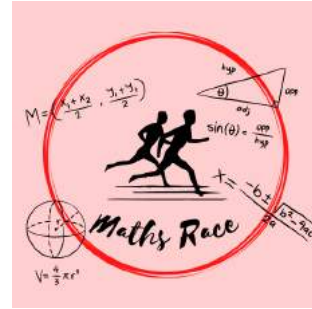




UNIVERSITI
MALAYA



PROJECT REPORT

SIM2007 APPRECIATION OF MATHEMATICS MATHS RACE SESSION 2022/2023

Prepared by:

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MATHS RACE PROJECT REPORT

SESSION 2022/2023

UNIVERSITY OF MALAYA

Summary

This project is part of the SIM2007 Appreciation of Mathematics course requirement. The project was called Maths Race. It took place on 7th of January 2023, starting at 8.30 p.m. and ending at 11.40 p.m. This project is conducted online via Microsoft Teams. The project included nine students from the Institute of Mathematical Sciences in their second year during the session 2022–2023, as well as fifteen students from the University of Malaya Foundation Centre. This project is a platform to raise awareness about the value of mathematics in everyday life. It also teaches us by putting what we've learned in SIM2007 Appreciation of Mathematics into practice with the project. The Maths Race is an exploration race consisting of four checkpoints. Each checkpoint provides a different set of activities. Sudoku, the bridge riddle, the penniless pilgrim riddle, and other activities are chosen. Furthermore, our tentative, photos, and budget sections demonstrate our group's planning for the Maths Race project, starting with the activities chosen and ending with participants receiving prizes.

Objectives

1. To apply concepts and theories learnt in real life activities.
2. To increase students' awareness of the importance of basic Mathematics.
3. To give intellectual enjoyment, satisfaction and an opportunity for creative expression while learning mathematics.

Target community

Our target audience consists of students who have a basic knowledge of mathematical concepts. We opted to select students of the Islamic Studies Program from the University of Malaya Foundation Center. This project has fifteen students, and all of them are 19 years old. We divided them into three groups, where each consisted of five students. The main reason we chose this particular group is that the games designed are appropriate for their cognitive level. Our project was held on 7th of January 2023 from 9:00 p.m. to 12:00 a.m. via an online meeting using Microsoft Teams as a medium.

1.0 Introduction

Maths Race is a program under Service Learning Malaysia-University for Society (SULAM), which is compulsory for students from the Institute of Mathematical Sciences to join as the service provider who uses the knowledge and skills learned in academic courses to provide services to the known community. The credit value and hours of community service implementation are counted in the total number of hours students study for related courses at the Institute of Higher Education (IPT).

Our initial plan was to make it physically at Sekolah Menengah Kebangsaan Cochrane for Form 4 students, but there were many challenges we had to face, so we decided to conduct it online via Microsoft Teams. This program was implemented smoothly with the participation of the University of Malaya Foundation students. This project is one of the ways to strengthen the relationship between ISM students and students from other courses. Various aspects will be improved to guarantee the quality of this program and ensure that it is more interesting to attract the attention of students to the concepts and importance of basic mathematics.

2.0 History Background

2.1 The Passcode Riddle

The Passcode Riddle is one of the games created by TED-Ed Animations directed by Jun Zee Myers. A video about this game has been uploaded by TED-Ed Animations voiced by Ganesh Pai. The passcode riddle asks for three whole positive numbers with each one being equal to or larger than the next. This passcode riddle is a great way to introduce factors and multiples. It also shows the most effective way to understand organised factorization.

2.2 Sudoku

Sudoku is a logic-based, combinatorial number-placement puzzle. The emergence of the name Sudoku is from a Japanese man named Maki Kaji who has an interest in puzzles. His interest in puzzles when he came across the numbered puzzle "Number Place" in an American newspaper in 1984 became the starting point in the production of Sudoku. Sudoku became more popular after being spread to Britain and the United States.

2.3 Bridge Riddle

Bridge riddle is a logic puzzle consisting of 4 people, a bridge and a torch. This game aims to determine the fastest time for the four people in crossing the river through a bridge with some constraints. Some variations exist such as different named people, or variations in the time of the intersection or the time limit, the

torch expires in a short time and then serves as a time limit. For example, The Midnight Train Riddle which has the same variation as this bridge riddle known to have appeared as early as 1981, in the book Super Strategies For Puzzles and Games. In this version of the puzzle, A, B, C and D take 5, 10, 20, and 25 minutes, respectively, to cross, and the time limit is 60 minutes. In all these variations, the structure and solution of the puzzle remains the same.

2.4 The Penniless Pilgrim Riddle

The Penniless Pilgrim Riddle was created by Daniel Finkel which is based on arithmetic. While he and his team created this riddle, they discovered that they needed to answer several intermediate questions, and even if they reached a solution, they might have a variety of other questions to work on. Therefore, Mathematics is not only about asking questions and giving answers, it is also about engagement that leads to new questions.

3.0 Tentative

Refer to Appendix A

4.0 Types of Activity

Refer to Appendix B

5.0 Swot Analysis

Refer to Appendix C

6.0 Organization Chart

Refer to Appendix D

7.0 List of Participants

Refer to Appendix E

8.0 Photos

Refer to Appendix F

9.0 Budget

Refer to Appendix G

Conclusion

Puzzles and games are good tools that require using higher order thinking skills in solving the problem by using their extreme abilities to reach the solution, and this is revealed in the current study through improving students' level of mathematical thinking. Also, students with high and moderate self-efficacy, who used puzzles and games in the learning process appeared to have a significant improvement in their mathematical thinking. To conclude, this project, which involves many types of puzzles and games, has given a lot of benefits to the participants, such as improving their mathematical thinking. Not to mention, mathematical knowledge has always been applied in all activities. Besides, a lot of joy and happiness have been given to everyone who has participated in this project. We are glad to have the opportunity to conduct this type of activity, which really improves our creativity, communication, and leadership skills.


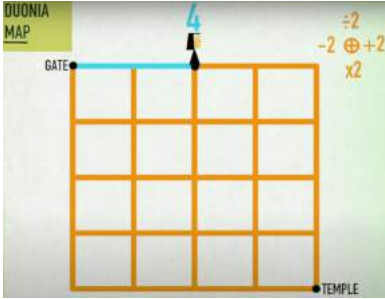
APPENDIX A

TENTATIVE

Time	Programs
8.30 p.m	Preparation of the program
9.00 p.m	Arrival of participants
9.15 p.m	Opening speech & photography session
9.30 p.m	Games and puzzles session
11.00 p.m	Closing ceremony
11.20 p.m	Award ceremony & photography session

TYPES OF ACTIVITY

Checkpoint	Activity	Explanation																																																																																	
1	The Passcode Riddle	<ul style="list-style-type: none"> ● Each group will be given 10 minutes to guess a passcode that consists of a combination of 3 numbers. ● Sara sees a hallway with multiple doors numbered from 1 - 1000. ● After she enters one of the doors, she needs to unlock a locked box containing a passcode of 3 numbers, x,y,z. ● Rules: $x \leq y, y \leq z$ ● She asks for a clue from the machine inside the room and gains the first clue <ol style="list-style-type: none"> 1. The product of the three numbers is 36. ● After she hears the first clue, she asks for the second clue, and the machine gives the clue. <ol style="list-style-type: none"> 2. The sum of the numbers is the same as the number on the door she entered. ● Even after she hears the second clue, she asks for a third one. <ol style="list-style-type: none"> 3. The largest number appears only once among the three numbers. ● Finally, she was able to unlock the box after getting 3 clues. ● Answer: $x = 2, y = 2, z = 9$ (229) 																																																																																	
2	Sudoku (Intermediate Level) <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <tbody> <tr><td></td><td></td><td>2</td><td></td><td></td><td>8</td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td>8</td><td>6</td><td>2</td><td></td><td>7</td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>7</td><td>4</td><td>9</td><td>2</td><td></td></tr> <tr><td>5</td><td></td><td></td><td></td><td>3</td><td></td><td></td><td></td><td>1</td></tr> <tr><td></td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td>7</td></tr> <tr><td></td><td>3</td><td></td><td></td><td>1</td><td></td><td></td><td></td><td>6</td></tr> <tr><td></td><td>5</td><td>1</td><td>4</td><td>6</td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td>3</td><td></td><td>8</td><td>2</td><td>1</td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td>5</td><td></td><td></td><td>2</td><td></td><td></td></tr> </tbody> </table>			2			8						8	6	2		7							7	4	9	2		5				3				1		2							7		3			1				6		5	1	4	6							3		8	2	1						5			2			<ul style="list-style-type: none"> ● Each group will be given only 10 minutes to finish this game. ● The Sudoku grid consists of 9x9 spaces. ● You can use only numbers from 1 to 9. ● Each 3x3 block can only contain numbers from 1 to 9. ● Each vertical and horizontal column can only contain numbers from 1 to 9. ● Each number in the 3x3 block, vertical column or horizontal row can be used only once. ● The game is over when the whole Sudoku grid is correctly filled with numbers.
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<p>3</p>	<p>Bridge Riddle</p> 	<ul style="list-style-type: none"> • The riddle consists of four people. • It is night, so walking through the bridge requires torchlight. The bridge can hold 2 people maximum at a time, with the walking speed of the slower person. • Rules: <ol style="list-style-type: none"> 1. Adam needs 1 minute to cross the bridge 2. Bob needs 2 minutes to cross the bridge 3. Clair needs 7 minutes to cross the bridge 4. Dave needs 10 minutes to cross the bridge • We need to find the fastest way to cross the bridge • Answer: $A+B>$, $A<$, $C+D>$, $B<$, $A+B> = 2+1+10+2+2 = 17$ minutes
<p>4</p>	<p>The Penniless Pilgrim Riddle</p> 	<ul style="list-style-type: none"> • This game contains 4x4 box which we need to walk through the line • Each group will start at the point where the person in the picture is located with 4 coins • Rules: <ol style="list-style-type: none"> 1. Going east adds 2, going south multiplies by 2, going west subtract 2, going north divides by 2. 2. The person cannot walk through the same line twice, but can hop through a line that he has walked. (at a junction) • Make sure when reaching the endpoint (the temple), the coins become zero. • Answer: SSS EE NNN W S WWW SSS EEEE

SWOT ANALYSIS

Strengths	<ol style="list-style-type: none"> 1. Smooth flow of the event 2. All members were cooperative 3. Enthusiastic participants 4. Good communication skills from teammates 5. Have experienced members 6. Ability to well handle all the groups and divide them into respective checkpoint
Weakness	<ol style="list-style-type: none"> 1. Last minute changing plan. 2. Unachievable desired number of participants 3. Limited in terms of transportation 4. Some participants can't join the channel at first 5. Slow response from the school
Opportunities	<ol style="list-style-type: none"> 1. Less budget since the event was conducted online 2. Explain the fun way of using mathematics 3. Less contact with each other since we are still in the pandemic Covid-19 4. Still can have good communication with participants throughout the event. 5. Increase sponsor involvement
Threats	<ol style="list-style-type: none"> 1. Many students are not available to join. 2. Bad internet connection 3. Unable to solve hard puzzles 4. Limited time in handle the project

APPENDIX D

ORGANISATION CHARTS

NAME	POSITION
Nur Izzah Irdina Binti Muhammad Yusry	Director
Wafa Binti Azeman	Secretary
Aireen Syuhada Binti Abdul Qawi	Treasurer
Hazril Bin Hazmal	Exco in Activity and Protocol
Mohammad Aidil Bin Mohammad Tang	Exco in Logistics
Nurul Syuhada Binti Sanipansuri	
Muhammad Akif Afifi Bin D Mohd Hapizi	Exco in Multimedia
Nur Athirah Kaiyisah Binti Yakup	Exco in Souvenirs
Nik Nur Aafiqah Binti Nik Ghazali	

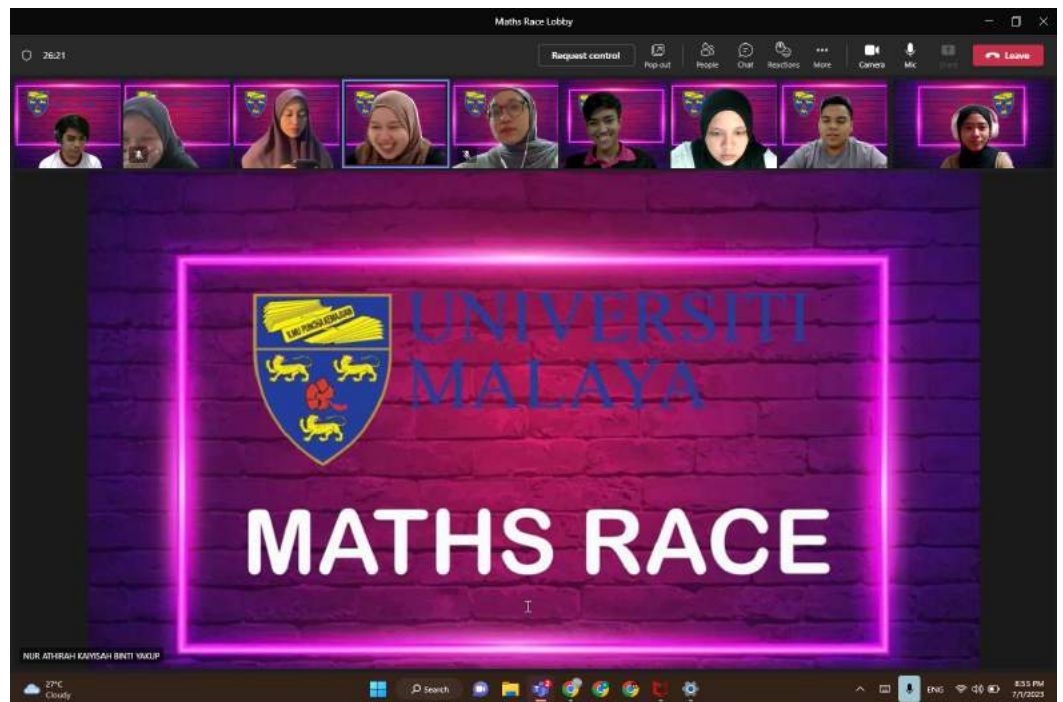
APPENDIX E

LIST OF PARTICIPANTS

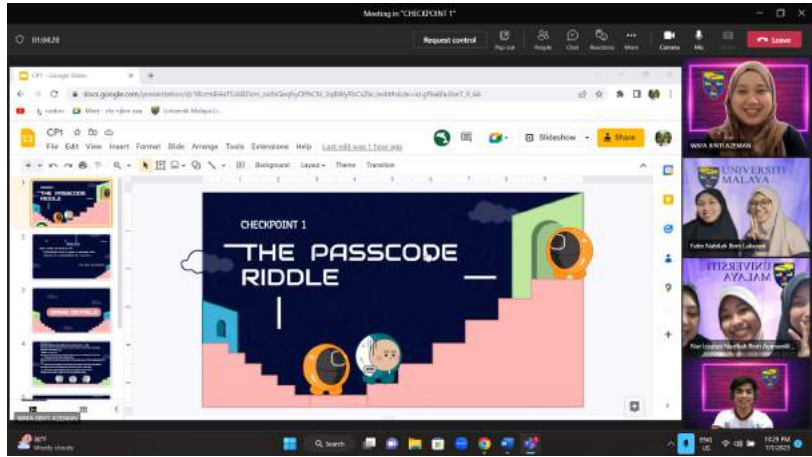
NO	NAME
1	SITI ALLYSSHA BINTI MHD AZIZ
2	KHOIRUNNISAA BINTI MUHAMMAD DAUD
3	REZKI RISMAYANA BINTI GALAM
4	NURUL SYUHaida BINTI BIDIN
5	KURNIYA BINTI MANSUR
6	NUR AMIERAH BINTI MASRI
7	IZZAH SYAHIRAH BINTI IDRIS
8	NURUL HAIFA' HANA BINTI SABELI
9	NURUL AMYRA SHAHIRA BINTI ABDULLAH
10	FATIN NABILAH BINTI LAKARANI
11	ANIS NABILA BINTI ANSIR
12	NUR IZZATUN NAZIHAH BINTI AGIMAN @ AZMAN
13	NURUL FARAHAIN BINTI MOHD ANIS
14	NUR SHAFIKAH NABILA BINTI HAMZAH
15	FATIN NABILAH BINTI LAKARANI

PHOTOS

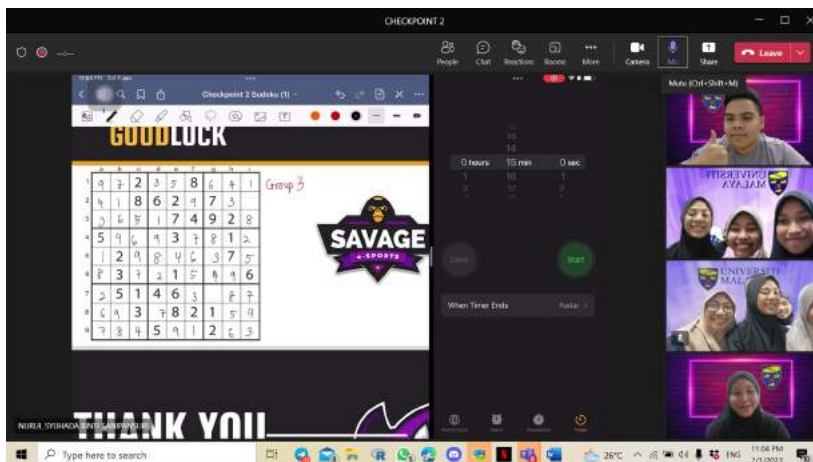
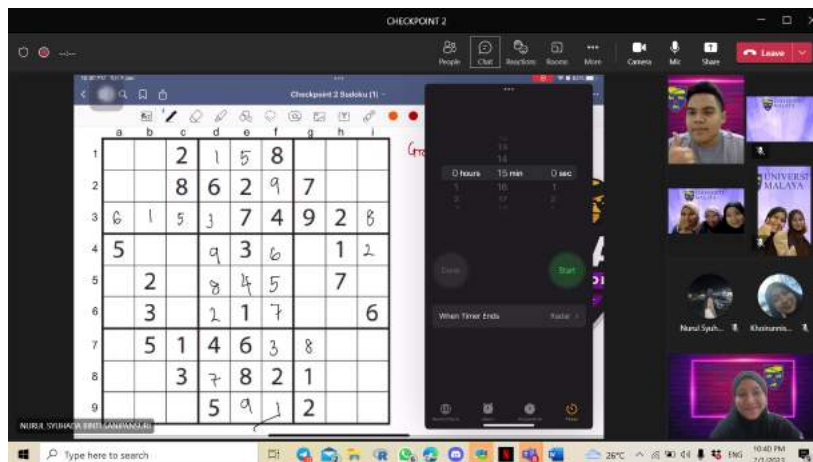
Opening & Ice Breaking Session



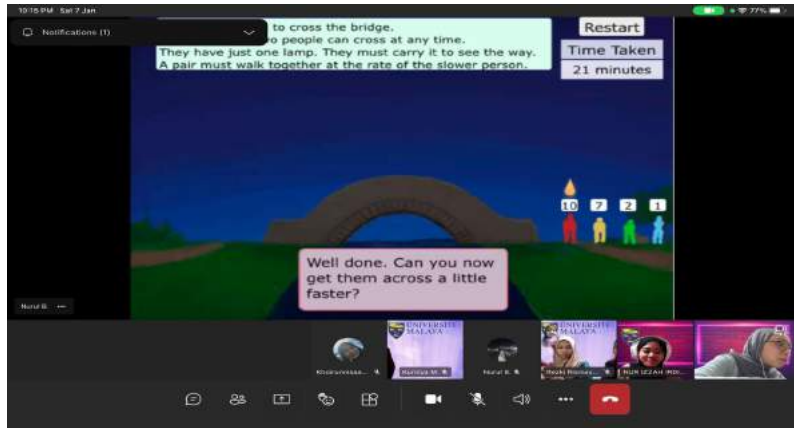
Checkpoint 1 (The Passcode Riddle)



Checkpoint 2 (Sudoku)



Checkpoint 3 (Bridge Riddle)



Closing & Winner



MATHS RACE <3

- 1st prize - RM60 + goodies
- 2nd prize - RM45 + goodies
- 3rd prize - RM30 + goodies

Thankyou for joining !!!

APPENDIX G

BUDGET

Income

CATEGORY	QUANTITY	PRICE (RM)	TOTAL (RM)
Committee Members	9	15	135
Goodies			
Nail Clipper	15	-	-
Snacks	15	-	-
Packets Drinks	15	-	-
OVERALL TOTAL (RM)			135

Expenses

CATEGORY	QUANTITY	PRICE (RM)	TOTAL (RM)
Money			
First Place	1	60	60
Second Place	1	45	45
Third Place	1	30	30
OVERALL TOTAL (RM)			135
BALANCE (RM)			-

PERSONAL REFLECTION

NUR IZZAH IRDINA BINTI MUHAMMAD YUSRY

Before the event, we had difficulty with secondary school and were unable to make it physically. We changed our plans and decided to do it online as we had limited time. I choose checkpoint 3, which is a bridge riddle, and create a slide for that checkpoint. When I searched the internet, I found websites that could play the riddle. Then, I used the websites to create a QR code so that the participants could easily understand the riddle.

During the event, as I introduced myself and explained how the game works, I felt excited and worried. Then, it is quite surprising that they can get the answer, as I thought it would be difficult for them. Out of three groups, only one gets the correct answer, and another two groups get 21 minutes.

After the events, we all shared the slide that contained the solutions with the participants. It is quite exhausting as it ends late at night, but it is worth all the fun with energetic participants and teammates.

Wafa Binti Azeman

As the secretary, I sent an email to a secondary school, SMK Cochrane but the students were not available at the time proposed.. I proposed another date but we got a late reply from the school. Due to the shortage of time and packed schedule, we had to change our plan. Everyone started preparing for the materials. There was a test run a day before the event to make sure that the event runs smoothly.

The communication between participants and committee members was a bit disturbed by the internet connection, but the event went smoothly.. I felt happy as the participants were very cooperative and enthusiastic.

It was quite tiring but I'm satisfied with our project.

NIK NUR AAFIQAH BINTI NIK GHAZALI

Every successful project has a plan and goals that they work hard for to reach their objectives. Throughout the Maths Race project, I learned different aspects of project management and skills that can be used in everyday life as long as they involve interacting with other participants. Our initial plan was to conduct the project at SMK Cochrane, but we had to change our plan because of many factors, so we decided to conduct the project online. So, I think this is my huge experience in handling the project online since we also had many challenges like having bad internet connection from the participants, but so far the project was successful with the help of all the members.

HAZRIL BIN HAZMAL

Before the start of the event, I had a hard time thinking and finding suitable mathematics games for the participants. I went through multiple mathematics puzzle games and tried to answer the puzzle myself so that I can assure the puzzles are solvable.

During the event, I was quite afraid they would find it too hard or would not be able to solve the puzzles. I was surprised that all of them are able to solve most of the puzzles, even though their time to answer varies.

After the event, I was thrilled because all of them gave positive feedback. They even told us that they enjoyed the games and learned a lot using mathematics skills. I fully hope that the participants learned the beauty of mathematics and solving problems.

NURUL SYUHADA BINTI SANIPANSURI

As someone who enjoys participating in community projects, I was quite excited to become an organiser of this mathematics project, even though the planning process felt a little sloppy due to certain issues with the school. We adjusted our plan to execute the project physically to online when we felt like the time ran short. Throughout the project, I was able to improve my social communication skills. Furthermore, I was able to create new relationships while assuring the project's success. I appreciate how responsible they are and how seriously they take their jobs. Despite the fact that the project was exhausting because our event ended at midnight, I was nevertheless delighted because I had contributed my time and energy to something worthwhile.

MOHAMAD AIDIL BIN MOHAMMAD TANG

Before this event started, I was worried if the participants who participated in our event were a little bit because of the problems we had faced. But thank God my worries disappeared because the participants who participated in our event exceeded my expectations. During this event, I was very satisfied because the participants who participated in our event were very sporting and did not shy away from us. I felt happy because I could see all the participants showing efforts to solve the riddle even though it's hard. After this event, I feel happy because all the participants gave positive comments and hope to hold this event again. This shows that we have achieved our target to develop and show the usefulness of mathematics in life.

NUR ATHIRAH KAIYISAH BINTI YAKUP

Handling this project makes me gain a lot of new experiences in many aspects. One of the big problems for us is the place we want to conduct this project. As we had planned to do it at SMK Cochrane, so at first I planned to survey the school canteen to book the food on the event day, but everything changed after we couldn't make it with SMK Cochrane and needed to change our plan. Luckily, we managed to obtain a good idea which is conducting the explorace virtually. After that, my job was to handle the souvenir, I managed to get it sponsored and free of charge. In my opinion, all of these situations have made me learn how to handle problems properly and, at the same time, practise my critical thinking to make sure all of my tasks are well done. Not to forget, I have been a moderator for the explorace and I need to make sure everything is good, especially the movement of each group to each checkpoint. I felt great as all of the participants gave me a good time following my instructions and making this project successful.

AIREEN SYUHADA BINTI ABDUL QAWI

Before the event, it was quite hard for me to communicate with my group members about the project because I went to Umrah. So, we need to discuss it online with a different timezone. Then, we decided to do it online after we had some issues with the school for doing it physically. I think that was a good choice because I never handle a program virtually. Hence, I was able to learn something new as an organiser of the event. During the event, I was assigned to guard checkpoint 4 which is 'The Penniless Pilgrim Riddle'. It was a fun experience because I never knew the existence of the game. For me, it was quite hard to play this game but after getting the answer we can see the beauty of Mathematics in it. Sadly, no groups were able to answer the question but I knew they did their best and it was fun to communicate with them because they were so hyper and active. After the event, I needed to do a budget report because my position in this event was a treasurer and it was quite hard for me at first because I have no experience as a treasurer but with some help from my friends, the report can be completed. Last but not least, this is one of the best events that I have handled and I think me and my groupmates did great in this event.

MUHAMMAD AKIF AFIFI BIN D MOHD HAPIZI

Before the event started, me and my friends were having problems with the school that we had chosen. The school didn't reply to our email and asked for project approval from the education department. At one point, we had decided to make our project online. I was also having a dilemma to give the difficult level of sudoku or the easy one but then, we decided to give the difficult level of sudoku to our players.

During the event, I was a little bit nervous and shy to handle checkpoint number 2 but after one trial, I managed to overcome it. It was so exciting and fun handling Sudoku's Checkpoint. The players were supportive and friendly to me and my friends. Most of them were able to finish the Sudoku.

At the end of this event, things that I could say is I am so happy that finally, our project is done successfully. There were no problems during the event and all players were so happy to join our event. We received good feedback from the players and that made us all satisfied with what we have done.

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