

**ACTIVITY REPORT  
COMMUNITY DEVELOPMENT PROGRAM**

**MAIN TITLE: DISCUSSION OF APPROPRIATE TECHNOLOGY**

**SUBTITLE: MATHEMATICS LEARNING BASED ON TECHNOLOGY**

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**MATHEMATICS STUDY PROGRAM  
FACULTY OF SCIENCE AND TECHNOLOGY  
STATE ISLAMIC UNIVERSITY MAULANA MALIK IBRAHIM  
MALANG  
2022**

## APPROVAL SHEET

The activity report of Community Development Program (CDP) 2022 with the title “DISCUSSION OF APPROPRIATE TECHNOLOGY” and subtitle “MATHEMATICS LEARNING BASED ON TECHNOLOGY” was approved on September 27, 2022.

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## FOREWORD

*Bismillahirrahmanirrahim*

Community service is one of the main tasks of a lecturer. On this occasion we were given an opportunity to carry out community service activities held by the Faculty of Science and Technology, State Islamic University Maulana Malik Ibrahim Malang in the scheme of the Community Development Program with the title "Socialization of Appropriate Technology" and subtitles "Mathematics Learning Based on Technology".

Alhamdulillah, the process of service activities can be carried out well. Our thanks go to:

1. Prof. Dr. M. Zainuddin, MA as the Chancellor of UIN Maliki Malang who provided support as well as the direction in carrying out Community Service.
2. Dr. Agus Maimun, M.Pd. as the chairman of LP2M UIN Maliki Malang who has given us the opportunity and also guidance regarding community service activities.
3. Faculty of Science and Technology UIN Maulana Malik Ibrahim Malang which has made Community Development Program activities.
4. Mathematics Study Program which has accommodated and facilitated community service schemes.
5. The programme leader, lecturers, and students of School of Applied Sciences and Mathematics as service partners.
6. As well as the entire team that is ready to serve both the lecturers and students involved.

Finally, we hope that our community service activities can be sustainable and have an impact on partners and the Faculty of Science and Technology of UIN Maulana Malik Ibrahim Malang.

Malang, September 27<sup>th</sup>, 2022

Writer Team

# CHAPTER I

## PRELIMINARY

### 1.1. Issues and Focus of Services

Technology can be said as a whole means to provide goods needed for the survival and comfort of human life. Meanwhile, appropriate technology is a technology designed for a particular society so that it can be adapted to the environmental, ethical, cultural, social, political, and economic aspects of the community concerned.

Mathematics is one of the old pieces of knowledge. The systematic study of mathematics in its own right began in Ancient Greece between 600 and 300 BC. Even so, mathematics continues to develop over time. Meanwhile, mathematics learning is often monotonous and boring. Whereas we can use technology to learn mathematics pleasantly. One of which is using the "Sage Math" application and the "Aryafilan" website as learning media. Sage Math is one of the open source mathematical software which we can access it freely. So does the "Aryafilan" website which we will use as learning media. But not many people know and use this application and website as a learning media.

At this community development, the Mathematics Study Program UIN Maulana Malik Ibrahim Malang will hold training on the use of the "Sage Math" application and "Aryafilan" website as a learning tool for mathematics. This training will be aimed at students of the School of Applied Sciences and Mathematics, Universiti Teknologi Brunei. We hope the students there will find it easier to learn mathematics.

### 1.2. Reasons for Choosing Accompanied Subjects

The assisted subjects targeted in this training are students of the School of Applied Sciences and Mathematics, Universiti Teknologi Brunei. The selection of the target of this activity is based on the following problems:

1. The rapid development of technology.
2. Mathematics learning media are often monotonous and boring.
3. Sage Math and the "Aryafilan" website are two learning media that are accessed freely, yet not many people know and use it.

### 1.3. Current Condition of Assisted Subjects

Universiti Teknologi Brunei (UTB) is an Engineering and Technology University in Brunei Darussalam that specialises in the niche areas of Engineering, Business, Computing, Applied Sciences & Mathematics, and Design. UTB was first established in 1986 as Institut Teknologi Brunei (ITB). In 2008, ITB was upgraded from a higher learning institution offering Higher National Diploma (HND) programmes in Engineering, Business and Computing to a university, and was then changed to Universiti Teknologi Brunei on 1 March 2016.

The Chancellor of Universiti Teknologi Brunei is their king, i.e. Kebawah Duli Yang Maha Mulia Paduka Seri Baginda Sultan Haji Hassanal Bolkiah Mu'izzaddin Waddaullah ibni Al-Marhum Sultan Haji Omar 'Ali Saifuddien Sa'adul Khairi Waddien, Sultan dan Yang Di-Pertuan Negara Brunei Darussalam. Meanwhile the vice-chancellor is Professor Dr Dayang Hajah Zohrah binti Haji Sulaiman.

There are five faculties in Universiti Teknologi Brunei, i.e. UTB School of Business, School of Computing and Informatics, School of Applied Sciences and Mathematics, School of Design, and Faculty of Engineering. Our aim of this Community Development Program is students at School of Applied Sciences and Mathematics.

#### **1.4. Expected Assistance Conditions (Outputs, Outcomes, Benefits, Impact)**

As for the conditions that are expected with the holding of this CDP activity, the students at the School of Applied Sciences and Mathematics can learn mathematics easily, interestingly, and usefully.

## **CHAPTER II**

### **COMMUNITY DEVELOPMENT PROGRAM IMPLEMENTATION**

#### **2.1. Activity Design**

The form of this service activity is to provide a training about mathematics learning media for students, especially for students of the School of Applied Sciences and Mathematics, Universiti Teknologi Brunei. This training will be conducted online using the zoom video call application.

#### **2.2. Target**

The target of this training is students, especially students of the School of Applied Sciences and Mathematics, Universiti Teknologi Brunei.

#### **2.3. Expected Results (Outcomes)**

With the implementation of technology-based mathematics learning training and the integration of Islamic values, we hope the students at the School of Applied Sciences and Mathematics can learn mathematics easily, interestingly, and usefully.

#### **2.4. Activity Process Description**

There are 3 stages of this training, i.e. initial discussion with the university leader, training preparation, and training implementation. Here is the illustration of each stage.

##### **a. Initial Discussion**

This service activity is carried out in several stages, starting with a survey and designing training activities which are also discussed with the university leader. The university leader we meant here is Associate Professor Dr. Muhamimin Ismoen, the Programme Leader, Applied Mathematics and Economics, Universiti Teknologi Brunei.

We plan to carry out the training on Saturday, September, 3rd, 2022. From this discussion agreed on the following points:

- Because it is impossible for us to go to Brunei, the training will be conducted online via the zoom meeting application.
- We will give the training from Mathematics Study Program, Science and Technology Faculty, UIN Maulana Malik Ibrahim Malang. Meanwhile, the UTB's students will join online from anywhere, most likely from Brunei Darussalam.
- The target of this training is Universiti Teknologi Brunei's students, especially from Applied Mathematics and Economics Department.
- The training topics are “Aryafilan” website and “Sage Math” application.

### b. Training Preparation

Even though the training is conducted online, we should prepare several things, like the computer, LCD projector, Wi-Fi, zoom account, and of course the consumption since the committee and the presenter have gathered in Mathematics Study Program.

### c. Training Implementation

The training is scheduled for Saturday, September, 3<sup>rd</sup>, 2022 from 9 AM WIB (Indonesian Time) or 10 AM BNT (Brunei Darussalam Time) to 10.40 AM WIB (Indonesian Time) or 11.40 AM BNT (Brunei Darussalam Time). The rundown of the workshop is written below.

Activity	Brunei Darussalam Time	Person In Charge
Opening	10.00 – 10.05	Master of Ceremony
Welcome Speech 1	10.05 – 10.15	Head of Math. Study Program
Welcome Speech 2	10.15 – 10.25	Dean of School of Applied Sciences and Mathematics
Presentation	10.25 – 11.10	Mr. M. Nafi Jauhari, M.Si.
Question and Answer	11.10 – 11.35	Speakers
Closing	11.35 – 11.40	Master of Ceremony

There is only one material that will be presented, i.e. “Learning Mathematics using Sage Math and ‘Aryafilan’ Website”, which is presented by Mr. M. Nafi Jauhari, M.Si.

### 2.5. Success Achieved According to Expected Results

“Learning Mathematics using Sage Math and ‘Aryafilan’ Website” training is an enrichment given to Universiti Teknologi Brunei’s students, especially Applied Mathematics and Economics students. Through this training, we hope students can learn mathematics easier since both Sage Math and the “Aryafilan” website provide many free online mathematics learning media.

### 2.6. Program Sustainability

As an evaluation of “Learning Mathematics using Sage Math and ‘Aryafilan’ Website” training, we asked for feedback from training participants via a google form. These are the question list.

1. What is your name?
2. What institution do you come from?
3. What semester are you?
4. How was the training? Is it useful?
5. After attending the training, can you create your own online-based learning media?
6. If Mathematics Study Program, UIN Maulana Malik Ibrahim Malang, will hold another training, what training topics do you expect?

Universitas Islam Negeri Maulana Malik Ibrahim Malang

## Training Feedback

dian.maharani@mat.uin-malang.ac.id [Ganti akun](#)

\* Wajib

Email \*  
Email Anda

Name \*  
Jawaban Anda

Institution \*  
Jawaban Anda

Semester

Semester  
Jawaban Anda

How was the training? \*

1 2 3 4 5

Very Useless      Very Usefull

Pertanyaan ini wajib diisi

After attending the training, can you create your own online-based learning media? \*

Of course  
 Maybe, I will try it  
 No, I still do not understand how it works

If Mathematics Study Program, UIN Maulana Malik Ibrahim Malang, will hold another training, what training topics do you expect?

Jawaban Anda

Kirim Kosongkan formulir

Training feedback google form

## 2.7. Recommendation

With the development of technology, online-based learning media will be more advanced and become sophisticated. Therefore, it is necessary to provide assistance to the Universiti Teknologi Brunei's students in making learning media. We may also give training about another application or programming language related to mathematics, such as phyton, R, or anything else.

## **2.8. Financial Statement**

**FINANCIAL STATEMENT**  
**COMMUNITY DEVELOPMENT PROGRAM**  
**MATHEMATICS LEARNING BASED ON TECHNOLOGY**

## ATTACHMENT

### I. Literature / Material Study

Media literacy consists of practices that enable people to access, critically evaluate, and create or manipulate media. Media literacy is not limited to one medium (Potter, 2010) and is understood as a set of competencies that are essential for work, life, and citizenship (Hobbs, 2010). Media literacy education is a process used to improve media literacy competence and is intended to increase awareness of the influence of media and create active attitudes towards media consumption and creation (Hobbs, 2011). Media literacy education is part of the curriculum in the United States and several European Union countries, and an interdisciplinary global community of media scholars and educators is engaged in knowledge sharing through scientific and professional journals and national membership associations (Šupšáková, 2016).

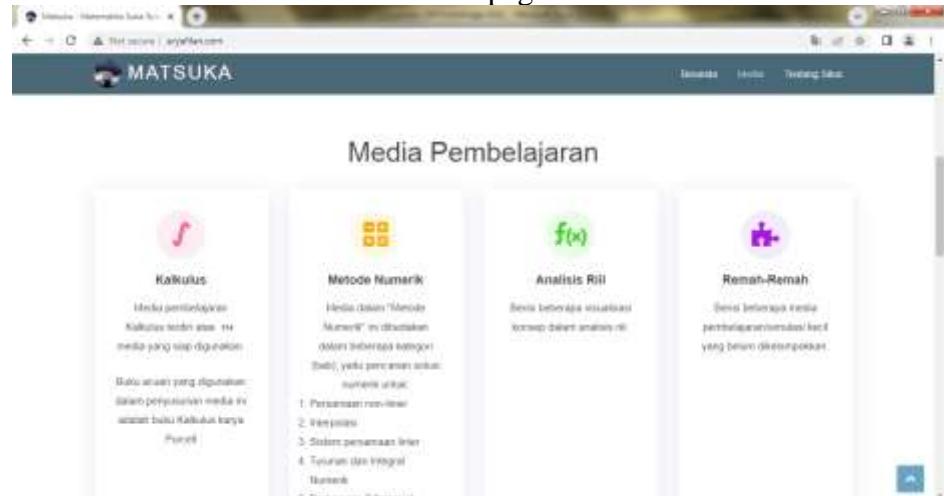
Education for media literacy often uses an inquiry-based pedagogic model that encourages people to ask questions about what they watch, hear, and read. Media literacy is moving beyond traditional non-printed texts and turning to more contemporary sources. Some examples of media literacy include, but are not limited to television, video games, photos, and audio messages. Media literacy education provides tools to help people develop receptive media skills to critically analyze messages, offers students opportunities to broaden their experiences of media, and helps them develop generative media skills to enhance creative skills in creating their own media messages (Bachmair & Bazalgette, 2007; Van Dijck & Poell, 2015). Critical analysis can include identifying authors, goals, and viewpoints, examining construction techniques and genres, examining media representation patterns, and detecting propaganda, censorship, and bias in news programming and public affairs (and why). Media literacy education can explore how structural features such as media ownership, or its funding model (Van Dijck & Poell, 2015) affect the information presented.

As defined by The Core Principles of Media Literacy Education, "the goal of media literacy education is to help individuals of all ages develop the habits of inquiry and expressive skills they need to become critical thinkers, effective communicators, and active citizens in today's world. this."(Parnis & Petocz, 2016). Education about media literacy can be started in early childhood by developing a Pedagogy around more critical thinking and deeper analysis and questions about concepts and texts (Share, 2009). As students age and enter adulthood, the use of learning media literacy will have an impact on identifying ethical and technical standards in teaching and learning media and understanding how the media binds to their cognitive, social, and emotional needs (Friesem, 2019).

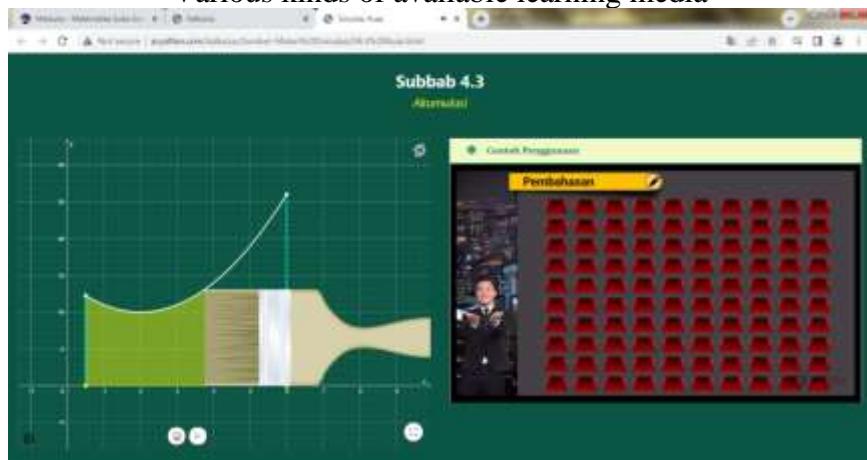
In general, there is a website that is used as a model in online-based learning media materials, namely <http://www.aryafilan.com/>. This website contains a variety of learning media for mathematics, including calculus, numerical methods, real analysis, and other materials. The average learning media contained on the website is in the form of simulations of materials that are quite abstract in the real of mathematics, such as limit and integral material. Here is a view of the website.



Homepage



Various kinds of available learning media

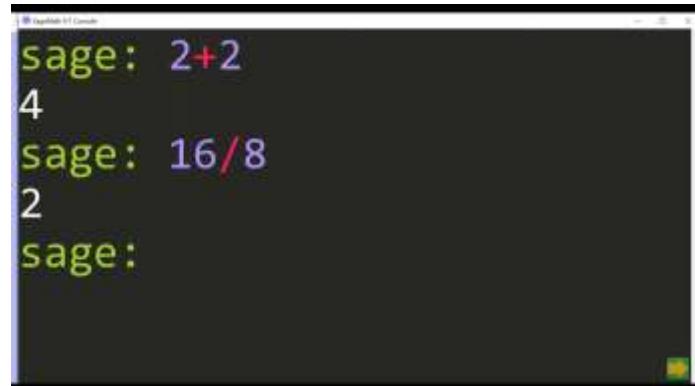


An example of one of the simulations (integrals topic)

Meanwhile, Sage Math (previously Sage or SAGE, "System for Algebra and Geometry Experimentation") is a computer algebra system (CAS) with features covering many aspects

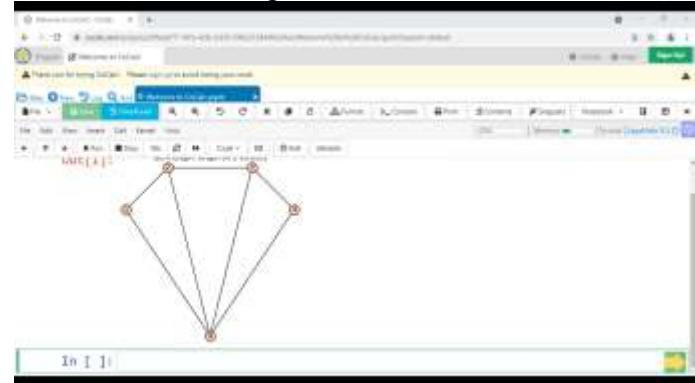
of mathematics, including algebra, combinatorics, graph theory, numerical analysis, number theory, calculus, and statistics.

The first version of Sage Math was released on 24 February 2005 as free and open-source software under the terms of the GNU General Public License version 2, with the initial goals of creating an "open source alternative to Magma, Maple, Mathematica, and MATLAB". The originator and leader of the Sage Math project, William Stein, was a mathematician at the University of Washington. Sage Math uses a syntax resembling Python's, supporting procedural, functional, and object-oriented constructs.

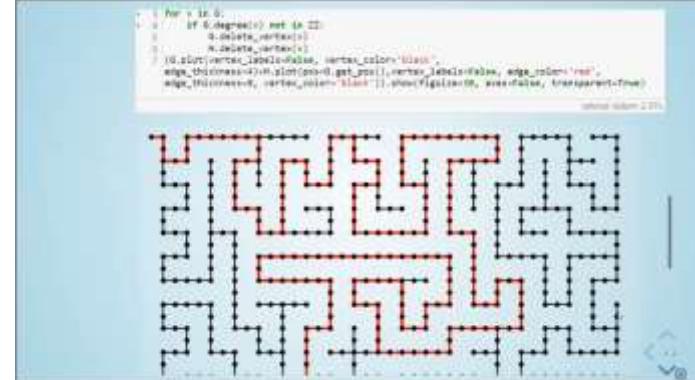


```
sage: 2+2
4
sage: 16/8
2
sage:
```

Sage Math console



Drawing graph using Sage Math



Finding the best maze route using Sage Math

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### III. Field Note



KEMENTERIAN AGAMA REPUBLIK INDONESIA  
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#### FIELD NOTE

Activity : COMMUNITY DEVELOPMENT PROGRAM (CDP) 2022

Title : MATHEMATICS LEARNING BASED ON TECHNOLOGY

Study Program : Mathematics

NO	DATE	ACTIVITY
1	Monday, August 29 <sup>th</sup> , 2022	Initial Discussion
2	Saturday, September 3 <sup>rd</sup> , 2022	Training / CDP Activity

Malang, September 6<sup>th</sup>, 2022  
Head of Mathematics Study Program

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#### IV. Activity Schedule



KEMENTERIAN AGAMA REPUBLIK INDONESIA  
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#### ACTIVITY SCHEDULE

Activity : COMMUNITY DEVELOPMENT PROGRAM (CDP) 2022  
Title : MATHEMATICS LEARNING BASED ON TECHNOLOGY  
Study Program : Mathematics

NO	DATE	TIME	ACTIVITY	PRESENTER
1	Monday, August 29 <sup>th</sup> , 2022	11.00 - done	Initial Discussion	Applied Mathematics and Economics Programme Leader
2	Saturday, September 3 <sup>rd</sup> , 2022	09.00 – 09.05	Opening	Master of Ceremony
		09.05 – 09.15	Welcome Speech 1	Head of Math. Study Program
		09.15 – 09.25	Welcome Speech 2	Dean of School of Applied Sciences and Mathematics
		09.25 – 10.10	Presentation	Mr. M. Nafi Jauhari, M.Si.
		10.10 – 10.35	Question and Answer	Speakers
		10.35 – 10.40	Closing	Master of Ceremony

Malang, September 6<sup>th</sup>, 2022  
Head of Mathematics Study Program

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## V. List of Attendees

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9/7/2022 11:20:08	Sabdah Nur Ulfa	ulfasabda13@gmail.com	UIN Malang	082143423904
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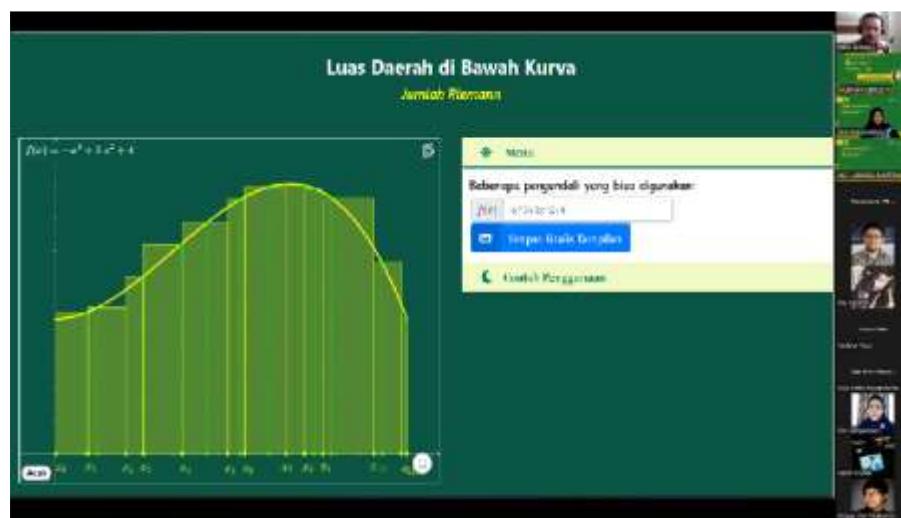
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9/3/2022 11:27:09	Della safitri	<a href="mailto:dellasafitri.19610030@gmail.com">dellasafitri.19610030@gmail.com</a>	Universitas Islam Negeri Maulana M	082358693419
9/3/2022 11:27:30	Dra. Endang Wahyu Handamari, M. Si	<a href="mailto:ewahyu-math@ub.ac.id">ewahyu-math@ub.ac.id</a>	Universitas Brawijaya	082140743549
9/3/2022 11:27:32	Egra Dwi Buana	<a href="mailto:egradwibiana200030@gmail.com">egradwibiana200030@gmail.com</a>	UIN MALANG	081331742345
9/3/2022 11:27:43	Sindi Ayuna Hustani	<a href="mailto:sindi11052001@gmail.com">sindi11052001@gmail.com</a>	UIN Malang	081239615165
9/3/2022 11:28:00	Lyla Lutvia Octaviona	<a href="mailto:Lyla.Lutvia.Octaviona">Lyla.Lutvia.Octaviona</a>	Universitas Islam Negeri Maulana M	082139582183
9/3/2022 11:28:26	Lengga Priyani	<a href="mailto:lenggapriyani63068@gmail.com">lenggapriyani63068@gmail.com</a>	UIN MALIKI MALANG	085330369472
9/3/2022 11:28:51	salwa, S.Pd.,M.Sc	<a href="mailto:salwa@unram.ac.id">salwa@unram.ac.id</a>	Universitas Mataram	087763302854
9/3/2022 11:28:53	AHMAD NAUFAL HANIF	<a href="mailto:naufalhanifan03@gmail.com">naufalhanifan03@gmail.com</a>	UIN MAULANA MALIK IBRAHIM MA	085606450326
9/3/2022 11:29:30	Dr. H. Muslimin Tendri, M.Pd	<a href="mailto:muslimintr@gmail.com">muslimintr@gmail.com</a>	Universitas Muhammadiyah Palemb	08117101960
9/3/2022 11:29:45	Indah Resti Ayuni Suri, M.Si	<a href="mailto:indahrestiayunisuri@gmail.com">indahrestiayunisuri@gmail.com</a>	Uin Raden intan Lampung	082282838476
9/3/2022 11:29:47	Vicky Alfina Nur Syafika	<a href="mailto:vickyalfina03@gmail.com">vickyalfina03@gmail.com</a>	UIN Malang	082334042594
9/3/2022 11:30:29	Ghoutsah Kholidah	<a href="mailto:ghoutsahkholidah054@gmail.com">ghoutsahkholidah054@gmail.com</a>	UIN Maulana Malik Ibrahim Malang	088803497672
9/3/2022 11:30:31	Muhammad Amin Cherid	<a href="mailto:muhammadamin1106@gmail.com">muhammadamin1106@gmail.com</a>	UIN Maulana Malik Ibrahim Malang	081913743291
9/3/2022 11:30:46	Dr. Marsudi, M.S.	<a href="mailto:marsudi61@ub.ac.id">marsudi61@ub.ac.id</a>	Universitas Brawijaya	08125267134
9/3/2022 11:31:09	Mochamad Ikhiyak Ulumudin Fahlevy	<a href="mailto:ihyaulumuddin4602@gmail.com">ihyaulumuddin4602@gmail.com</a>	Universitas Islam Negeri Maulana M	082141914142
9/3/2022 11:31:10	Anisa suryanti	<a href="mailto:suryantianisa64@gmail.com">suryantianisa64@gmail.com</a>	UINMA	085788124885
9/3/2022 11:31:36	Yusuf Ariefuddin Nugroho	<a href="mailto:yusufarieffudin2929@gmail.com">yusufarieffudin2929@gmail.com</a>	UIN Malang	085732635421
9/3/2022 11:31:59	Dr. Hamda, M.Pd.	<a href="mailto:hamdamath@unm.ac.id">hamdamath@unm.ac.id</a>	Universitas Negeri Makassar	081342732826
9/3/2022 11:32:31	Anindya Luthfiani Susetyo	<a href="mailto:niindya.ls@gmail.com">niindya.ls@gmail.com</a>	UIN MALANG	082132273282
9/3/2022 11:33:47	Qhonita Guruh Dwi Lestari	<a href="mailto:Qhonita.Guruh.Dwi.Lestari">Qhonita.Guruh.Dwi.Lestari</a>	UIN Maulana Malik Ibrahim Malang	081330572431
9/3/2022 11:33:56	Nindi Destiani	<a href="mailto:nindidestiani@gmail.com">nindidestiani@gmail.com</a>	UIN Maulana Malik Ibrahim	087879047484
9/3/2022 11:34:04	Lutfa Rahma Zakiya	<a href="mailto:lutfarahmaz4@gmail.com">lutfarahmaz4@gmail.com</a>	UIN Maulana Malik Ibrahim Malang	085852477043
9/3/2022 11:34:22	Abdulloh Jaelani, M.Si.	<a href="mailto:abdjae@fst.unair.ac.id">abdjae@fst.unair.ac.id</a>	Unair	085852136447
9/3/2022 11:36:25	Heri Sopian Hadi, S.Pd	<a href="mailto:herysopyan07@gmail.com">herysopyan07@gmail.com</a>	UIN Maulana Malik Ibrahim Malang	087751066326
9/3/2022 11:36:49	FIRDAUS MASITHA	<a href="mailto:firdaus.masitha@gmail.com">firdaus.masitha@gmail.com</a>	UIN MALANG	+6285536572019
9/3/2022 11:38:00	Hilda Zaqa Elnaz Putri	<a href="mailto:hildazaqaelnaz@gmail.com">hildazaqaelnaz@gmail.com</a>	Uin Malang	085929858278
9/3/2022 11:40:32	GANI GUNAWAN	<a href="mailto:ggnani9905@gmail.com">ggnani9905@gmail.com</a>	UNISBA	081320044903
9/3/2022 11:41:13	Erna Herawati, M.Pd.	<a href="mailto:faridatul_mahya@uin-malang.ac.id">faridatul_mahya@uin-malang.ac.id</a>	UIN Maulana Malik Ibrahim Malang	0895401468428
9/3/2022 11:44:54	Firman Riansyah, M.Sc.	<a href="mailto:Firman.Riansyah">Firman.Riansyah</a>	Institut Agama Islam Negeri (IAIN) K	085241855325
9/3/2022 11:51:18	Ahda Hanifah	<a href="mailto:Ahda.Hanifah">Ahda.Hanifah</a>	UIN Maulana Malik Ibrahim Malang	0895369541370

9/3/2022 11:52:57	MAULANA AGIL	<a href="mailto:maulanaaqill91@gmail.com">maulanaaqill91@gmail.com</a>	uin maliki ibrahim malang	085604430845
9/3/2022 11:56:31	Dera Cahyani	<a href="mailto:deracahyani08@gmail.com">deracahyani08@gmail.com</a>	UIN Malang	083835970994
9/3/2022 13:29:33	Wike Nur Anisa	<a href="mailto:Wike Nur Anisa">Wike Nur Anisa</a>	UIN Malang	085893718408
9/3/2022 11:07:24	Ari Kusumastuti	<a href="mailto:arikusumastuti@gmail.com">arikusumastuti@gmail.com</a>	UIN Malang	085259215252
9/3/2022 11:20:25	Siti Farikhatum Mufida	<a href="mailto:farikhatummufida2001@gmail.com">farikhatummufida2001@gmail.com</a>	UIN Malang	085604881532
9/3/2022 11:21:34	Maghfiroh Romadhoni	<a href="mailto:maghfirohr88@gmail.com">maghfirohr88@gmail.com</a>	UIN Malang	085935372449
9/3/2022 11:25:52	Habiba Amalia Az Zahra	<a href="mailto:Lia Habiba Amalia Az Zahra">Lia Habiba Amalia Az Zahra</a>	UIN Malang	08813155732

## VI. Activity Documentation

```
 8     image = Image.open('10.png')
 9     image = np.array(image)
10
11     w=[188,324,...,1888]
12     y=[881,1883,...,1773]
13
14     tombol=(i//(1//5,183) for i in range(183))
15     v=[i//5 for i in range(183) for i in range(183)]
16
17     # selection
18     Amatrix=GP(2).graphy.Grid2D()
19     for i in range(25):
20         A[i,i]=1
21
22     # matrix.zero(25,1)
23     for i in v+~v:
24         aA[i]
25
26     #A.A_right_kernel()
27     solusi=(vector(QQ,vector(zR)+k)
28     solusi.mutate(solusi, keysum)
29     solusi=np.array(solusi)[0]
30     print(solusi)
31     print("image.open('10.png').")
32     shuffle(solusi)
33     for i in solusi:
34         # device.InputSwipe(x=tombol[y[tombol[i]]], y=tombol[i], 20)
35         device.InputTap(x=tombol[i], time.sleep(2)
36         clear_output(wait=True)
37     # device.InputSwipe(10000, 2822,
```

Sage Math training by Mr. M. Nafie Jauhari, M.Si.



Training “Aryafilan” Website

**VII. Activity Letter of Statement (SK Kegiatan)**