31 ms, for 5 ms. Then T4 is executed for another 4 ms until 35 ms. Then T2 is executed afterwards. The remaining of T2 is 6 ms. Then this process, T2 continues to be executed for 4 ms and 2 ms afterwards, to be 6 ms, since T2 is left 2 ms.

Then the last process is T4. T4 is left 4 ms. Then, T4 is executed for the last 4 ms until 45. For calculation of waiting time, we get as follow: $T1=0+(16-4)=12$
 $T2=4+(22-8)+(35-26)=27$ $T3=8+(26-12)=22$ $T4=12+(31-16)+(41-35)=33$ It is concluded that for simple round robin algorithm, the average waiting time is $94/4=23.50$ ms. Then we calculate the turn around time.

The first step is, we populate the table below for turn around time analysis, as per Table 3. below: Table 3. Turn Around Time with Quantum 4

Process	Arrival Time	Burst Time	Start Time	Finish Time	Turn Around Time
T1	0	10	0	22	22
T2	0	14	4	41	41
T3	0	9	8	31	31
T4	0	12	12	45	45

It is concluded that the average turn around time is $= (22+41+31+45)/4=34.75$ ms 5.3

Case Study 3 In this case study 3, the quantum is 5. The total processes are the same as the case study 1 and case study 2, which is 45 ms. Please take a look on Figure 4. Below:

```

1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 20  _T1 T1 T1 T1
_T1 T2 T2 T2 T2 T2 T3 T3 T3 T3 T3 T3 T3 T3 T3 T4
-----
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
40  _T4 T4 T4 T4 T1 T1 T1 T1 T1 T2 T2 T2 T2 T2 T2 T2 T2 T4 T4 _
-----
41 42 43 44 45  _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
_T4 T4 _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
Figure 4. Gantt Chart with quantum 5. T1 and T2 are
executed for 5 ms second in a row. Namely, 5 ms for T1 and 5 ms for T2 until 10.

```

Then, afterwards T3 is executed. The burst time of T3 is 9 ms. The first 5 ms is executed, Then T3 is left 4 ms. Then afterwards, systems continue to execute T3 for another 4 ms until 19. So that T3 is executed 9 ms in a row. Then, afterwards, T4 is executed for 5 ms. Then, T1 is executed for another 5 ms. At this point, 29 ms, T1 is finish. Then, T2 is executed.

Since T2 is left 9 ms, then the systems continue to execute the 5 ms, then directly the 4 ms, since 4 ms is below the quantum, which is 5 ms. T2 is finish at 38. Then the last one is T4. T4 is left 7. Then the 5 ms of T4 is executed. The remaining of T4 is 2 ms. Then systems continue to execute T4, the last 2 ms. For calculation of waiting time, we get as

follow: $T1=0+(24-5)=19$ $T2=5+(29-10)=24$ $T3=10$ $T4=19+(38-24)=33$ It is concluded that for simple round robin algorithm, the average waiting time is $86/4=21.50$ ms. Then we calculate the turn around time. The first step is, to populate the Table 4.

below for turn around time analysis: Table 4. Turn Around Time with Quantum 5

Process	Arrival Time	Burst Time	Start Time	Finish Time	Turn Around Time
T1	0	10	0	29	29
T2	0	14	5	38	38
T3	0	9	10	19	19
T4	0	12	19	45	45

It is concluded that the average turn around time is $(29+38+19+45)/4=32.75$ ms

Comparison Analysis Based on analysis above, here is the comparison table of number of context switching, average waiting time, and average turn around time: Table 5.

Case Study	Number of Context Switching	Average Waiting Time	Average Turn Around Time
quantum 3	14	24.75	37.25
quantum 4	10	23.50	34.75
quantum 5	7	21.50	32.75

Please take a look at the Table 5. above.

For quantum 3, the number of context switching is 14, where in quantum 4 the number of context switching is 10 and in quantum 5, it is 7. In quantum 5, the context switching reduce up to 50% , which is 7, compared with the quantum 3. The average waiting time for quantum 3 is 24.75 ms, where in quantum 4, it is 23.50 and in quantum 5, it is 21.50 ms. For average turn around time, in quantum 3 is 37.25 and in quantum 4, it is 34.75, and lastly for quantum 5, it is 32.57 ms. The lower the average turn around time, the more efficient the system.

We can say, in this context, that the bigger the quantum the more efficient the systems. For average waiting time from quantum 3 and quantum 5, we get reduction 13.13% of average waiting time. For turn around time for quantum 3 and quantum 5, we get reduction 12.08%.

Conclusion Based on analysis above, we can conclude that improved round robin algorithm was more efficient if the quantum is bigger. As we can take a look at the comparison analysis above, that there is an increase of 50% context switching from quantum 3 to quantum 5. And for average turn around time we get 13.13% reduction in efficiency. While in average waiting time we get reduction 12.08% efficiency.

For future works, the improved round robin algorithm can be modified and combine with priority scheduling like shortest job first algorithm. Other comparisons also can be done, like comparison between intelligent round robin and improved round robin.

References Datta, L. (2015). Efficient Round Robin Scheduling Algorithm with Dynamic Time Slice. International Journal on Education and Management Engineering, 2, 10–19.

Dhruv, R. (2019).

Round Robin Scheduling Algorithm Based on Dynamic Time Quantum. International Journal of Engineering and Advanced Technology (IJEAT), X(X), 593–595. Govind Prasad Arya, Kumar Nilay, D. P. (2018). An Improved Round Robin CPU Scheduling Algorithm Based on Priority of Process. International Journal of Engineering & Technology, 7(4.5), 238–241. J. R. Indusree, B. P. (2017).

Enhanced Round Robin CPU Scheduling with Burst Time Based Time Quantum. IOP Conf Series: Material Science and Engineering, 1–8. m. LaxmiJeevani, T.S.P. Madhuri, Y. S. D. (2018). Improvised Round Robin Scheduling Algorithm and comparison with Existing Round Robin CPU Scheduling Algorithm. IOSR Journal of Computer Engineering, 20(3), 1–4. Manish Kumar Mishra, F. R. (2014). An Improved Round Robin CPU Scheduling Algorithm with Varying Time Quantum.

International Journal of Computer Science, Engineering and Applications (IJCSEA), 4(4), 1–8. Neha, A. J. (2018). An Improved Round Robin CPU Scheduling Algorithm. Iconic Research and Engineering Journal, 1(9), 82–86. Purnomo, R., & Putra, T. D. (2022). Simulation of Preemptive Shortest Job First Algorithm. Ijarcce, 11(5), 1–11. <https://doi.org/10.17148/ijarcce.2022.11501> Putra, T. D. (2020). Analysis of Preemptive Shortest Job First (SJF) Algorithm in CPU Scheduling.

IJARCCCE, 9(4), 41–45. <https://doi.org/10.17148/ijarcce.2020.9408> Putra, T. D. (2022). Analysis of Priority Preemptive Scheduling Algorithm: Case Study. Ijarcce, 11(1), 27–30. <https://doi.org/10.17148/ijarcce.2022.11105> Putra, T. D., & Purnomo, R. (2021). Analisis Algoritma Round Robin pada Penjadwalan CPU. Jurnal Ilmiah Teknologi Informasi Asia, 15(2), 85. <https://doi.org/10.32815/jitika.v15i2.481> Sharma, A. (2015).

Analysis of Adaptive Round Robin Algorithm and Proposed Round Robin Remaining Time Algorithm. International Journal of Computer Science and Mobile Computing, 4(12), 139–147. Tithi Paul, Rahat Hossain Faisal, M. S. (2019). Improved Round Robin Scheduling Algorithm with Progressive Time Quantum. International Journal of Computer Application, 178(49), 30–36. Tri Dharma Putra, A. F. (2021).

Comparison Between Simple Round Robin and Intelligent Round Robin Algorithms in CPU Scheduling. International Journal of Advanced Research in Computer and Communication Engineering, 10(4), 86–90. Yaashuwanth, C., & R. Ramesh. (2010). Intelligent Time Slice for Round Robin in Real Time Operating Systems. IJRRAS, 2(2), 126–131.

INTERNET SOURCES:

<1% -

<https://www.ijcaonline.org/archives/volume178/number49/paul-2019-ijca-919419.pdf>

<1% -

<https://rightedusoal.blogspot.com/2021/09/sia-ubhara-jaya-bekasi-pmb-ubhara-jaya.html>

<1% -

<https://www.chegg.com/homework-help/questions-and-answers/write-function-struct-pcb-handleprocessarrivalpp-struct-pcb-readyqueue-queue-max-int-queue-c-q51227835>

<1% -

<https://www.compuhoy.com/how-does-the-user-interact-with-the-operating-system/>

<1% - <https://lmp.norushcharge.com/what-is-time-slice-in-operating-system/>

<1% -

<https://www.chegg.com/homework-help/questions-and-answers/determine-fcfs-first-come-first-serve-sjf-shortest-job-first-priority-round-robin-given-jobs-q97988095>

<1% - <https://ijcrt.org/papers/IJCRT1704213.pdf>

1% -

<https://www.jardcs.org/backissues/abstract.php?archiveid=2124&year=2017&issue=11-Special%20Issue&page=9>

<1% -

<https://www.coursehero.com/file/p4c8c2hb/Q-517-Consider-the-following-set-of-processes-with-the-length-of-the-CPU-burst/>

1% -

https://www.researchgate.net/publication/351485635_Comparison_Between_Simple_Round_Robin_and_Intelligent_Round_Robin_Algorithms_in_CPU_Scheduling/fulltext/609abce1458515d31513aa74/Comparison-Between-Simple-Round-Robin-and-Intelligent-Round-Robin-Algorithms-in-CPU-Scheduling.pdf

<1% -

<https://www.geeksforgeeks.org/round-robin-scheduling-with-different-arrival-times/>

<1% -

https://www.academia.edu/69466967/CPU_Burst_Processes_Prioritization_Using_Priority_Dynamic_Quantum_Time_Algorithm_A_Comparison_with_Varying_Time_Quantum_and_Round_Robin_Algorithms

<1% -

<https://www.chegg.com/homework-help/questions-and-answers/3-select-two-case-studies-discussed-lessons-10-11-use-3-examples-case-study-examine-ways-c-q89797533>

<1% -

<https://testbook.com/question-answer/which-of-the-following-algorithms-defines-time->

qua--5e8c8d85f1b5d40d27cddeae

<1% - <https://irejournals.com/formatedpaper/1700273.pdf>

<1% -

<https://www.chegg.com/homework-help/questions-and-answers/assignment-simulate-t-hree-state-process-model-ready-running-blocked-simple-process-control-q38590416>

<1% -

<https://www.chegg.com/homework-help/questions-and-answers/select-one-three-case-studies-discuss-chosen-case-study-brief-evaluation-includes-relevant-q69479106>

<1% - <https://www.geeksforgeeks.org/cpu-scheduling-in-operating-systems/>

<1% -

<https://www.chegg.com/homework-help/questions-and-answers/please-take-look-figures-answer-questions-s-urgent-kindly-cooperate--many-thumbs-q61483113>

<1% -

<https://community.atlassian.com/t5/Confluence-questions/Can-I-populate-1-column-in-a-table-with-data-from-a-different/qaq-p/1932102>

<1% -

<https://www.chegg.com/homework-help/questions-and-answers/assume-4-teams-labeled-t1-t2-t3-t4-compete-tournament-assume-probability-winning-game-ran-q44498270>

<1% - <https://www.tutorialandexample.com/round-robin-scheduling-algorithm>

<1% -

<https://www.chegg.com/homework-help/questions-and-answers/adjust-code-populate-table--provide-summary-experiment-table-filled-worst-case-screenshot--q93890393>

<1% -

<https://babyandbump.momtastic.com/threads/please-take-a-look%E2%80%A6.2488636/>

<1% - <https://radiologykey.com/t1-t2-and-t2/>

<1% - <https://www.ijeat.org/portfolio-item/a1235109119/>

<1% -

https://www.academia.edu/es/36803768/Improvised_Round_Robin_Scheduling_Algorithm_and_Comparison_with_Existing_Round_Robin_CPU_Scheduling_Algorithm

<1% -

<https://academic-accelerator.com/Impact-of-Journal/Iosr-Journal-Of-Computer-Engineering>

<1% -

https://www.researchgate.net/publication/360783034_Simulation_of_Preemptive_Shortest_Job_First_Algorithm

1% - <https://link.springer.com/article/10.1007/s41870-019-00351-5>

<1% -

<https://academic-accelerator.com/4-Year-Impact-of-Journal/International-Journal-Of-Computer-Science-And-Mobile-Computing>



UNIVERSITAS BHAYANGKARA JAKARTA RAYA
FAKULTAS ILMU KOMPUTER

Kampus I: Jl. Harsono RM No. 67, Ragunan, Pasar Minggu, Jakarta Selatan 12550
Telepon: (021) 27808121 – 27808882
Kampus II: Jl. Raya Perjuangan, Marga Mulya, Bekasi Utara, Jawa Barat, 17142
Telepon: (021) 88955882, Fax.: (021) 88955871
Web: fasilkom.ubharajaya.ac.id, E-mail: fasilkom@ubharajaya.ac.id

SURAT TUGAS

Nomor: ST/305/VII/2022/FASILKOM-UBJ

1. Dasar: Kalender Akademik Ubhara Jaya Tahun Akademik 2021/2022.
2. Dalam rangka mewujudkan Tri Dharma Perguruan Tinggi untuk Dosen di Universitas Bhayangkara Jakarta Raya maka dihimbau untuk melakukan Penelitian.
3. Sehubungan dengan hal tersebut di atas, maka Dekan Fakultas Ilmu Komputer Universitas Bhayangkara Jakarta Raya menugaskan:

NO.	NAMA	NIDN	JABATAN	KETERANGAN
1.	Tri Dharma Putra, S.T., M.Sc.	0302117101	Dosen Tetap Prodi Informatika	Sebagai Penulis Pertama
2.	Rakhmat Purnomo, S.Pd., S.Kom., M.Kom.	0322108201	Dosen Tetap Prodi Informatika	Sebagai Penulis Kedua

Membuat Artikel Ilmiah dengan judul "**Case Study: Improved Round Robin Algorithm**" dengan menerima LoA pada tanggal 23 Juli 2022 untuk dipublikasikan di media Sinkron: Jurnal dan Penelitian Teknik Informatika, Vol. 7, No. 3, Juli 2022, e-ISSN: 2541-2019, p-ISSN: 2541-044X.

4. Demikian penugasan ini agar dapat dilaksanakan dengan penuh rasa tanggung jawab.



Bekasi, 23 Juli 2022

DEKAN FAKULTAS ILMU KOMPUTER

Dr. Tyastuti Sri Lestari, S.Si., M.M.

NIP. 1408206

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : JURNAL IMIAH

Judul Artikel Ilmiah : Case Study : Improved Round Robin Algorithm
 Jumlah Penulis : 2
 Status Pengusul : Penulis ke - 2
 Identitas Jurnal Ilmiah :
 a. Nama Jurnal : Sinkron : Jurnal dan Penelitian Teknik Informatika
 b. Nomor ISSN : 2541-2019
 c. Vol. No. Bln. Thn : Vol 7 No. 3, Juli 2022
 d. Penerbit : Politeknik Ganesha Medan
 e. Jumlah Halaman : 7

Kategori Publikasi Jurnal Imiah (beri \checkmark pada kategori yang tepat) :

- Jurnal Ilmiah Internasional Berputasi
- Jurnal Ilmiah Internasional
- Jurnal Ilmiah Nasional Terakreditasi Sinta 3**
- Jurnal Ilmiah Nasional Tidak Terakreditasi
- Jurnal Ilmiah Terindex di DOAJ/lainnya

I. Hasil Penilaian Validasi :

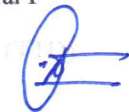
No	Aspek	Uraian/Komentar Penilaian
1	Indikasi Plagiasi	Tidak ada unsur plagiat, Hasil Similarity hanya 6%
2	Linieritas	Cukup sesuai bidang Ilmu penulis

II. Hasil Penilaian Peer Review:

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah (isi kolom yang sesuai)					Nilai Akhir Yang Diperoleh
	Internasional Berputasi	Internasional	Nasional Terakreditasi	Nasional Tidak Terakreditasi	Nasional Terindex DOAJ dll.	
Kelengkapan dan kesesuaian unsur isi jurnal (10%)			2			117
Ruang lingkup dan kedalaman pembahasan (30%)			6			515
Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)			6			515
Kelengkapan unsur dan kualitas Penerbit (30%)			6			515
Total = (100%)			20			1812
Kontribusi pengusul: (contoh: nilai akhir peer X Penulis Pertama = 18 X 60% = (nilai akhir yang diperoleh pengusul)						911
Komentar/ Ulasan Peer Review :						
Kelengkapan kesesuaian unsur	Unsur lengkap dan sesuai					
Wajib diisi dan diulas secara rinci oleh peer (ditulis tangan)						

<p>Ruang lingkup dan kedalaman pembahasan</p>	<p>Ruang lingkup pembahasan cukup dalam</p> <p><i>Wajib diisi dan dipelaskau secara jujur oleh reviewer (ditulis tangan)</i></p>
<p>Kecukupan dan kemutakhiran data/informasi dan metodologi</p>	<p>Menggunakan data privat dan metodologi terbaru</p> <p><i>Wajib diisi dan dipelaskau secara jujur oleh reviewer (ditulis tangan)</i></p>
<p>Kelengkapan unsur dan kualitas Penerbit</p>	<p>Penerbit bereputasi. Masuk jurnal terakreditasi Sinta 3</p> <p><i>Wajib diisi dan dipelaskau secara jujur oleh reviewer (ditulis tangan)</i></p>

Penilai I



Nama Lengkap : **Ir. Muhammad Khaerudin, M.Kom**
 NIDN : 0413066604
 Unit kerja : Fakultas Ilmu Komputer, Universitas Bhayangkara Jakarta Raya
 Bidang Ilmu : Informatika
 Jabatan Akademik (KUM) : Lektor Kepala 400
 Pendidikan Terakhir : S2 Ilmu Komputer

**LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : JURNAL ILMIAH**

Judul Artikel Ilmiah : Case Study : Improved Round Robin Algorithm
 Jumlah Penulis : 2
 Status Pengusul : Penulis ke - 2
 Identitas Jurnal Ilmiah :
 a. Nama Jurnal : Sinkron : Jurnal dan Penelitian Teknik Informatika
 b. Nomor ISSN : 2541-2019
 c. Vol. No. Bln. Thn : Vol 7 No. 3, Juli 2022
 d. Penerbit : Politeknik Ganesha Medan
 e. Jumlah Halaman : 7

Kategori Publikasi Jurnal Ilmiah (beri \checkmark pada kategori yang tepat) :
 Jurnal Ilmiah Internasional Berputasi
 Jurnal Ilmiah Internasional
 Jurnal Ilmiah Nasional Terakreditasi Sinta 3
 Jurnal Ilmiah Nasional Tidak Terakreditasi
 Jurnal Ilmiah Terindex di DOAJ/lainnya

I. Hasil Penilaian Validasi :

No	Aspek	Uraian/Komentar Penilaian
1	Indikasi Plagiasi	Hasil Similarity 6%. Aman
2	Linieritas	Sangat Sesuai dengan Bidang Ilmu Penulis

II. Hasil Penilaian Peer Review:

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah (isi kolom yang sesuai)					Nilai Akhir Yang Diperoleh
	Internasional Bereputasi	Internasional	Nasional Terakreditasi	Nasional Tidak Terakreditasi	Nasional Terindex DOAJ dll.	
Kelengkapan dan kesesuaian unsur isi jurnal (10%)			2			1,8
Ruang lingkup dan kedalaman pembahasan (30%)			6			5,7
Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)			6			5,7
Kelengkapan unsur dan kualitas Penerbit (30%)			6			5,7
Total = (100%)			20			18,9
Kontribusi pengusul: (contoh: nilai akhir peer X Penulis Pertama = 18 X 60% = (nilai akhir yang diperoleh pengusul)						9,45
Komentar/ Ulasan Peer Review :						
Kelengkapan kesesuaian unsur	Unsur cukup sesuai dan cukup lengkap					
Wajib diisi dan dijelaskan secara rinci oleh peer (ditulis tangan)						

<p>Ruang lingkup dan kedalaman pembahasan</p>	<p>Ruang Lingkup Pembahasan Cukup Mendalam</p> <p>Wajib diisi dan dijelaskan secara rinci oleh peer (ditulis tangan)</p>
<p>Kecukupan dan kemutakhiran data/informasi dan metodologi</p>	<p>Menggunakan Data Organisasi dan Metodologi terkini</p> <p>Wajib diisi dan dijelaskan secara rinci oleh peer (ditulis tangan)</p>
<p>Kelengkapan unsur dan kualitas Penerbit</p>	<p>Penerbit Jurnal Terakreditasi Sinta 5.</p> <p>Wajib diisi dan dijelaskan secara rinci oleh peer (ditulis tangan)</p>

Penilai II



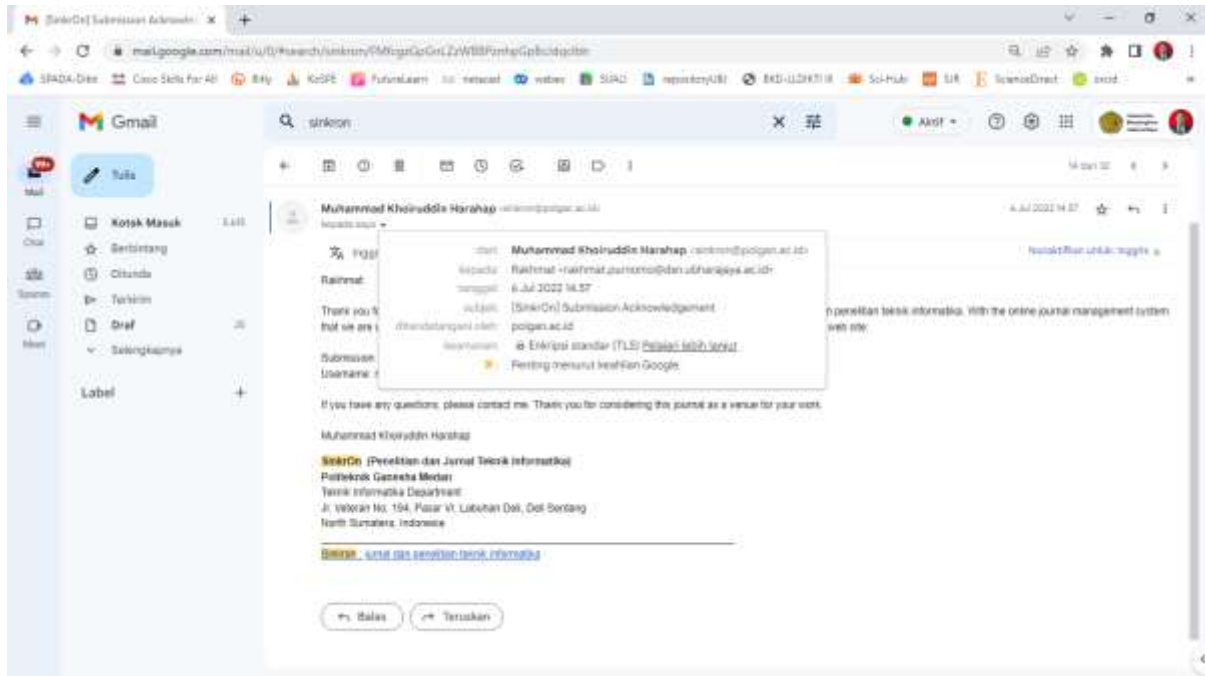
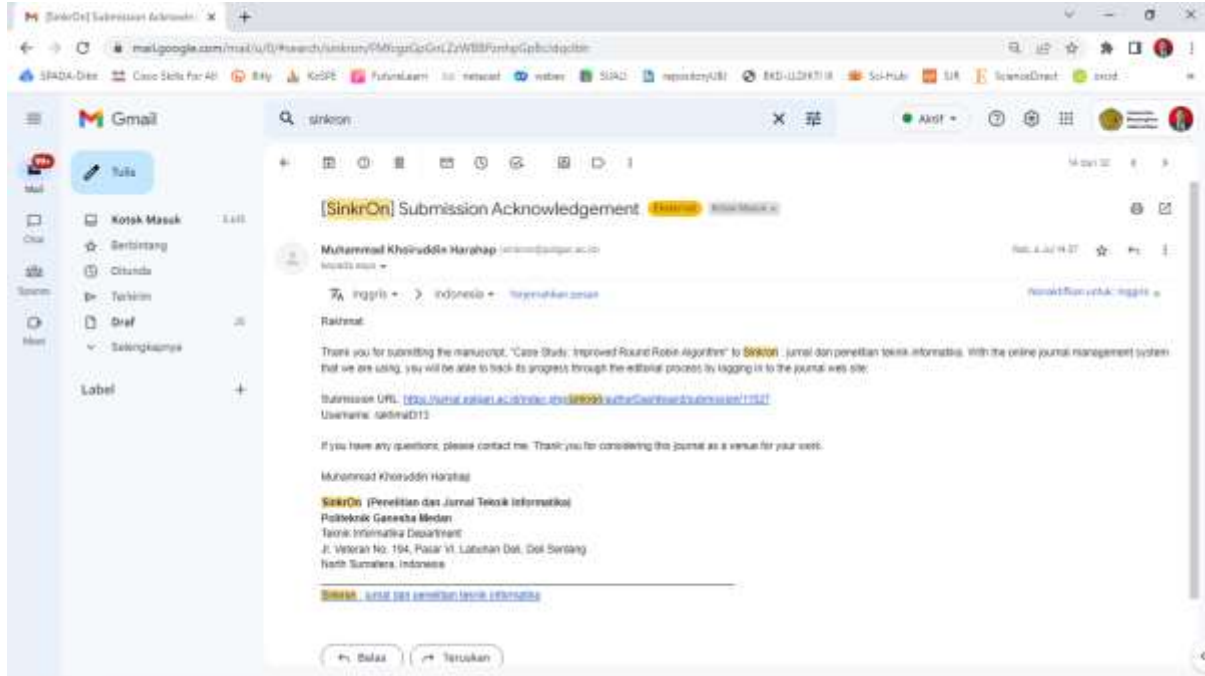
Nama Lengkap : **Kusdarnowo Hantoro, S.Kom., M.Kom.**
 NIDN : 0329076601
 Unit kerja : Fakultas Ilmu Komputer, Universitas Bhayangkara Jakarta Raya
 Bidang Ilmu : Informatika
 Jabatan Akademik (KUM) : Lektor 300
 Pendidikan Terakhir : S2 Ilmu Komputer

Bukti Korespondensi

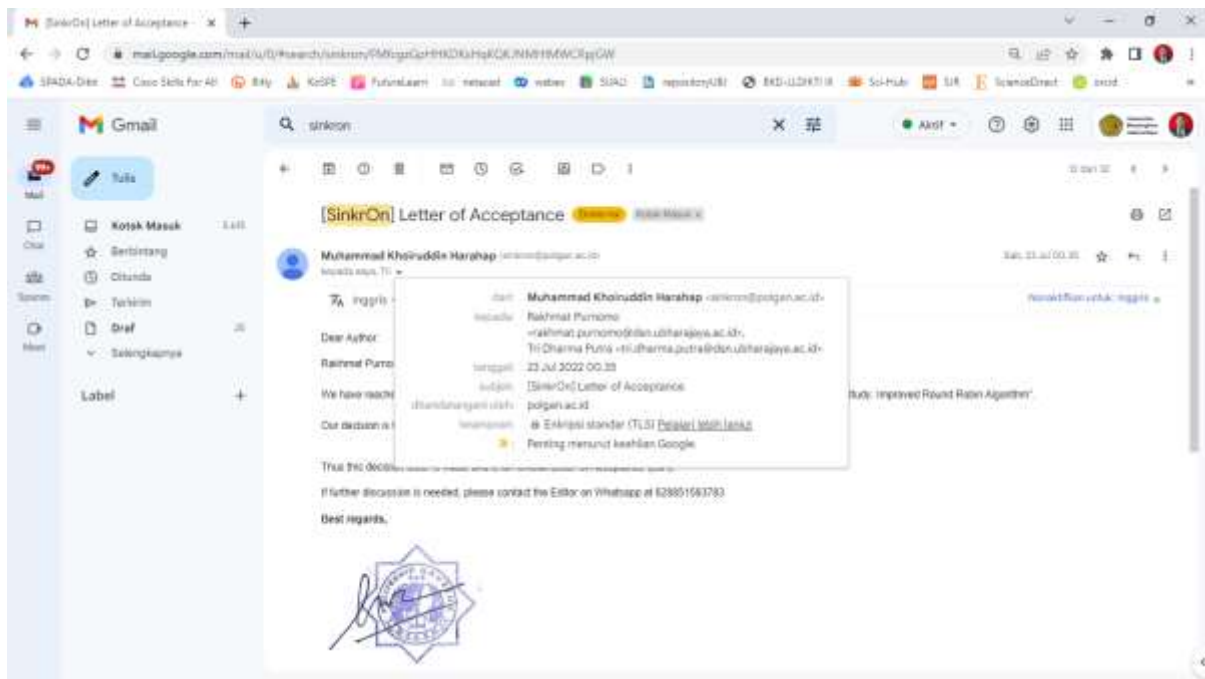
Artikel : case studi: Improved round robin algoritrm

Jurnal : Sinkron – Jurnal dan Penelitian Teknik Informatika

1. Submission



2. LoA



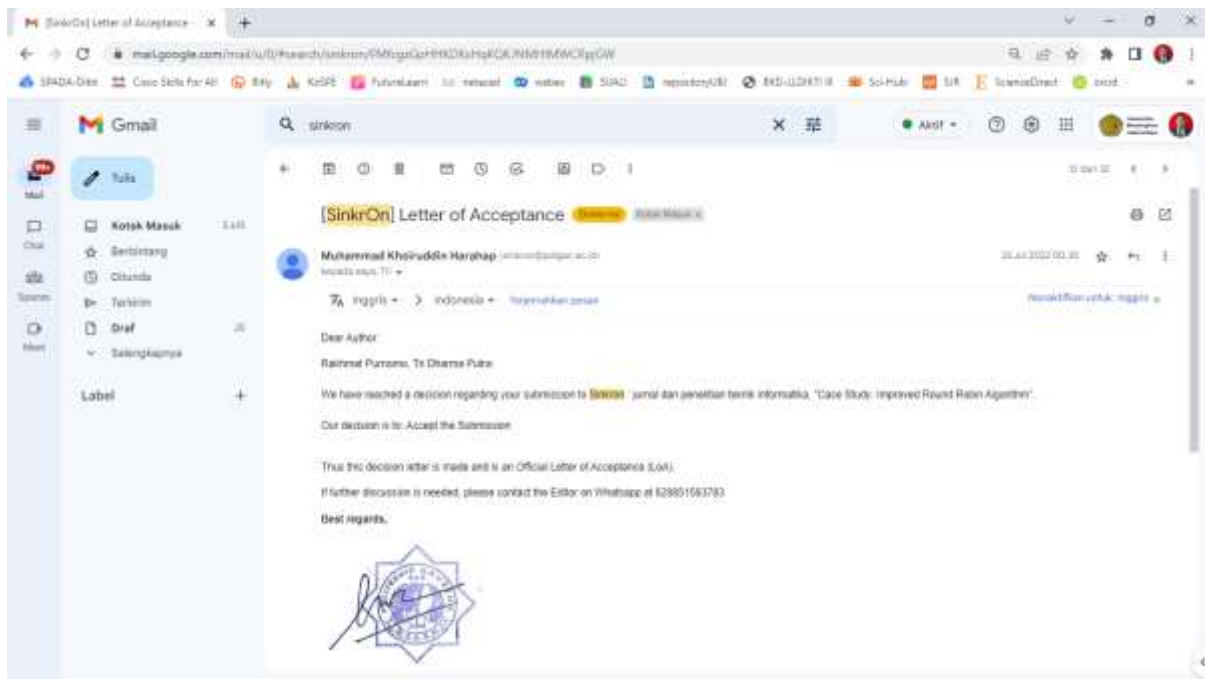

This screenshot shows a Gmail interface with a search bar containing 'sinkron'. The email list shows one result: '[SinkrOn] Letter of Acceptance' from Muhammad Khoiruddin Harahap, dated Jul 23, 2022, 00:31. The email content is as follows:

[SinkrOn] Letter of Acceptance

Muhammad Khoiruddin Harahap <sinkron@pdjgen.ac.id>
Muhammad Khoiruddin Harahap <sinkron@pdjgen.ac.id>
Dear Author,
Rahmat Purnomo
We have reached a decision regarding your submission to Sinkron journal dan penelitian teknik informatika, "Case Study: Improved Round Robin Algorithm".
Our decision is to: **Accept the Submission**

Thus this decision letter is made and is an Official Letter of Acceptance (LoA).
If further discussion is needed, please contact the Editor on Whatsapp at 828851583783

Best regards,




This screenshot shows the same Gmail interface, but the email content is more complete. The subject line is '[SinkrOn] Letter of Acceptance' and the sender is Muhammad Khoiruddin Harahap. The email content is as follows:

[SinkrOn] Letter of Acceptance

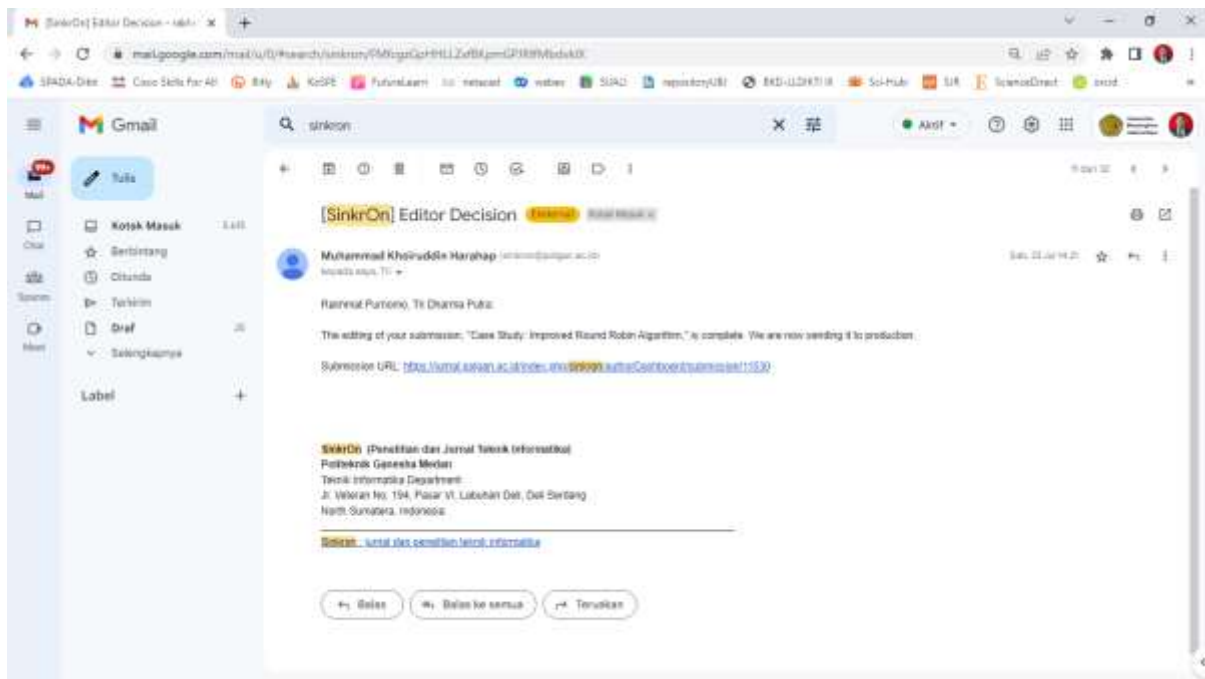
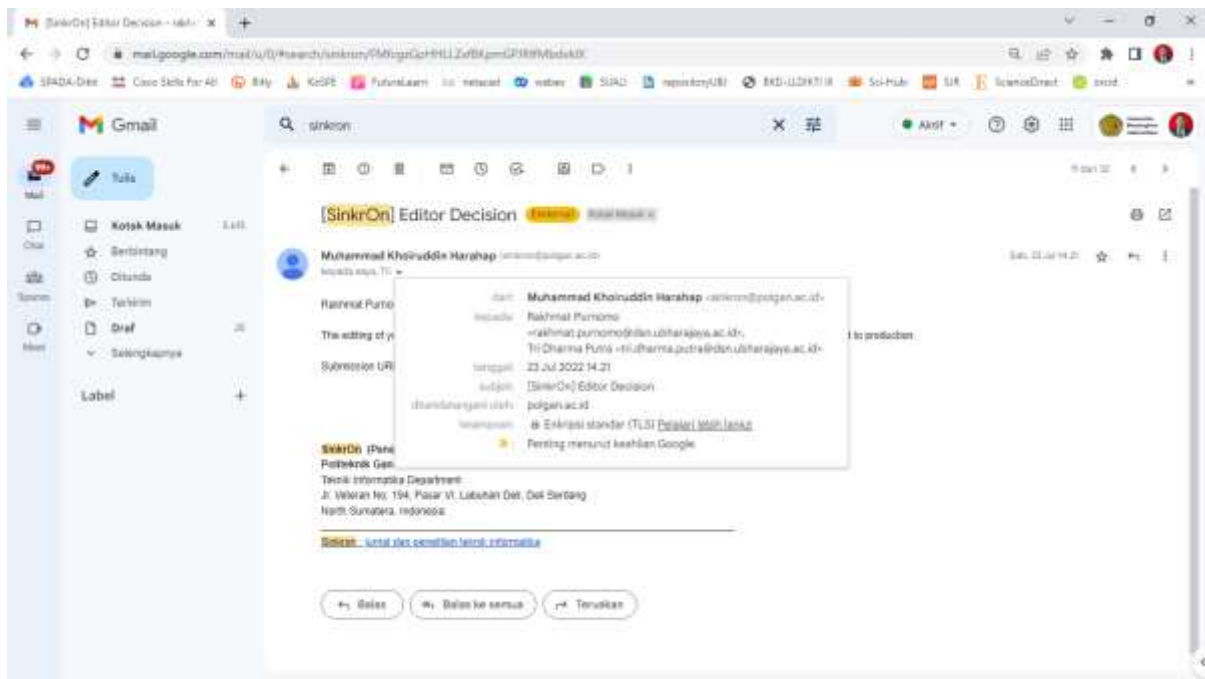
Muhammad Khoiruddin Harahap <sinkron@pdjgen.ac.id>
Dear Author,
Rahmat Purnomo, Tri Dharma Putra
We have reached a decision regarding your submission to Sinkron journal dan penelitian teknik informatika, "Case Study: Improved Round Robin Algorithm".
Our decision is to: **Accept the Submission**

Thus this decision letter is made and is an Official Letter of Acceptance (LoA).
If further discussion is needed, please contact the Editor on Whatsapp at 828851583783

Best regards,



3. Editor decision



4. Artikel terbit

