

INDUSTRIAL TRAINING REPORT:  
NATIONAL HYDRAULIC RESEARCH INSTITUT OF  
MALAYSIA

SPECIAL PROJECT: SYSTEM DEVELOPMENT (SISTEM E-  
FASILITI NAHRIM)

BY  
NOR' AIN NATASSHA BINTI ABDULLAH SANI

FACULTY SUPERVISOR  
MOHD NAIM BIN NASFI

REPORT SUBMITTED IN FULFILLMENT OF THE  
REQUIREMENT FOR THE INDUSTRIAL TRAINING  
FACULTY OF INFORMATION MANAGEMENT  
UNIVERSITI TEKNOLOGI MARA KELANTAN

01 AUGUST 2016 – 31 DECEMBER 2016

## DECLARATION

I hereby declare that this is my original work. I have not copied from any other student's work or from other sources. I am also declare that no part of this report has been published or submitted for publication except where due to reference or acknowledgement is made explicitly in text, nor has any part been written for me by another person. I confirm that I have read and understood the UiTM regulations with regards to plagiarism and will be penalized by the university if found guilty.

Signed by:

\_\_\_\_\_

NOR' AIN NATASSHA BT ABDULLAH SANI

2014455528

Date of submission: 9 January 2017

## ABSTRACT

National Hydraulic Research Institute of Malaysia I was established on 1990. The trainee did undergo industrial training from 1st August 2016 to 30<sup>th</sup> December 2016 at National Hydraulic Research Institute of Malaysia. This organization move ahead to become an excellent centre in hydraulic engineering research and supporting service to meet the demand from both public and private sector in the water related development.. The trainee are placed in the Information Management Department (Bahagian Pengurusan Maklumat) under the supervision of Mr. Mohammad Fikry Bin Abdullah. For the main project, the trainee has made 'Sistem E-Fasiliti NAHRIM'. This project is a high impact project whereby, by having the automated system, it can save administrative time and can make facilities reservation through online.. The trainee need to do some other activities during industrial training in which each activity requires its own skills. The trainee also gained a lot of knowledge and skills that can be used in the future. The industrial training programs run smoothly but there are also some drawbacks that need to be resolved. Thus, the trainee give some suggestions to solve the problema and also give some personal opinion about the training industry.

Keywords: National Hydraulic Research Intitute of Malaysia, SEFN, BPM, Industrial Training.

## **ACKNOWLEDGEMENT**

My deepest appreciation goes to the management of National Hydraulic Research Institute of Malaysia for giving me the opportunity to undergo my internship training for 5 months in Information Management Department at the organization. Special thanks are dedicated for Mr. Mohammad Fikry Bin Abdullah as a supervisor during my industrial training at the company. He gives me guidance and supports, and also teaches me new knowledge.

Thank you to all the lecturers who manage industrial training, Mrs. Izzatil Husna Bt. Arshad, a lecturer who acts as my supervisor, Mr. Mohd Naim Bin Nasfi. The guidance provided for industrial training with distinction and class to produce professional reports that will be greatly appreciated. Other than that, lots of love and thanks to my beloved parents who always support me. They also gave me encouragement and support to complete this report. Thanks also to the friends who share their knowledge and opinions to get a good report. All guidance from all people has given me a new experience in the world of work and it will be useful for my future. Thank you again.

**TABLE OF CONTENTS**

**Table of Contents**

DECLARATION ..... i

ABSTRACT ..... ii

ACKNOWLEDGEMENT ..... iii

TABLE OF CONTENTS ..... iv

LIST OF TABLE ..... vi

LIST OF FIGURES ..... vii

LIST OF APPENDIXES ..... ix

CHAPTER 1 ..... 1

INTRODUCTION OF ORGANIZATION ..... 1

    1.1 Background of National Hydraulic Research Institute of Malaysia (NAHRIM) ..... 1

        1.1.1 Organization Objective ..... 5

        1.1.2 Mission ..... 5

        1.1.3 Vision ..... 5

        1.1.4 Facilities and services provided ..... 5

            a) Water Quality Laboratory ..... 5

            c) Library ..... 7

            d) Computer Laboratory ..... 8

            e) Hydraulic & Instrumentation Laboratory ..... 9

            f) Sport facilities ..... 13

CHAPTER 2 ..... 15

ORGANIZATION INFORMATION ..... 15

    2.1 Organizational structure ..... 15

        2.1.1 Departmental Structure ..... 16

    2.2 Department of National Hydraulic Research Institute of Malaysia (NAHRIM) ..... 17

        2.2.1 Department Function (Information Management Division) ..... 22

        2.2.2 Department Objective (Information Management Division) ..... 22

        2.2.3 National Hydraulic Research Institute of Malaysia (NAHRIM) ..... 23

        2.2.4 National Hydraulic Research Institute of Malaysia (NAHRIM) ..... 27

CHAPTER 3 ..... 31

INDUSTRIAL TRAINING ACTIVITIES ..... 31

    3.1 Training activities ..... 33

        a) Administrative works ..... 33

        b) Recordkeeping ..... 34

        c) System Development (Data Migration) ..... 35

d) Secretariat .....	36
3.2 SPECIAL PROJECT .....	38
3.2.1 'Sistem E-Fasiliti NAHRIM' .....	38
I. Problem Statement .....	38
II. Project Overview .....	38
III. Target User .....	39
IV. Project Objective .....	39
3.2.1.1 Project Planning .....	39
3.2.1.2 ANALYSIS .....	42
3.2.1.2 Structuring System Requirement: Process Modelling .....	44
3.2.1.4 DESIGN .....	48
3.2.1.5 Storyboard of system .....	48
3.2.1.6 Interface Design .....	62
3.2.2 Survey on user satisfaction indexes towards NAHRIM's mobile application .....	66
CHAPTER 4 .....	67
CONCLUSIONS .....	67
4.1 Application of knowledge, skills, and experience in undertaking the task .....	67
4.3 Lesson learnt .....	73
4.3.1 Communication skills .....	73
4.3.2 Problem solving .....	73
4.3.3 Teamwork .....	73
4.3.4 Time management .....	74
4.3.5 Respect each other .....	74
4.3.6 Expose in real working environment .....	74
4.3.7 Courageous .....	74
4.4 Limitation and Recommendations .....	75
REFERENCES .....	76

**LIST OF TABLE**

Table 1: Department of National Hydraulic Research Institute of Malaysia (NAHRIM) .....	17
Table 2: Summary of Industrial Training .....	32
Table 3: Data Dictionary .....	46
Table 4: Application of knowledge, skills, and experience in undertaking the task .....	68

## LIST OF FIGURES

Figure 1: National Hydraulic Research Institute of Malaysia .....	3
Figure 2: Logo of National Hydraulic Research Institute of Malaysia (NAHRIM) .....	3
Figure 3: The location of National Hydraulic Research Institute of Malaysia (NAHRIM) .....	4
Figure 4: Cod Reactor .....	6
Figure 5: UV Spectrophotometer .....	7
Figure 6: National Hydraulic Research Institute of Malaysia .....	7
Figure 7: Mussolah at National Hydraulic Research .....	8
Figure 8: Computer Laboratory .....	8
Figure 9: Coastal Wave Basin facilities .....	10
Figure 10: Hydraulic Channel.....	11
Figure 11: Sport Court .....	13
Figure 12: Mini auditorium .....	14
Figure 13: Organizational Structure .....	15
Figure 14: Departmental Structure .....	16
Figure 15: Flood Flow Decision Support System.....	23
Figure 16: 2) Future Hydroclimate Data Retrieval .....	24
Figure 17: Gedung 1Nahrim .....	25
Figure 18: NAHRIM Hydroclimate Projection .....	27
Figure 19: NAHRIM SLR (Sea Level Rise) Projection .....	28
Figure 20: NAHRIM Modelling Calculator .....	28
Figure 21: Clean the Water (Game).....	29
Figure 22: Myplop (Game) .....	29
Figure 23: Inspectorate File .....	34
Figure 24: Device for respondent to access the mobile application .....	37
Figure 25: The trainee show to respondent on how to play mobile game (Clean the Water) .....	37
Figure 26: Gant Chart of the system .....	40
Figure 27: Context Diagram of system.....	44
Figure 28: Data Flow Diagram of the System.....	45
Figure 29: Relationship diagram .....	48



Figure 30: Login Staff and admin .....	48
Figure 31: Admin Homepage .....	49
Figure 32: Daftar Pengguna .....	50
Figure 33: Senarai Pengguna .....	51
Figure 34: Maklumat Fasiliti .....	52
Figure 35: Daftar Tempahan .....	53
Figure 36: Senarai Tempahan .....	54
Figure 37: Laporan .....	55
Figure 38: Log Keluar .....	56
Figure 39: Homepage .....	57
Figure 40: Daftar Tempahan .....	58
Figure 41: Maklumat Fasiliti .....	59
Figure 42: Senarai Tempahan .....	60
Figure 43: Log Keluar .....	61
Figure 44: Login interface of admin and staff .....	62
Figure 45: Homepage of the system .....	62
Figure 46: Register User (Admin) .....	63
Figure 47: List of User (Admin) .....	63
Figure 48: Book Facilities (Admin & User).....	64
Figure 49: Boking Facilities List (Admin & User) .....	64
Figure 50: Laporan Tempahan.....	65
Figure 51: Laporan Tempahan (Bulanan) .....	65
Figure 52: Laporan Tempahan mengikut fasiliti .....	65

## **LIST OF APPENDIXES**

**Appendix A- Survey Report**

**Appendix B- Log Book**

**Appendix C- Attendance**

**Appendix D- Survey Form**

## CHAPTER 1

### INTRODUCTION OF ORGANIZATION

#### 1.1 Background of National Hydraulic Research Institute of Malaysia (NAHRIM)

The need to establish a National Hydraulic Research Institute of Malaysia (NAHRIM) started way back in 1990 as a result from Delft Hydraulic & Co findings. The report acknowledged the establishment of a research institute with a capability to conduct experimental simulation and numerical hydrodynamic analysis, ecological and morphological processes and its interaction with human activities. Subsequently, in the Cabinet Meeting on the 14th April 1993, approved the establishment of NAHRIM with the main objective as follows:

To build a pool of experts and provide research service that need in planning, designing, building and implementing research related to development of water resources in particular and environment in general; and to set up as a National Focal Point that coordinate research on hydraulic engineering in Malaysia.

NAHRIM started its operation in September 1995 and move ahead to become an excellent centre in hydraulic engineering research and supporting service to meet the demand from both public and private sector in the water related development. In line with its establishment objectives as indicated above and NAHRIM's function as also written in the Ministerial Function Act 1969 (Ministers of the Federal Government (No.2) Order 2008) are as follows:

- i. Conducts basic and applied research in hydraulic engineering, coastal engineering , water resources and water quality for public and private sector;
- ii. Experts/specialised consultancy services to public and private sectors;

- iii. Co-operate with local universities and institute in hydraulic engineering research;
- iv. Function as Government advisor on matters relating to hydraulics; and
- v. To act as the National centre in hydraulic engineering research and become the coordinator of all research in the country.

There are several main function of National Hydraulic Research Institute of Malaysia (NAHRIM)

- i. Conducting basic and applied research within water sector such as river basin, water resources and climate change, coastal and oceanography, hydrogeology and water quality and environment;
- ii. Providing expert consultancy services pertaining to water and its environment for the public and private sector;
- iii. Providing advisory role in the water related fields;
- iv. As a referral centre for water and environment related research at the national level as well as participating actively in bilateral or multilateral research at international level.



Figure 1: National Hydraulic Research Institute of Malaysia



Figure 2: Logo of National Hydraulic Research Institute of Malaysia (NAHRIM)

**Company address**

National Hydraulic Research Institute of Malaysia

Lot 5377, Jalan Putra Permai,

43300 Seri Kembangan,



### Company Location

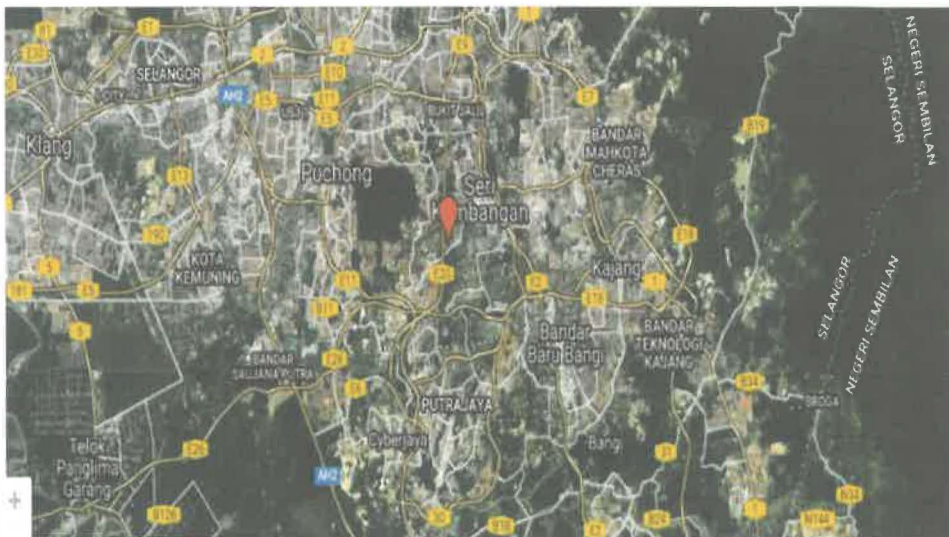


Figure 3: The location of National Hydraulic Research Institute of Malaysia (NAHRIM)

### **1.1.1 Organization Objective**

There are several objectives of National Hydraulic Research Institute of Malaysia (NAHRIM) includes:

- i. To be an excellent and main referral centre for water and it's environment.
- ii. To be the national focal point to co-ordinate research activities in water and its environment.
- iii. To be the expert of consultancy service centre in development projects related to water and its environment.

### **1.1.2 Mission**

The mission of to provide excellent services as an expert centre on water and its environment management to ensure sustainable growth in order to improve the quality of life and wellbeing.

### **1.1.3 Vision**

National Hydraulic Research Institute of Malaysia (NAHRIM) aim to be the premier hydraulic research centre for water and its environment in the world by 2030

### **1.1.4 Facilities and services provided**

#### **a) Water Quality Laboratory**

- i. Functions of Water Quality Laboratory, NAHRIM can be translated as follows:
- ii. Administrate and manage the operation of Water Quality Laboratory in accordance with recognized accredited laboratory management, coordinating the implementation of the quality system in accordance with MS ISO / IEC 17025 and follow the

guidelines of Laboratory Accreditation Scheme of Malaysia (SAMM);

- iii. To plan, manage and improve the policies, guidelines and water quality analytical services in the laboratory;
- iv. Manage a centralized database, to properly store and provide analytical data of water quality analysis produced in the laboratory;
- v. To provide support for water quality analysis as part of research and development in the field of water and environment;
- vi. To conduct research and product development related to water quality and environment.

**b) List of analytical and research facilities in Water Quality**

**Laboratory**

1) Analytical

i. Agregate Organic

Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD)



Figure 4: Cod Reactor



ii. Inorganic/Nutrient

Suspended Solid (SS), Nitrate, Nitrite, Sulphate, Phosphate, Nitrogen Ammonia, etc.



c) Library

Figure 5: UV Spectrophotometer

There are a library available in National Hydraulic Research Institute of Malaysia (NAHRIM).

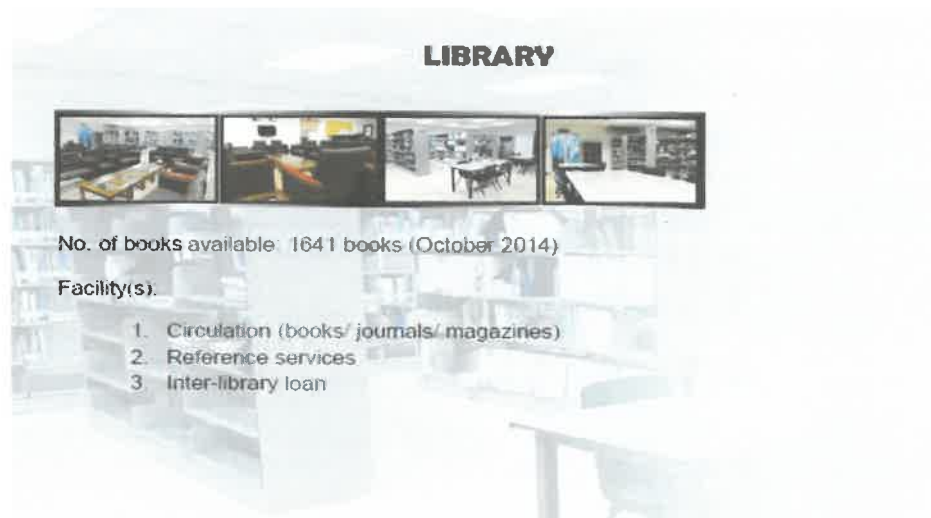


Figure 6: National Hydraulic Research Institute of Malaysia

## MUSSOLAH



Name Taqi Al-Din Mussolah

Date launched 14 September 2009

Background of Taqi Al-Din.

Taqi Al Din Muhammad ibn Ma'ruf Al Shami Al Asadi or also known as Taqi Al Din Taqi Al Din was a clergyman in Turkey. Taqi Al-Din was born in Damascus, Syria. He became a qadi (judge in Islamic law) and expert in many field such as engineering and mathematic. His contribution of technology inventions appreciated by many people in the world. Some of the inventions were 'Monobloc' Pump with six cylinder engine, waterwheel, windmill, dam and hydraulic pump system which flow the water to the agriculture area.

Figure 7: Mussolah at National Hydraulic Research

### d) Computer Laboratory

## COMPUTER LAB



Capacity 23 persons

Facility(s) 23 unit computers, LCD projector, printer

Figure 8: Computer Laboratory

**e) Hydraulic & Instrumentation Laboratory**

Hydraulic and Instrumentation Laboratory of NAHRIM was established to conduct basic and applied research and development (R&D) in physical modelling in various field including studies on dam, rivers, coastal and offshore.

Hydraulic and Instrumentation Laboratory is also providing services and facilities for physical modelling as well as managing, coordinating and maintaining the equipment and instrument of NAHRIM's Hydraulic Laboratory.

Started its full operation on 2007, the Hydraulic Laboratory of NAHRIM has a total area of 12,000 square meters, equipped with various facilities for research in physical modelling consisting of:

**1) Coastal & Estuarine facility**

Study on the wave effect to the coastal area, sediment transport and changes, and built structure at the coastal areas e.g. jetties and port. Study on the effect of wave to the coastal stability in the coastal areas. Mobile bed/engineering structures interactions, wave impact loadings and current flows.



Figure 9: Coastal Wave Basin facilities

## 2) Port & Harbour Facility

Physical model studies on coastal structures such as breakwaters, revetments, artificial reefs, groin, wave/structure interactions, beach profile response as well as complex design layouts such as wave agitation in harbours and marinas, problems at estuaries such as sedimentations/erosions. Also used to simulate ship mooring force and movement at ports, harbours and offshore.

### 3) Tidal/River Facility

To study flood event that may occur within the river catchments and flood mitigation scheme. Research on hydraulic parameters, measuring water current, water level and flow rate at any point along the river.



Figure 10: Hydraulic Channel.

### 4) Tilting Flume

Generate and test various frequencies and pattern of wave in small quantity and various continuous water discharge and flow pattern and Calibration of hydraulic equipment's e.g. current meter, flow meter, etc.

### 5) List of Physical Modelling Project

- i. Study On Local Scour at Complex Pier in 2D Flume (Universiti Putra Malaysia - December 2008)
- ii. Study on General Sand Dispersion Pattern in Coastal Basin (June 2008)

- iii. Breakwater Study On Muddy Coast For Mangrove Replanting in Parit Hj Dorani, Sabak Bernam, Selangor Part 1 & Part 2 (FRIM & JPSM - May 2010)
- iv. Structure Stability Test for Semi-Swath Boat Model Fasa 1 in 2D Flume (UiTM - July 2010)
- v. Analysis of Dry Sieving on Sediment Distribution Pattern for Pangkor Island (Pusat Hidrografi Nasional - July 2010).
- vi. Experiment on Sediment Settling Velocity for Muddy Coast of Sungai Haji Dorani (March 2010)
- vii. Experiment on Sediment Settling Velocity for Fresh Water of Sungai Kuyoh (March 2010)
- viii. Structure Stability Test for Revetment in Johor State in 2D Flume (March 2010)
- ix. Study of Rainwater Harvesting System First Flush Effect (August 2010)
- x. Evaluation of the Laboratory Performance of Field Off take 150mm Diameter with Flexi-Gates and Float Type Automated Flow Control Valve and Flat Regulator for Flow Control and Measurement in Tertiary Irrigation (Universiti Putra Malaysia)
- xi. Study of Lift and Drag Balance With Models : Characteristics of Flow Around Two Varying Diameter Cylinders and an Aerofoil (Multimedia University)\*
- xii. Physical Modeling Study of Terengganu Airport Extension\*
- xiii. Hydraulic Model Investigations of The Proposed Alteration of Batu Dam Spillway, Selangor Darul Ehsan.
- xiv. Structural Stability of Rock Armour ss Groyne for Batu Manikar Beaches, Federal Territory Of Labuan

- xv. The Development of H-Block for River Bank Protection
- xvi. Study on Suitability of Geo-Tube to Address Erosion Problem for Mangrove Replanting at Sg. Hj. Dorani
- xvii. Flood Modelling Evaluation in River Meandering Channel Under Tidal Effect for Sungai Selangor.
- xviii. Structure Stability Testing for Armour Rock Revetment Design at Tanjung Piai, Johor Darul Ta'zim
- xix. Study of Wabcore Artificial Reef Stability for Wave Breaker Function

**f) Sport facilities**



Figure 11: Sport Court



Figure 12: Mini auditorium



## CHAPTER 2

### ORGANIZATION INFORMATION

#### 2.1 Organizational structure

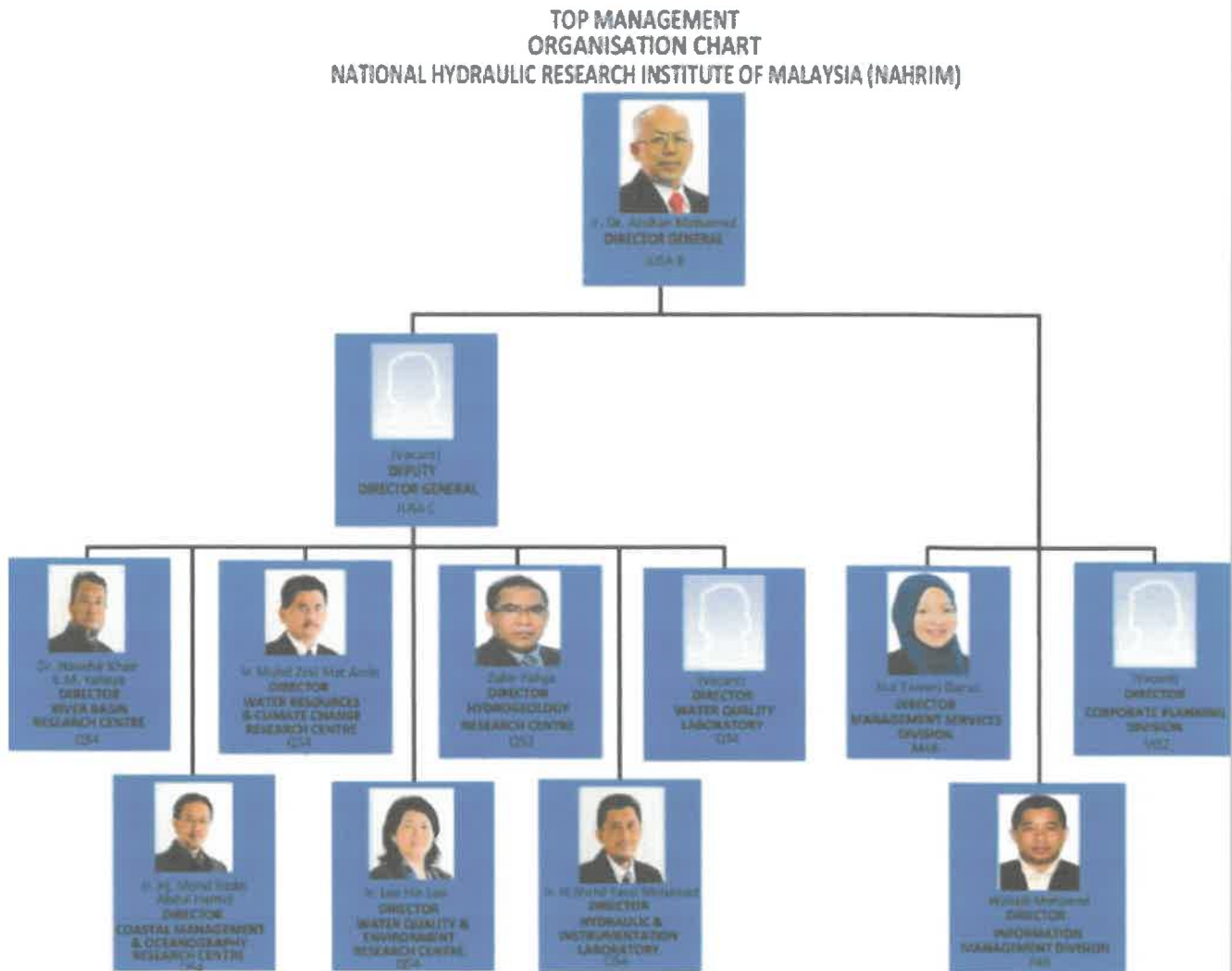


Figure 13: Organizational Structure

### 2.1.1 Departmental Structure

Information Department of National Hydraulic Research Institute of Malaysia (NAHRIM) consist of eight employees.



Figure 14: Departmental Structure

**2.2 Department of National Hydraulic Research Institute of Malaysia (NAHRIM)**

In National Hydraulic Research Institute of Malaysia (NAHRIM), it has 10 divisions. Below is the list of departments and their job scope in working area.

Table 1: Department of National Hydraulic Research Institute of Malaysia (NAHRIM)

NO	DIVISIONS	SCOPE
1.	Water resources and climate change research centre	<ul style="list-style-type: none"> <li data-bbox="823 745 1321 1417">i. Administrate and manage the operation of Water Quality Laboratory in accordance with recognized accredited laboratory management, coordinating the implementation of the quality system in accordance with MS ISO / IEC 17025 and follow the guidelines of Laboratory Accreditation Scheme of Malaysia (SAMM);</li> <li data-bbox="823 1451 1321 1675">ii. To plan, manage and improve the policies, guidelines and water quality analytical services in the laboratory;</li> <li data-bbox="823 1709 1321 1886">iii. Manage lot a centralized database, to properly store and provide analytical data of water</li> </ul>

		<p>quality analysis produced in the laboratory;</p> <p>iv. To provide support for water quality analysis as part of research and development in the field of water and environment;</p> <p>v. To conduct research and product development related to water quality and environment.</p>
2.	Water Quality and environment research centre	<p>i. R&amp;D in water treatment technology;</p> <p>ii. R&amp;D on water quality for water bodies such river and lakes;</p> <p>iii. Maintain inventory and databases of various bodies such as National Lake Inventory;</p> <p>iv. R&amp;D in aquatic ecosystem; and</p> <p>v. Conduct Water quality analysis.</p>
3.	River Basin Research Centre	<p>i. Provides research and development (R&amp;D) services and to promote the business on hydraulic aspects especially in surface water and to restore river basin and its surrounding environment in general;</p>

		<ul style="list-style-type: none"> <li>ii. To establish Research Centre for River Management as the national expert on surface water;</li> <li>iii. To improve on development and capacity building within the country to further enhance the expertise in water services sectors; and</li> <li>iv. To carry out research, development and management of river basin in line with Integrated Water Resource Management (IWRM).</li> </ul>
4.	Hydraulic and Instrumentation Laboratory	<ul style="list-style-type: none"> <li>i. Basic and applied R&amp;D through physical hydraulic modelling in various fields such as dams, rivers, coastal and offshore;</li> <li>ii. Offers services and laboratory facilities for physical modelling, and;</li> <li>iii. Manage, coordinate and maintain all laboratory instrumentation.</li> </ul>
5.	Water Quality Laboratory	<ul style="list-style-type: none"> <li>i. To carry out research on climate change and water resources;</li> </ul>

		<ul style="list-style-type: none"> <li>ii. To carry out research and development on rainwater harvesting; and</li> <li>iii. To carry out research and development on hydrological modelling and optimization of water resources system.</li> </ul>
6.	Hydrology Research Centre	<ul style="list-style-type: none"> <li>i. R&amp;D on groundwater management;</li> <li>ii. R&amp;D and evaluation on geohazard related to over pumping of groundwater and groundwater flow.</li> </ul>
7.	Management services Division	<ul style="list-style-type: none"> <li>i. Manage NAHRIM's administration and office management operation;</li> <li>ii. Manage accounts and finances; and</li> <li>iii. Manage all administration, services, training and human resources development for NAHRIM.</li> </ul>
8.	Corporate Planning Division	<ul style="list-style-type: none"> <li>i. Prepare, implement and monitor NAHRIM's strategic development plan;</li> </ul>

		<ul style="list-style-type: none"> <li>ii. To manage and implement strategy and marketing master plan for product, laboratory and NAHRIM consultation services; and</li> <li>iii. Co-ordinate and provide annual budget estimation for NAHRIM's development projects.</li> </ul>
9.	Information Management Division	<ul style="list-style-type: none"> <li>i. Plan, manage and monitor ICT infrastructure to ensure availability and implementation of ICT projects are in line with the nation's requirement;</li> <li>ii. To provide IT support to accelerate R&amp;D related to water and its environment; and</li> <li>iii. Supervise, implement and manage policies and guidelines on ICT Security.</li> </ul>
10.	Coastal Management and Oceanography Research Centre	<ul style="list-style-type: none"> <li>i. To carry out research, development and coastal management;</li> <li>ii. To develop National Marine Centre</li> </ul>

		<ul style="list-style-type: none"> <li>iii. To have collaborative R&amp;D with local universities and research institute on coastal engineering; and</li> <li>iv. To be National Focal point for Research in Coastal Engineering.</li> </ul>
--	--	--

**2.2.1 Department Function (Information Management Division)**

- i. Plan, manage and monitor ICT infrastructure to ensure availability and implementation of ICT projects are in line with the nation's requirement;
  - a) To provide IT support to accelerate R&D related to water and its environment; and
  - b) Supervise, implement and manage policies and guidelines on ICT Security.

**2.2.2 Department Objective (Information Management Division)**

- i. Plan, monitor and ensure the implementation of ICT projects in line with the Strategic Plan (ISP) NAHRIM;
  - a) Ensure that the needs of the ICT infrastructure is always available (availability);
  - b) Ensure the development and implementation of ICT systems to meet the needs of users; and
  - c) Maintaining the quality and safety of ICT assets NAHRIM.
  - d) Manage, implement and monitor ICT security management system in NAHRIM through comprehensive information security program to



protect the data centre infrastructure in order to achieve security objectives NAHRIM ICT NAHRIM

### 2.2.3 National Hydraulic Research Institute of Malaysia (NAHRIM) System/Online Application

There are several systems developed for National Hydraulic Research Institute of Malaysia (NAHRIM) for their usage. Several of them are;

#### 1) Flood Flow Decision Support System

### Flood Flow Decision Support System



Figure 15: Flood Flow Decision Support System

Flood Flow System (FFS) is designed to provide tools for determining the ability of river drainage system and water catchment areas in accommodating the impacts of extreme climate change and variability due to the increasing rainfall volume, its intensity and frequency.

The first module of FFS namely Soil Hydrology Properties was developed as it will provide data and information to users particularly for hydrology and hydraulic modelers. It will also be used as main input to other modules in the proposed Flood Flow Decision Support System (FFDSS). The accuracy and readiness of soil hydrology and hydraulic properties will ensure accurateness

of analysis and hydrology modelling especially in flood risk management and water related infrastructure project

## 2) Future Hydroclimate Data Retrieval

### Future HydroClimate Data Retrieval

National Hydraulic Research Institute of Malaysia (NAHRIM)



Figure 16: 2) Future Hydroclimate Data Retrieval

- a) Our main objective is to provide timely information to the government, consultants and researchers to be leveraged on when developing new projects and adapted it to the climate change scenario.
- b) Climate change adaptation is key to ensure minimal impact on water resources, rainforest and biodiversity, sea level rise, marine life and most important our health.
- c) Future Hydroclimate Database was developed in 2 phases; Phase 1 was developed in 2007/2008 for Peninsular Malaysia while phase 2 is for Sabah and Sarawak was completed in 2011/2012.
- d) There are a total of 1700 grid located for Peninsular Malaysia while Sabah and Sarawak was divided into 2660 grid.

### 3) Gedung 1Nahrim



Figure 17: Gedung 1Nahrim

In the 9th Malaysia Plan, NAHRIM has taken the initiative to develop an application that serves to facilitate and encourage R & D activities of water and the environment through the provision of information and data of previous R & D carried out by various parties. The application development cost is £ 1.3 million, of which the Centre National Hydraulic Data (BUILDING) is a product developed ICT as a support system and delivery system for projects R & D conducted by NAHRIM. Application developed knowledge-based information management and information technology as a platform to develop these applications, STORE is an application that becomes the reference point for getting information on water and environmental research and related information.

The main objective of the report is to archive all water and environmental research into digital form to guarantee research information that has been generated is stored for various purposes in the future. The objective of the development of this application are as follows:

- a) As a point of reference in obtaining information on R & D of water and environment in Malaysia;
- b) Coordinate R & D water & environment so that no redundant work and function;
- c) Access to R & D and related information can be reached 24 hours a day and 365 days a year;
- d) Generating new information for a more comprehensive and inclusive process of information extraction and filtering information from various reports R & D and related information; and
- e) Encourage the sharing of information to help improve R & D activities in the field of water and environment;
- f) The target group for the use of various stakeholders and interest in the use of data and information on water and environmental research as follows:
  - Government departments and agencies
  - University
  - Non-government organization
  - negotiator
  - researcher

## 2.2.4 National Hydraulic Research Institute of Malaysia (NAHRIM) Mobile Application

### 1) NAHRIM Hydroclimate Projection

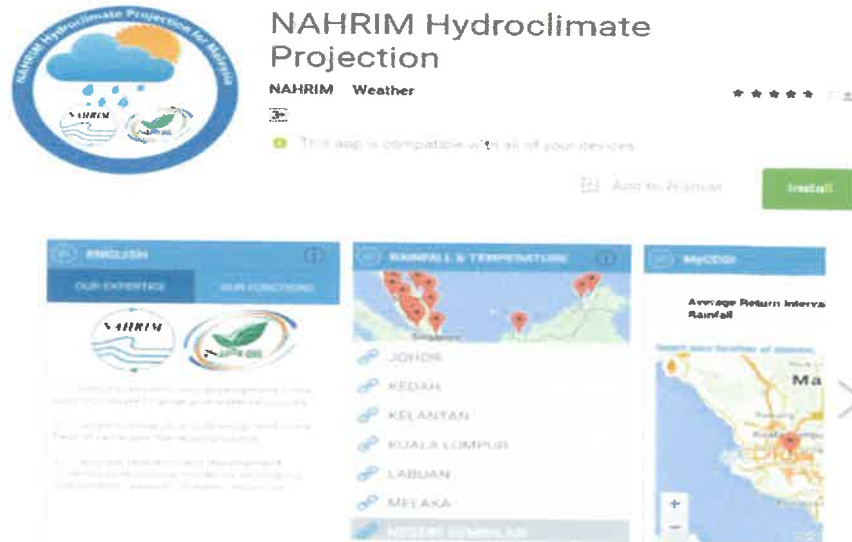


Figure 18: NAHRIM Hydroclimate Projection

This application develop by Research Centre For Water Resources and Climate Change. The NAHRIM Hydroclimate Projection for Malaysia Application provides:

- a) Provides design and database management geoformation
- b) Manage and develop the practice and design of hydrology and water resources in mind.
- c) Research and development of hydro - climate model projections & downscaling data
- d) Development, management and updating of database projections of climate change
- e) Preparation of projections of climate change

## 2) NAHRIM SLR (Sea Level Rise) Projection



Figure 19: NAHRIM SLR (Sea Level Rise) Projection

NAHRIM Sea Level Rise Apps (SLRAPP) shows data collection of projection sea level rise for Malaysia until certain years. The data will be used to monitor of coastal protection structures including Port and Harbor and also analyze potential impact due to Sea Level Rise.

## 3) NAHRIM Modelling Calculator



Figure 20: NAHRIM Modelling Calculator

This application was developed by the Hydraulic and Instrumentation Laboratory (MHI), NAHRIM which aims to facilitate the calculation of hydraulic parameters while doing physical

modeling study in the laboratory. This application is developed using Froude Similitude Law.

#### 4) Clean the Water (Game)



Figure 21: Clean the Water (Game)

This is edutainment mobile application to educate and entertain on topic of water quality. Besides this game teach user how to pollute the water and save the water life.

#### 5) MyPlop (Game)



Figure 22: Myplop (Game)

MyPlop, latest mobile application about groundwater. A mixture of entertainment and education that we called as edutainment.

Educate and entertain players about groundwater. Learning surrounding groundwater environment teach the player elements involved in groundwater domain.



## CHAPTER 3

### INDUSTRIAL TRAINING ACTIVITIES

During the practical training period, the trainee familiarize with the working procedures and tasks in their own field of specialization. According to Robert (2011), the main objective of training activities is to expose the trainee to actual working environment and enhance their knowledge and skill from what they have learned in university.

Another purpose of this program is to install the good qualities integrity, responsibility and self-confident. All ethical values and good working practice must be followed by the trainee. It is also help the trainee about the safety practices and regulation inside the industry and to encourage the spirit of teamwork and good relationship between trainee and others employee.

This chapter is a summary of the activities that has been done by the trainee during industrial training. The trainee has been place in Information Management department. Based on the activities that have been record in logbook, these activities are given by their supervisor. So all the activities are record on the logbook will be explained in this chapter. All the activity will be explained in detail includes the name of activity, scope, duration and the workflow of the activity.

During the practical, the trainee has learns many new things that have not been studied at university. The staffs give a new knowledge to the trainee. The staffs give a good cooperation in order to teach the trainee to do the task. For five months of practical in this organization, there are a few activities that the trainee will do almost every day. Some work needs the trainee to do every month. All activities are discussed here.

Table 2: Summary of Industrial Training

No.	Training activities	Department
1.	<b>Administrative works</b> <ul style="list-style-type: none"> <li>- Preparing document for Inspectorate ICU 2016</li> <li>- Preparing document in Information Management Department</li> </ul>	Information management department
2.	<b>Recordkeeping</b> <ul style="list-style-type: none"> <li>- Manual/paper filing</li> <li>- Electronic filing</li> </ul>	Information management department
3.	<b>System development (Data Migration)</b> <ul style="list-style-type: none"> <li>- Website Gedung 1Nahrim (National Hydraulic Research Institute of Malaysia (NAHRIM))</li> <li>- Official website of National Hydraulic Research Institute of Malaysia (NAHRIM)</li> </ul>	Information management department
4.	<b>Secretariat (Assembly)</b> <ul style="list-style-type: none"> <li>- Promote Nahrim's mobile application</li> <li>- Distribute and collect survey question</li> </ul>	Information management department
5.	<b>Survey Analysis</b> <ul style="list-style-type: none"> <li>- Survey for user satisfaction toward mobile application by National Hydraulic Research Institute of Malaysia (NAHRIM)</li> </ul>	National Hydraulic Research Institute of Malaysia (NAHRIM)

### **3.1 Training activities**

#### **a) Administrative works**

##### **I. Preparing document for inspectorate ICU**

The first task given by the trainee's supervisor is to prepare all the document required for inspectorate ICU for Hydraulic Information Repository Management and Climate Change and Upgrading Infrastructure / Infostructure ICT to Support Research and Development NAHRIM project. The definition of inspectorate is a mechanism of monitoring of government departments and agencies in implementing the directives and circulars of the Government to produce a quality public service. The purpose is to ensure that the reform efforts are continued to improve public service delivery. The department which is Information Management Department was selected by National Resources Environment for document Revision sessions Assessment Activities Inspectorate for Program / Project Development Plan 10 and that need the department to prepare all document related to the selected project development. The program was held at Baiduri Hall, National Resources Environment, on 6 September 2016. There are four staff represent the department for the program. The document required is by each program in year 2014 and 2015 while each program and allocation must have their document transaction such as local order, invoice, delivery order, contract between vendors and organization, payment Boucher, and report. The trainee should find the document and separate it by program. Next the trainee need to find the document and scan the original copy then place the copy into a new file. The trainee could not reveal the information because it is private and confidential. The file is shown below. The details of project cannot be exposed. It took about one

month to find the document and the trainee successfully finish to prepare and compile all document needed before the due date.



Figure 23: Inspectorate File

#### **b) Recordkeeping**

The trainee also get task to manage and control record at the Information management Department which is manual and electronic recordkeeping. For manual record, the trainee need to list all the record or document available in the file and also need to control the movement of the record. If new record available, the trainee need to write down the file number that has stated for the file then compile it together neatly in the file. The staff at the department will hands on the document that need to record so that it can easily retrieve by them if they need to revise in future and also act as a backup for them if any problem occur. It is important for trainee to know the movement of the record.

For electronic record keeping, sometimes the trainee need to keep the record in Network Attached Storage (NAS) when was asked by staff. The trainee will scan the document then transfer it to the folder that the staff want. It can make the staff easy

to find the record when they can access it by themselves at their personal computer. Besides, electronic record keeping can act as a backup record and it gives benefit for them. Other than that, the trainee also has rewrite the name list of every records so that it will be more neat and orderly and the trainee will find the missing document that supposed to be in the file by referring to their file number. The files and record that the trainee had manage and control could not reveal because it is private and confidential.

### **c) System Development (Data Migration)**

It is the first experience for the trainee in data migration task. The trainee has get task to migrate data for website available in National Hydraulic Institute of Malaysia. According to TechTarget, data migration is the process of transferring data between data storage systems, data formats or computer systems. A data migration project is usually undertaken to replace or upgrade servers or storage equipment, for a website consolidation, to conduct server maintenance or to relocate a data center. The trainee need to do data migration for two website which is first website is Gedung 1Nahrim and second is official website of National Hydraulic Research Institute of Malaysia.

For the first data migration, the trainee need to migrate the data which is technical terms that available in website Gedung 1Nahrim. The technical term was arranged in alphabetically letter from A to Z. The trainee need to migrate the data using Sharepoint. Sharepoint is a web based application that intergrates with Microsoft Office and empower individuals, teams and organization to intelligently discover, share and collaborate on content from anywhere and on any device. It make the trainee need to know how to use the tools and the staff has teach how to do the data migration. After that the trainee successfully migrate all the technical terms data on time.

The second website that the trainee need to make the data migration is official website of National Hydraulic Research Institute of Malaysia. The staff ask the trainee to use WordPress as the tool to make the data migration. WordPress is an online, open source website creation tool written in PHP and it's also a highly flexible content management system (CMS) that enables user to build and manage user own full-featured website using web browser. The content that need the trainee to do data migration is News and Archive that available at the old official website of National Hydraulic Research Institute of Malaysia. The staff has guide the trainee on how to use the tools and after that the trainee do it by her own. Besides, the trainee finished the task on time.

**d) Secretariat**

At 9 November 2016, the trainee was given a task to be a secretariat for Innovation day at National Resources Environment (NRE) and it also for monthly gathering for national Resources Environment for November month. It was a big event because the Ministry of National Resources Environment was invited to the event. For the event, the trainee need to prepare a booth for National Hydraulic Research Institute of Malaysia's Mobile Application. The trainee and the other staff need to set up the booth and prepare all the things needed for the promotion. At the event, the trainee and the other staff need to promote the mobile application that had develop by the organization. The trainee need to distribute the survey form titled 'Indeks Kepuasan Pelanggan terhadap Aplikasi Mobil NAHRIM. The survey also be my second special project that the trainee ask to do. During distribute the survey form, the trainee need to tell the information about the mobile application and guide the respondent on how to use. There are five (5) mobile application which were develop by the organization.

- a. Mobile applications (Android): Sea Level Rise Projection for Malaysia;
- b. Mobile applications (Android): Hydroclimate Projection for Malaysia;

- c. Mobile applications (Android and iOS): Modelling Calculator;
- d. Mobile game app (Android and iOS): MyPlop; and
- e. Mobile game app (Android and iOS): Clean the Water. There are;



Figure 24: Device for respondent to access the mobile application

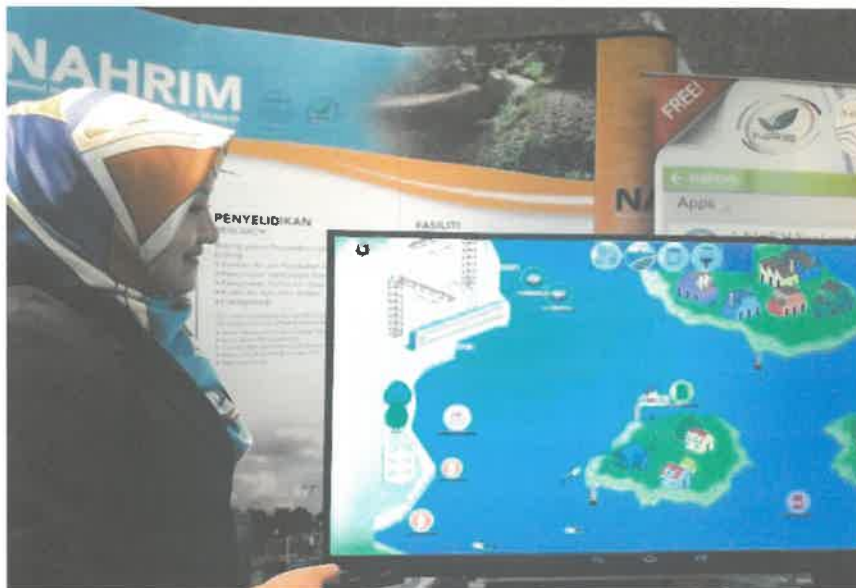


Figure 25: The trainee show to respondent on how to play mobile game (Clean the Water)

## **3.2 SPECIAL PROJECT**

### **3.2.1 'Sistem E-Fasiliti NAHRIM'**

During the trainee practical in Information Management Department, the executive of the department has given a project that needs to be completed by students during their practical organization. The project that's given by the Information Management Department executive is system development which is the trainee need to make facilities booking system from being used by staff of National Hydraulic Research Institute of Malaysia (NAHRIM). The time taken for this system to finish was five months starting from 1<sup>st</sup> September until 30<sup>th</sup> December 2016.

#### **I. Problem Statement**

Currently, National Hydraulic Research Institute of Malaysia (NAHRIM) do not have specific system for booking facilities that available for example in every department. They had to book the facilities in manual way and ask every department for confirmation. In National Hydraulic Research Institute of Malaysia (NAHRIM), most of department have its own facilities for discussion and meeting. Hence, the organization needs to come out with automated systems which can assist them to handle the facilities booking with more effective and provide a good service for their staffs

#### **II. Project Overview**

The system that's being developed is facilities booking system. The systems will facilitate and assists National Hydraulic Research Institute of Malaysia (NAHRIM) to record all the facilities booking process that made by staff. The advantages of these systems, National Hydraulic Research Institute of Malaysia (NAHRIM) can reduce time and the usage of manpower to manage the booking process made by staffs because the systems will be automated and can be done by online access. Hence,



all the staffs of National Hydraulic Research Institute of Malaysia (NAHRIM) can access and book the facilities through online access.

### **III. Target User**

The target user of this system is the staff at National Hydraulic Research Institute of Malaysia (NAHRIM). Only registered staff can use the system and make the facilities reservation. The admin of the system will register the staff and manage staff details.

### **IV. Project Objective**

The main objective of facilities booking system is to improve the booking process make by the staffs so that the facilities booking can be made systematically without any problem or issues that probably happen among staff in National Hydraulic Research Institute of Malaysia (NAHRIM). For example redundant booking make by the staff and need confirmation by each department to know the availability of the facilities. It can make they need more time when need to book facilities. Other than that, it also will empowers staffs to self-manage booking facilities and facilities approval at anytime and anywhere. In addition, it not only save administrative time and cost by eliminating messy paper-based forms but also improve staffs satisfaction, productivity, and performance.

#### **3.2.1.1 Project Planning**

In project development, planning is very important. This is because in planning phase it involves defining, clear, discrete activities and the work needed to complete each activity within a single project. Every requirement need to be mention in planning phase do that there is no information or requirement were left behind because if happen it will affect the project development. Project planning is part of project management, which relates to the use of schedules such as Gantt charts to plan and subsequently report progress within the project environment. Besides, Project planning is a procedural step in project management, where required documentation

is created to ensure successful project completion. In the information systems development project, anything that involved in the information systems projects must be measured. Below is the work breakdown structure to show that the trainee have been planning about this project. This information systems project will assist the Information Management Department to manage facilities booking process make by staff.

ID	Task Mode	Task Name	Duration	Start	Finish
1		Preliminary	1 day	Fri 2/9/16	Fri 2/9/16
2		Kick of meeting	1 day	Fri 2/9/16	Fri 2/9/16
3		Planning	18 days	Mon 5/9/16	Wed 28/9/16
4		Identify the problem/problem statement	2 days	Mon 5/9/16	Tue 6/9/16
5		Project overview	2 days	Wed 7/9/16	Thu 8/9/16
6		Project objective	2 days	Fri 9/9/16	Mon 12/9/16
7		Project Planning	8 days	Tue 13/9/16	Thu 22/9/16
8		Project feasibility	4 days	Fri 23/9/16	Wed 28/9/16
9		Analysis	22 days	Thu 29/9/16	Fri 28/10/16
10		Analyze existing & current system	2 days	Thu 29/9/16	Fri 30/9/16
11		Functional requirement	2 days	Mon 3/10/16	Tue 4/10/16
12		Non functional requirement	2 days	Wed 5/10/16	Thu 6/10/16
13		Conceptual data model	2 days	Fri 7/10/16	Mon 10/10/16
14		Physical DFD	7 days	Tue 11/10/16	Wed 19/10/16
15		System model	4 days	Fri 21/10/16	Wed 26/10/16
16		Design	22 days	Thu 27/10/16	Fri 25/11/16
17		Erd Diagram	7 days	Thu 27/10/16	Fri 4/11/16
18		System flowchart	7 days	Mon 7/11/16	Tue 15/11/16
19		System input	4 days	Wed 16/11/16	Mon 21/11/16
20		System output	4 days	Tue 22/11/16	Fri 25/11/16
21		Implementation	26 days	Mon 28/11/16	Mon 2/1/17
22		Put design into coding	11 days	Tue 29/11/16	Tue 13/12/16
23		Create database	9 days	Wed 14/12/16	Mon 26/12/16
24		Installation	2 days	Tue 27/12/16	Wed 28/12/16
25		User manual	1 day	Thu 29/12/16	Thu 29/12/16
26		Testing	2 days	Fri 30/12/16	Mon 2/1/17

Figure 26: Gant Chart of the system

### **A) Gantt chart**

Gantt chart is a graphical representation of the duration of tasks against the progression of time. Gantt charts are useful tools for planning and scheduling projects. A Gantt chart is helpful when monitoring a project's progress. A Gantt chart is a type of bar chart that illustrates a project schedule. Gantt charts illustrate the start and finish dates of the terminal elements and summary elements of a project.

The function of Gantt Chart are planning and scheduling and monitor a project. People use Gantt chart to plan how long a project should take and the Gantt chart lays out the order in which the tasks need to be carried out. Besides, Gantt chart let us see immediately what should have been achieved at any point in time and see how remedial action may bring the project back on course. However, for representing deadlines and other significant events, it is very useful to include this feature on a Gantt chart. Refer appendix \_\_ for Gantt chart.

### **B) Network Diagram**

A network diagram is a visual representation of network architecture. It maps out the structure of a network with a variety of different symbols and line connections. It is the ideal way to share the layout of a network because the visual presentation makes it easier for users to understand how items are connected. In other word, network diagram is a quality management tool that charts the flow of activity between separate tasks. It graphically displays interdependent relationships between groups, steps, and tasks as they all impact a project. Bubbles, boxes, and arrows are used to depict these activities and the links between them. This is also known as a flow chart, project network, or process map. Refer network diagram at appendix \_

### **3.2.1.2 ANALYSIS**

System analysis is to determine where the problem is, in an attempt to fix the system. This step involves breaking down the system in different pieces to analyse the situation, analysing project goals, breaking down what needs to be created and attempting to engage users so that definite requirements can be defined. The purpose of analysis is to determine what information and information processing services are needed to support selected objectives and functions of the organization. Furthermore, gathering this information is called requirements determination and used to learn about the current system, the organization that the replacement system will support, and user requirements or expectations for the replacement system. In proceeding this project, the first crucial elements that needed to be known is the information on the current operations and requirement for a replacement system must be organize through analysis and organizing.

#### **a. Proposed System**

The trainee had decided to propose a new system to the organization based on the observation make by the trainee. Before this, the organization use manual way to make a facilities booking. This method make the staff need to know the availability and status of the facilities if in use or not. Besides, traditional method is difficult to access and retrieve by staff. Based on research, the trainee want to introduce a new system which is 'Sistem E-fasiliti NAHRIM' mean a system that allow the staff to make the facilities reservation. Basically, the 'Sistem E-fasiliti NAHRIM' is an online or offline system that will used by the staffs to make the facilities reservation.

#### **b.Determining System Requirement**

There are some requirement that the trainee identify for the system need.

##### **a. Functional Requirement**

- I. The system must able to book facilities available at the organization

- II. The system able to view the list of facilities at the organization
- III. The system should be user friendly and make the staff easy to use.
- IV. The system should be easy to maintain or update by the staff or technician.
- V. The system must be able to work offline or online for staff.

b. Non-functional Requirement

- I. The system must have a provision for data back-up.
- II. The system should utilize uninterruptible power supply (UPS) system to ensure protect against power failure.
- III. The network connection must be up and running 24x7 without failure.
- IV. Easy to maintain and update by the staff or system analyst

c. System requirements

These consist of the hardware and software components of a computer system that are required to install in order to use the software efficiently. System portability requirements

d. System should be able to execute on Windows 7, Windows 8 or 8.1, and Windows

System efficiency requirements ;

Server software shall be:

- MS SQL Server
- MS Access 2010
- Notepad++
- WampServer Version 2.1
- Dreamweaver

Hardware requirements shall be:

- Processor: Intel CORE i3, CORE i5, or above
- Processor Speed: 2.4GHZ or above
- RAM: 2 GB RAM or above

- Hard Disk: 100 GB hard disk or above
- Fiber optic network connection
- Printer for printing reports
- Uninterruptible power supply to ensure a constant access of data.

### 3.2.1.2 Structuring System Requirement: Process Modelling

#### a.Context Data Flow Diagram (CFD)

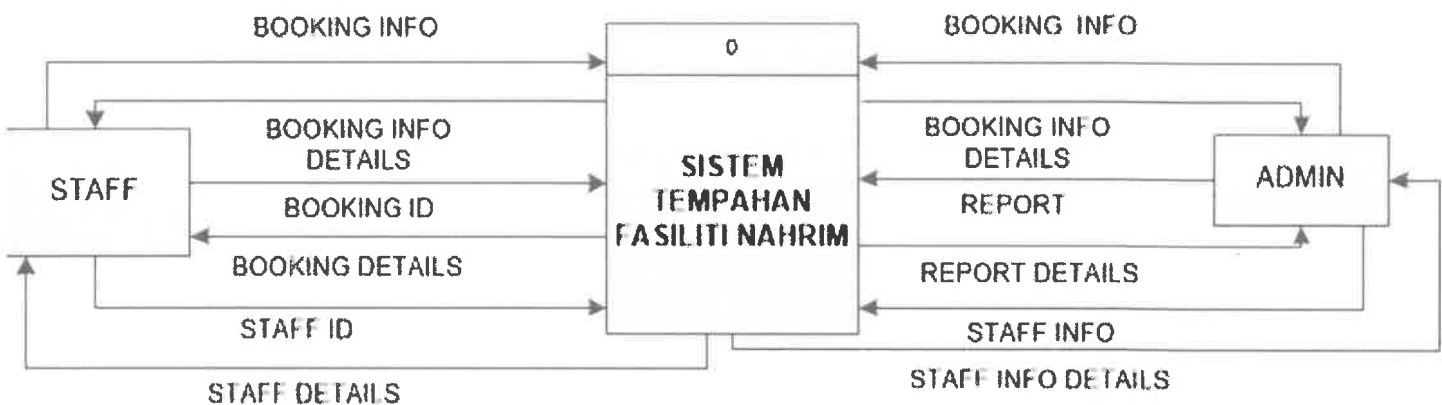


Figure 27: Context Diagram of system

**b. DFD of New Logical System**

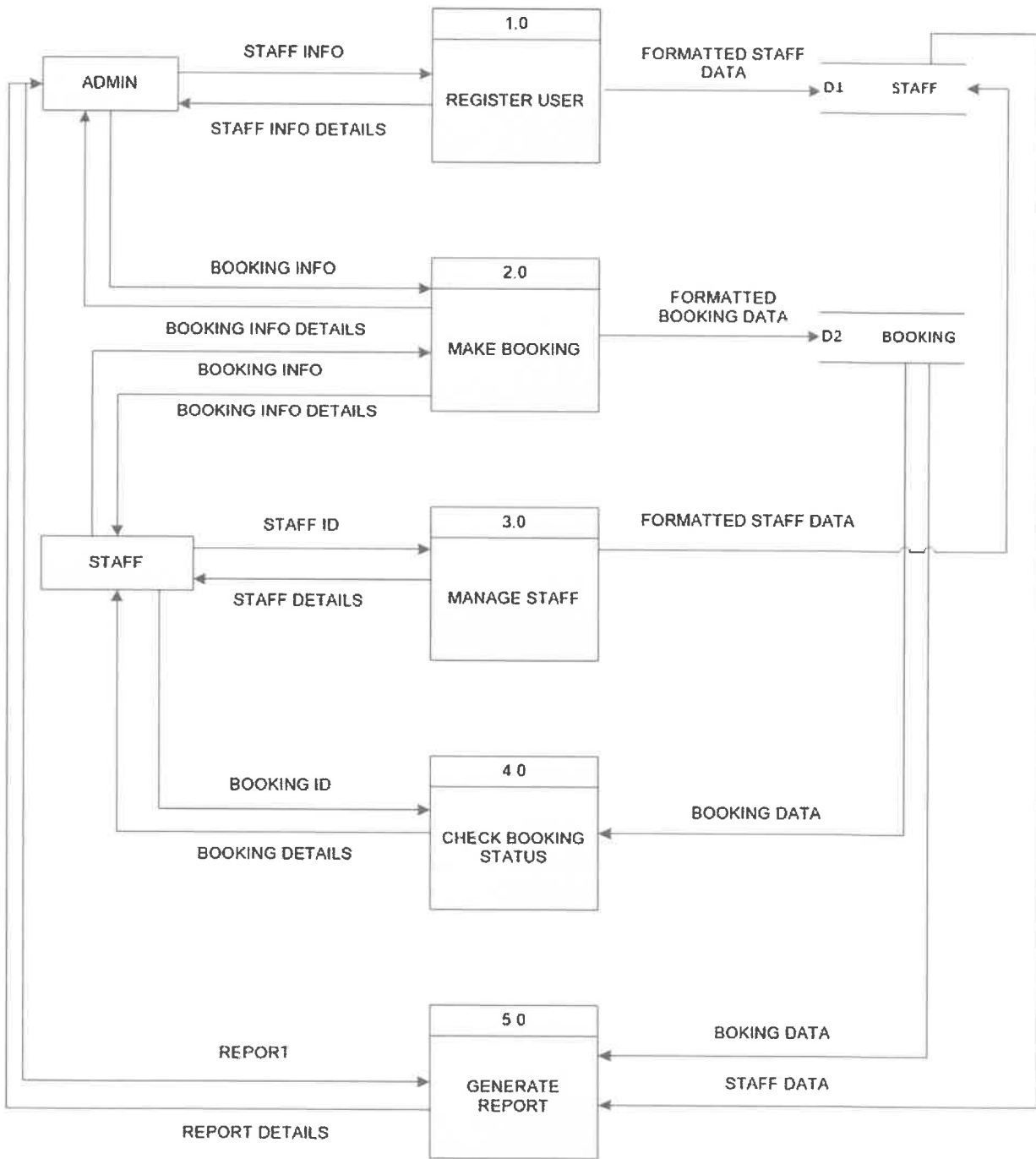


Figure 28: Data Flow Diagram of the System

Based on the context diagram above, we can see there are two (2) external entities which is staff and admin. Based on the diagram there are four (4) types of data flow that communicate between staff and system while seven (7) types of data flow that communicate between admin and system. The system can generate report that only can be accessed by the admin of the system.

Next diagram is Data Flow Diagram Level [0] that called as DFD [0]. As indicated by the diagram in the Facilities Booking System of NAHRIM, there will be three (3) modules that we called as the process consists of Registration, Facilities booking, and Generate report. Each module will process the data between (staff and the system), and (admin and system). Besides that, there are three (3) categories of database be created in the systems to store the information includes staff details, facilities details, and facilities booking details.

Table 3: Data Dictionary

Data Dictionary	
Sources	Description
Staff	Contain information on staff details and booking facilities
Admin	Register user, booking and manage facilities make by user, update facilities information and generate report.
Data Flow	Description
Log in	Staff and admin need to login first to use the system
Book Facilities	Staff and admin can book facilities that available
Booking List	Staff and admin can view the facilities booking list make by user



Update Personal Details	The staff can update their personal details when they were registered and admin can add user and update user details too.
Register Users	Only admin can register user to access the system
User List	Only admin can view the list of users available.
Facilities Details	Staff can view facilities details while admin can add and view the facilities.
Generate Report	Only admin can generate and view report.
<b>Processes</b>	<b>Description</b>
Process 1.0	Process to register users by admin and for staff to login into system. The staff can update their personal details then admin can add and view the user list.
Process 2.0	Process to book facilities that make by staff and admin (Registered Users). Admin can view the list of facilities booking.
Process 3.0	Process to generate report that only can be view and generate by admin.
<b>Data Store</b>	<b>Description</b>
Staff File	Data store that holds staff details and information.
Booking File	Data store that holds facilities booking make by users.
Facilities File	Data store that holds facilities details and information

### 3.2.1.4 DESIGN

#### a. Relationship Diagram

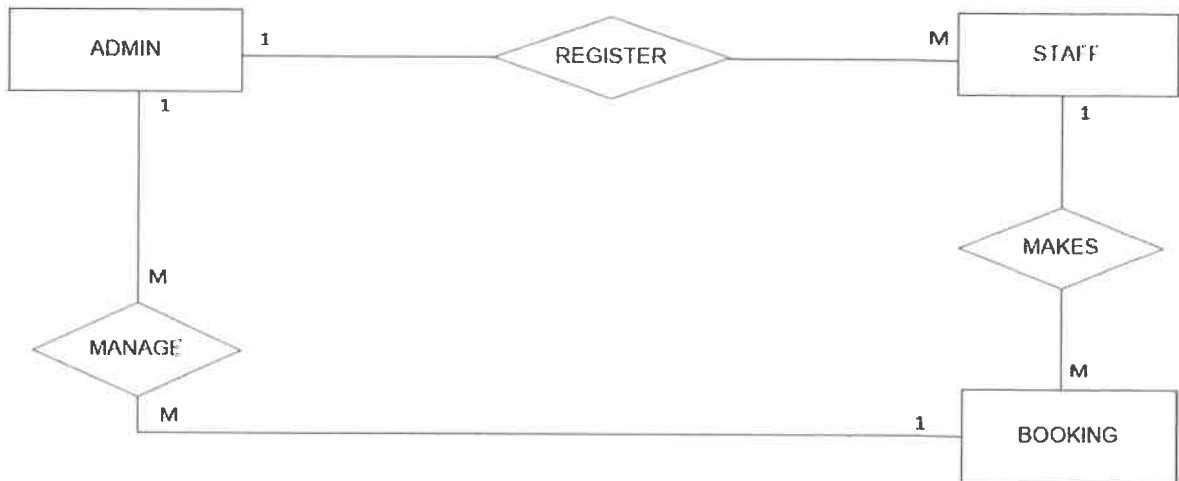


Figure 29: Relationship diagram

#### 3.2.1.5 Storyboard of system

Login staff & Admin

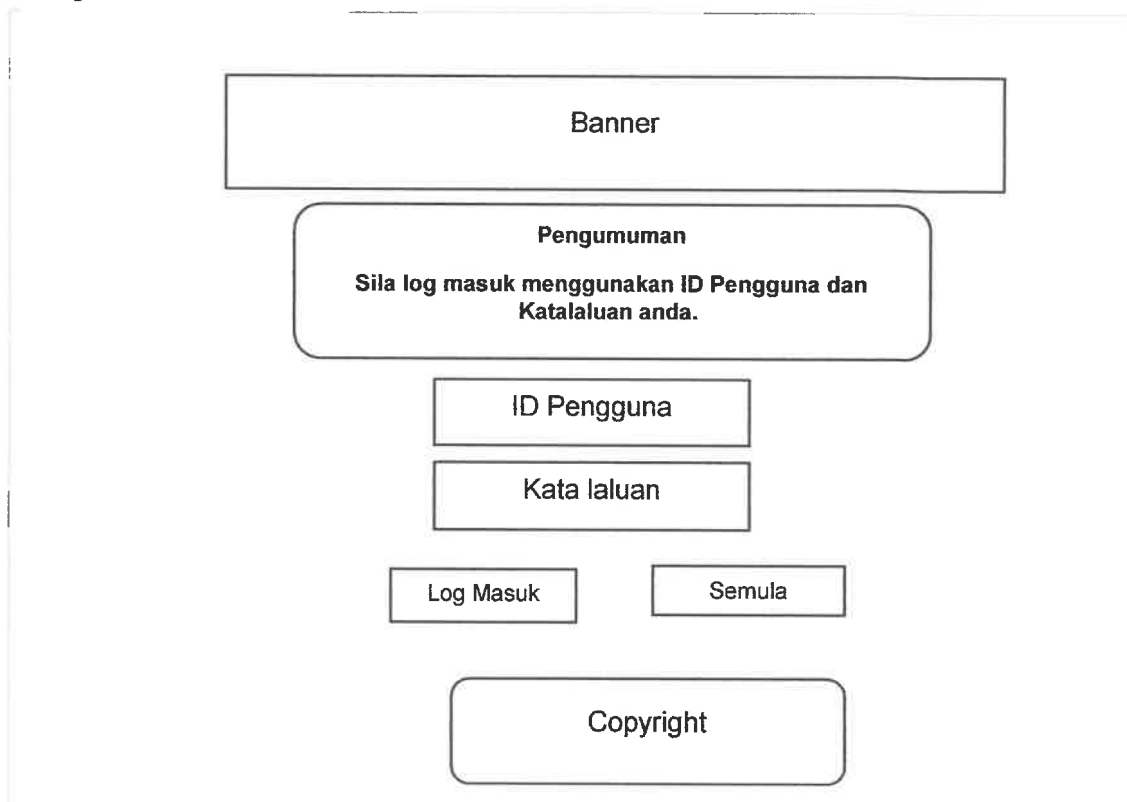


Figure 30: Login Staff and admin

### Admin Homepage

Banner						
eFasiliti	Pengguna	Maklumat Fasiliti	Daftar Tempahan	Senarai Tempahan	Laporan	Log Keluar
	Daftar Pengguna					
	Senarai Pengguna					
Nama/Aras						
Sila Kemaskini Maklumat anda						
Maklumat Staff						
Nama:						
Id Pengguna:						
No Telefon:						
Emel:						
Pusat Kajian:						
Aras:						
Kemaskini						
Tukar Kata Laluan						
Kata Laluan:						
Kata Laluan Baru:						
Sah Kata Laluan:						
Tukar			Semula			
Copyright						

Figure 31: Admin Homepage

Admin (Daftar Pengguna)

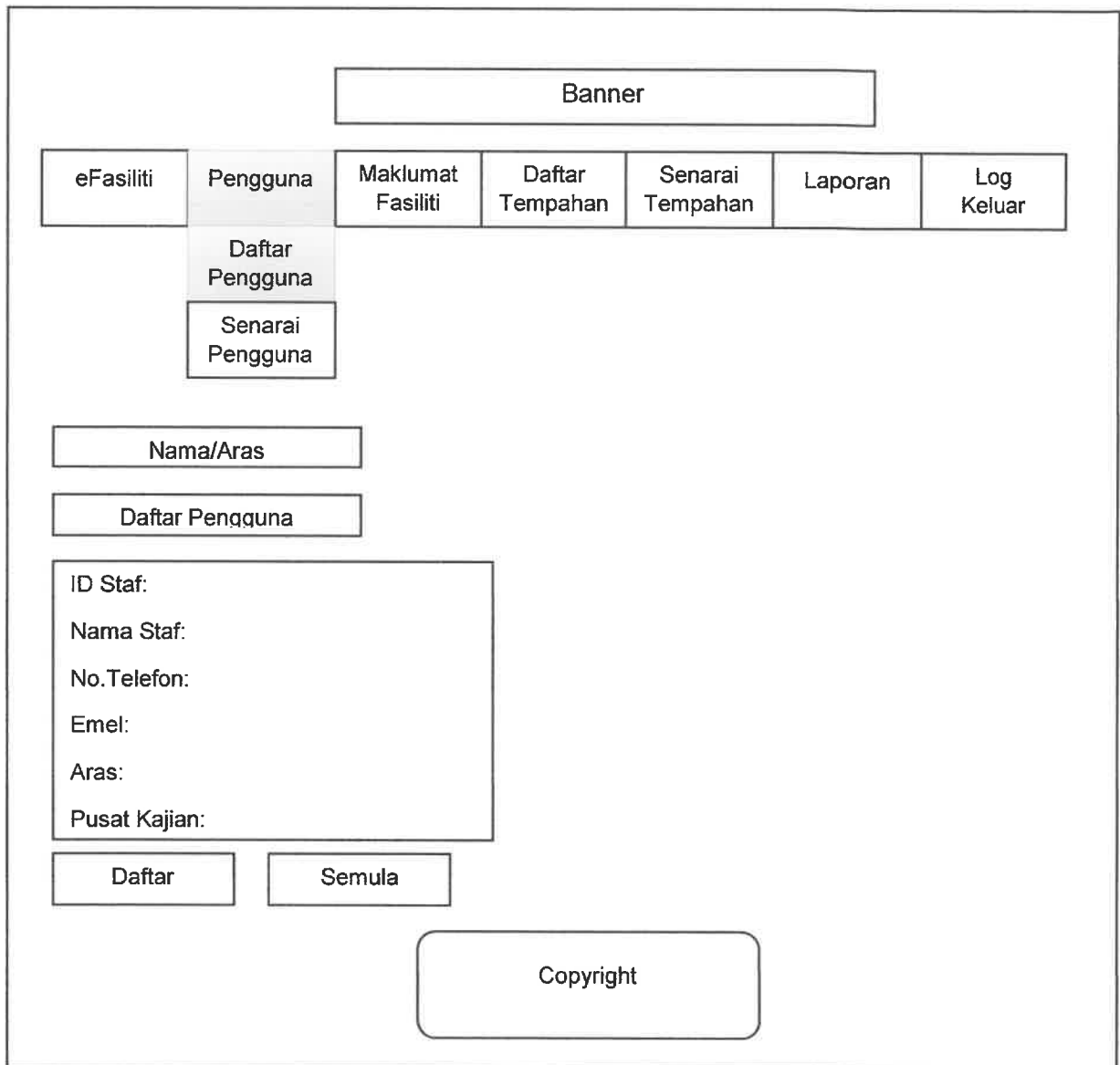


Figure 32: Daftar Pengguna

Admin (Senarai Pengguna)

Banner

eFasiliti	Pengguna	Maklumat fasiliti	Daftar Tempah	Senarai Tempahan	Laporan	Log Keluar
	Daftar Pengguna					
	Senarai Pengguna					

Nama/ Aras

Senarai Pengguna

Bil	Nama	No.Telefon	Emel	Aras Pengguna	Pusat Kajian	Status Pengguna

Copyright

Figure 33: Senarai Pengguna

Admin (Maklumat Fasiliti)

The interface is enclosed in a large rectangular frame. At the top center is a 'Banner' box. Below it is a horizontal navigation menu with seven items: 'eFasiliti', 'Pengguna', 'Maklumat fasiliti' (highlighted), 'Daftar Tempahan', 'Senarai Tempahan', 'Laporan', and 'Log Keluar'. Under the 'Pengguna' menu item, there are two stacked boxes: 'Daftar Pengguna' and 'Senarai Pengguna'. Below these are three boxes: 'Nama/ Aras', 'Daftar fasiliti', and 'Nama Fasiliti:'. Under 'Nama Fasiliti:' are two buttons: 'Daftar' and 'Semula'. Below these is a box labeled 'Senarai Fasiliti'. At the bottom left is a table with two columns: 'Bil' and 'Nama Fasiliti'. The table has two rows, with the second row being empty. At the bottom right is a rounded rectangular box labeled 'Copyright'.

Figure 34: Maklumat Fasiliti

Admin (Daftar Tempahan)

Banner

eFasiliti	Pegguna	Maklumat Fasiliti	Daftar Tempahan	Senarai Tempahan	Laporan	Log Keluar
-----------	---------	-------------------	-----------------	------------------	---------	------------

Daftar Pengguna
Senarai Pengguna

Nama/Aras

Daftar Tempahan

Tajuk/Perkara:
Nama Pengerusi:
Nama Penganjur:
Tempat:
Tarikh:
Masa Mula:
Masa tamat:
Peralatan yang diperlukan

Daftar	Semula
--------	--------

Copyright

Figure 35: Daftar Tempahan

Admin (Senarai Tempahan)

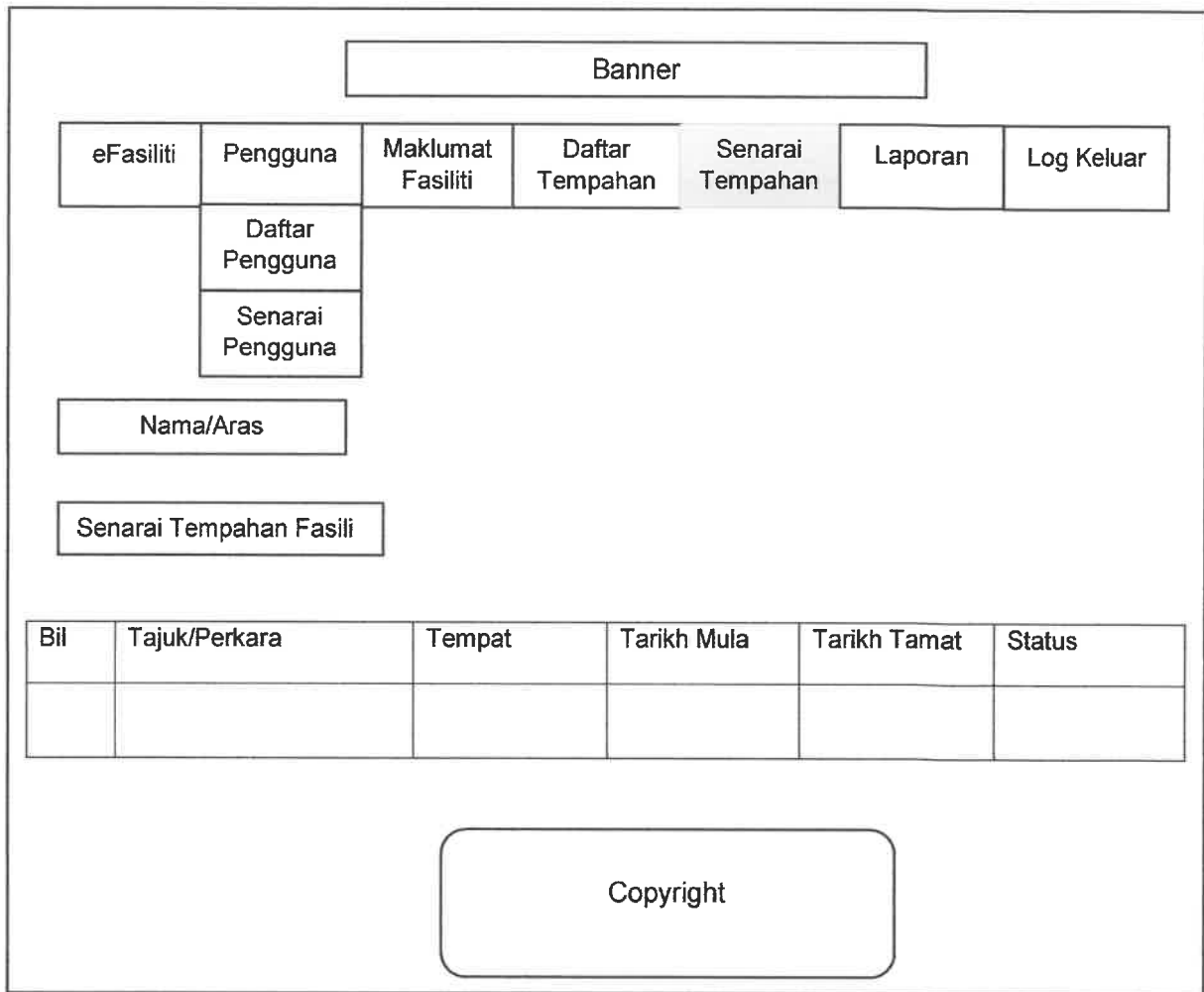


Figure 36: Senarai Tempahan



Admin (Laporan)

The screenshot displays the 'Admin (Laporan)' interface. At the top, there is a 'Banner' box. Below it is a navigation menu with seven items: 'eFasiliti', 'Pengguna', 'Maklumat Fasiliti', 'Daftar Tempahan', 'Senarai Tempahan', 'Laporan', and 'Log Keluar'. The 'Laporan' item is highlighted. Under the 'Pengguna' menu item, there are two sub-items: 'Daftar Pengguna' and 'Senarai Pengguna'. Below the navigation menu, there are two input fields: 'Nam/ Aras' and 'Laporan Tempahan'. A section titled 'Capaian Laporan:' contains three buttons: 'Sila Pilih Kategori Laporan' (highlighted in blue), 'Laporan Bulanan', and 'Laporan Mengikut Fasiliti'. At the bottom of the interface, there is a 'Copyright' box.

Figure 37: Laporan

Admin (Log Keluar)

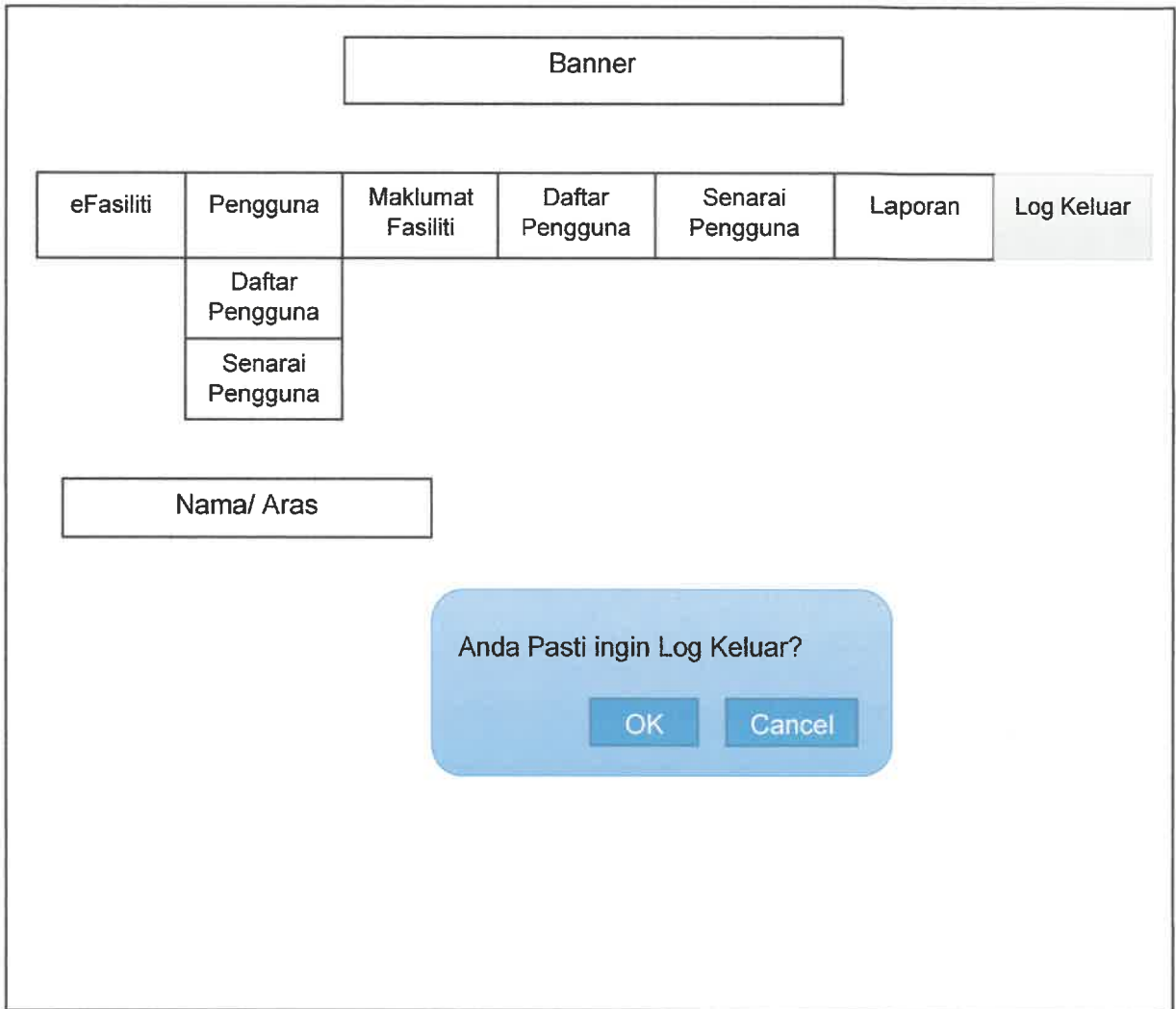


Figure 38: Log Keluar

Staff (Home page)

The image shows a web interface for staff registration and management. At the top, there is a 'Banner' box. Below it is a horizontal menu with five buttons: 'eFasiliti', 'Daftar Tempahan', 'Maklumat Fasiliti', 'Senarai Tempahan', and 'Log Keluar'. The 'eFasiliti' button is highlighted. Below the menu are two buttons: 'Nama/ Aras' and 'Maklumat Staff'. A large form box contains labels for 'Nama:', 'Id Pengguna:', 'No Telefon:', 'Emel:', and 'Aras:'. Below this form are three buttons: 'Kemaskini', 'Tukar Kata Laluan', and a larger box containing labels for 'Kata Laluan:', 'Kata Laluan Baru:', and 'Sahkann Kata Laluan:'. At the bottom of this section are two buttons: 'Tukar' and 'Semula'. Finally, at the very bottom, there is a rounded rectangular box labeled 'Copyright'.

Figure 39: Homepage

Staff (Daftar Tempahan)

The screenshot shows a web application interface for 'Daftar Tempahan' (Booking Registration). At the top, there is a 'Banner' box. Below it is a navigation menu with five items: 'eFasiliti', 'Daftar Tempahan' (highlighted), 'Maklumat Fasiliti', 'Senarai Tempahan', and 'Log Keluar'. Below the navigation menu, there is a search bar labeled 'Nama/Aras' and a 'Daftar Tempahan' button. Below the search bar, there is a form with the following fields: 'Tajuk/Perkara:', 'Nama Pengerusi:', 'Nama Penganjur:', 'Tempat:', 'Tarikh:', 'Masa Mula:', 'Masa tamat:', and 'Peralatan yang diperlukan'. Below the form, there are two buttons: 'Daftar' and 'Semula'. At the bottom right, there is a 'Copyright' notice.

Figure 40: Daftar Tempahan

Staff (Maklumat Fasiliti)

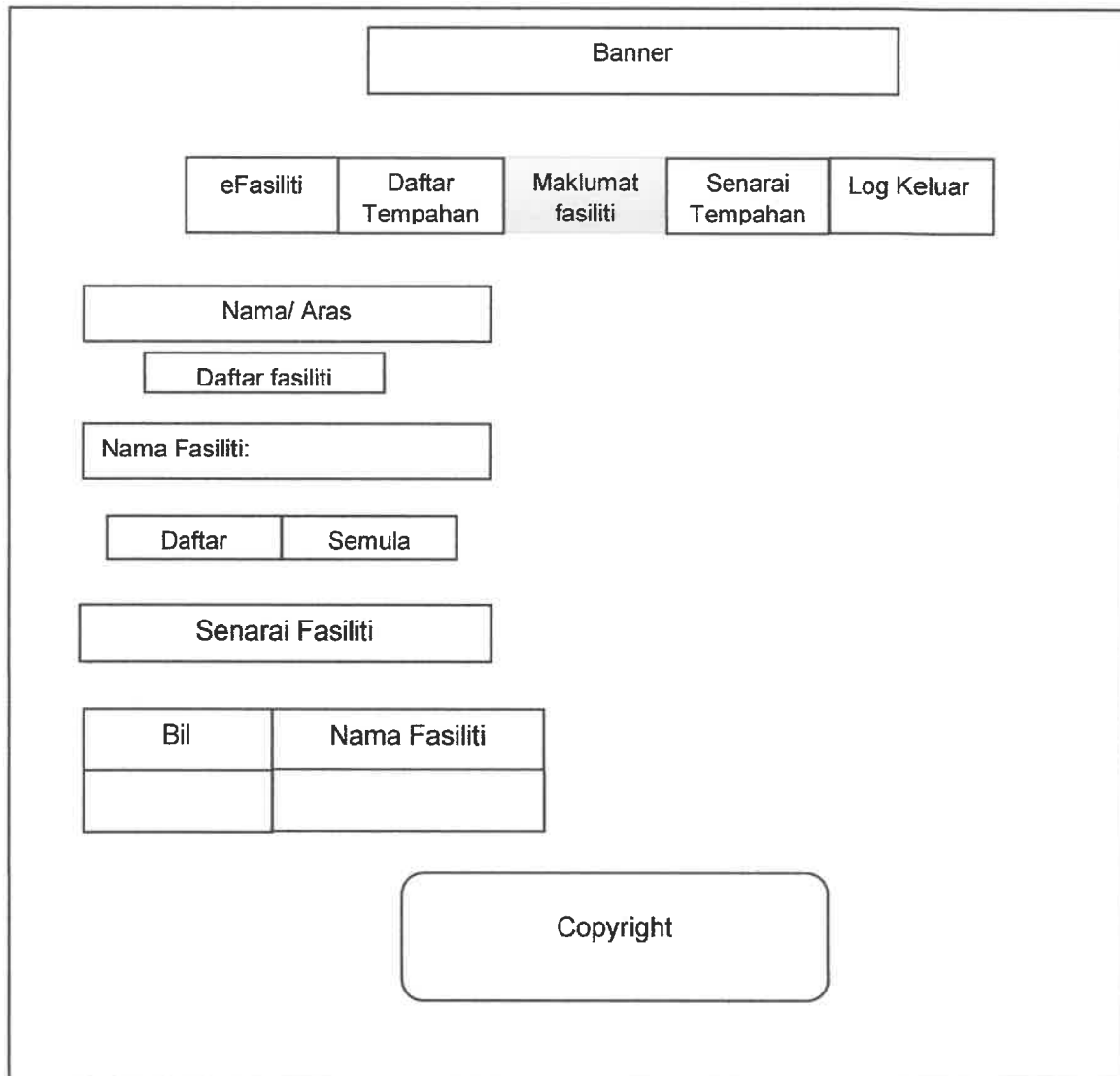


Figure 41: Maklumat Fasiliti

Staff (Senarai Tempahan)

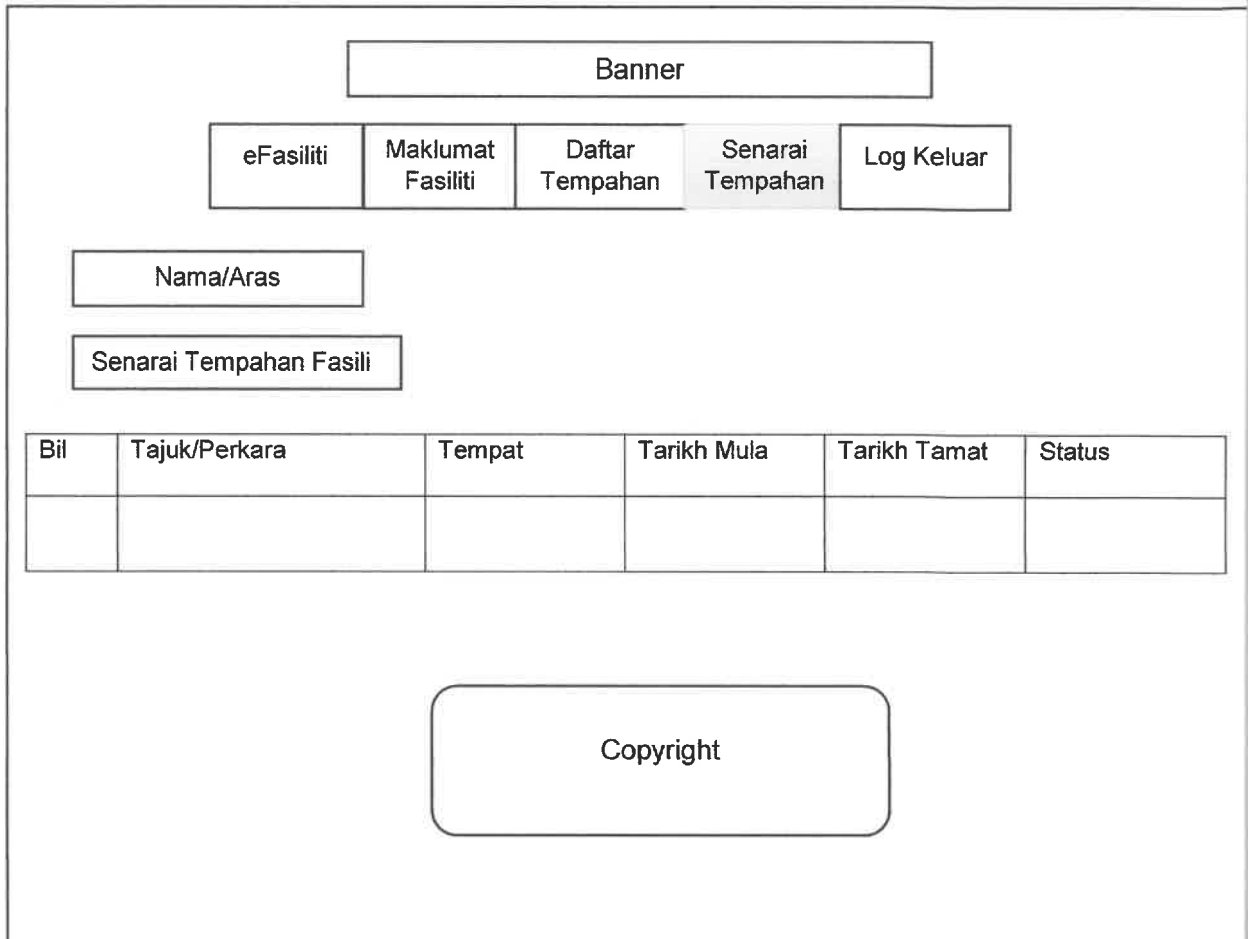


Figure 42: Senarai Tempahan

Staff (Log Keluar)

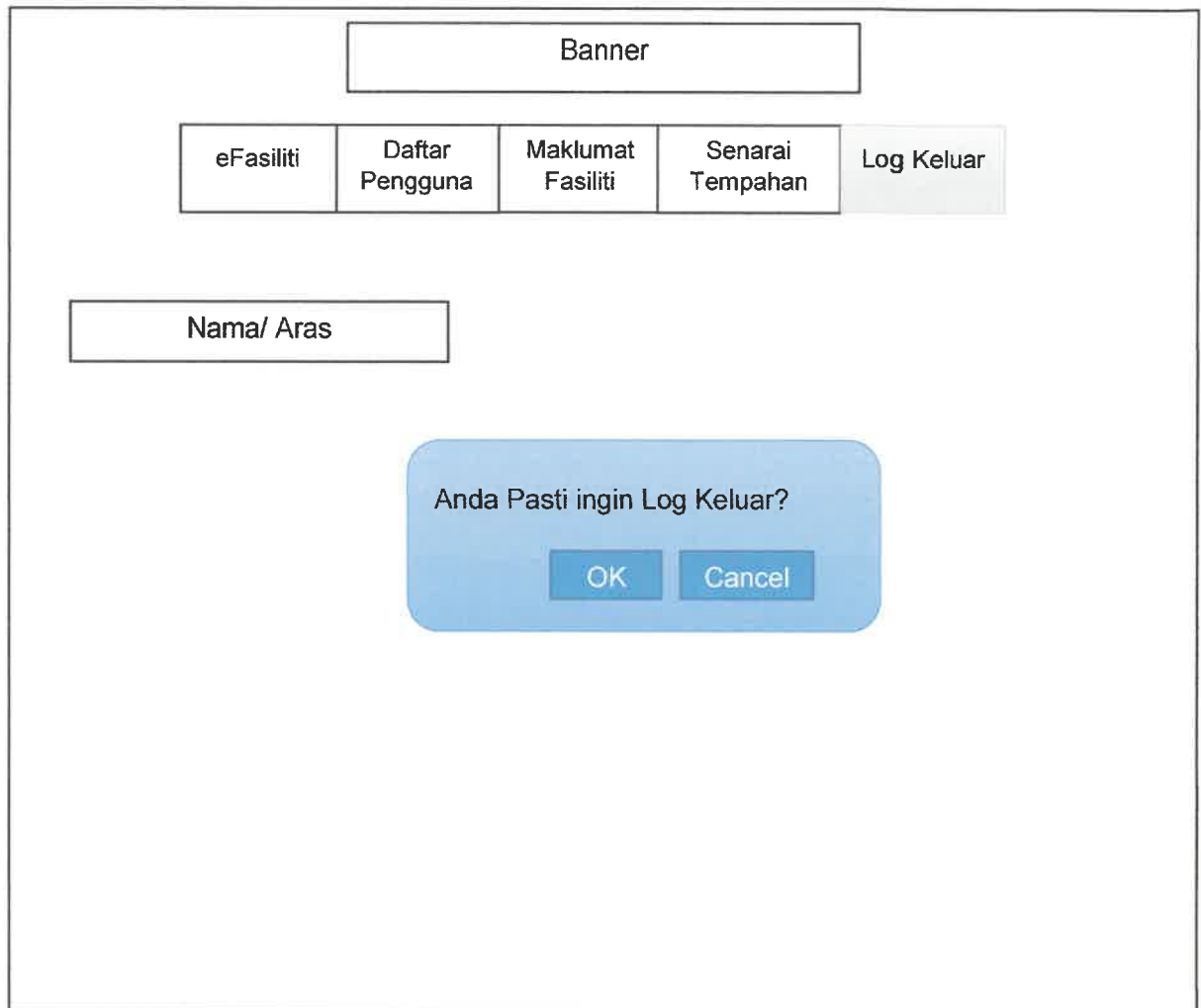


Figure 43: Log Keluar

### 3.2.1.6 Interface Design



Figure 44: Login interface of admin and staff



Figure 45: Homepage of the system



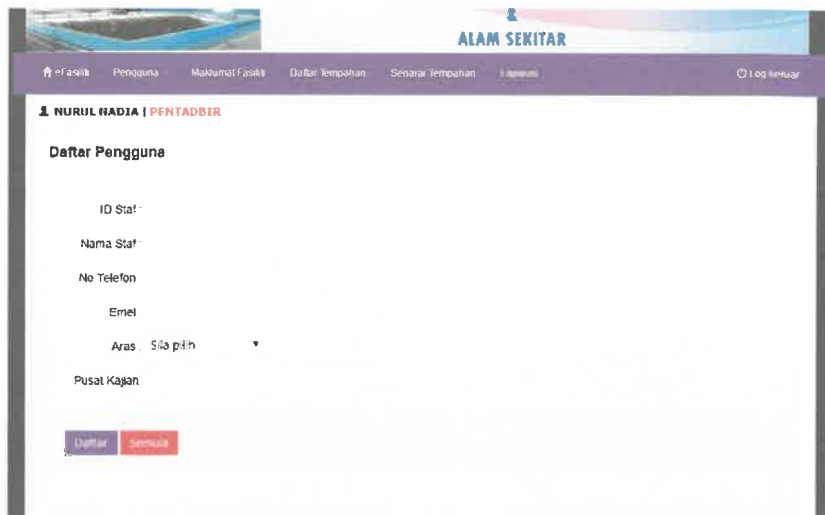


Figure 46: Register User (Admin)

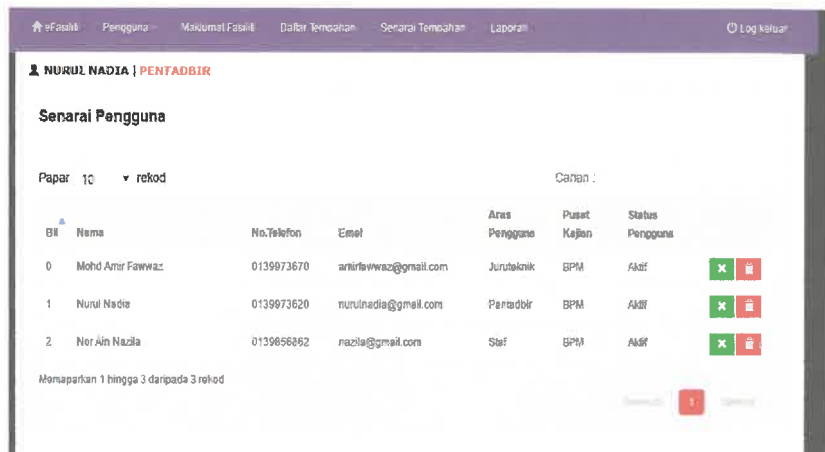


Figure 47: List of User (Admin)

IMC 690 INDUSTRIAL TRAINING

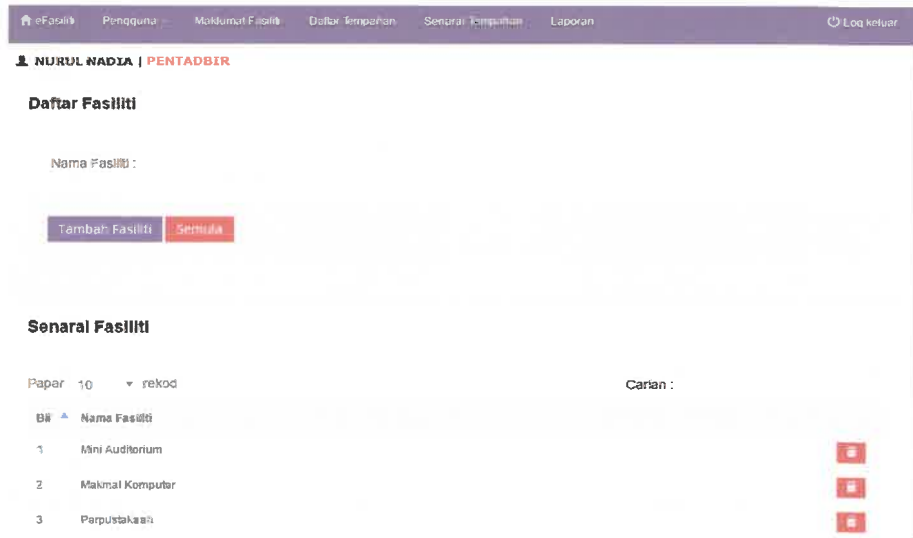


Figure 48: Book Facilities (Admin & User)

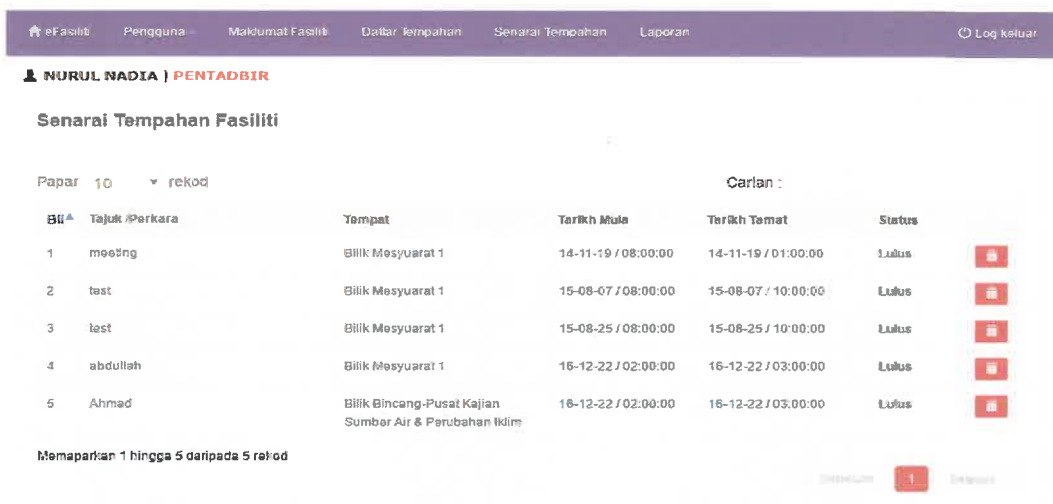


Figure 49: Boking Facilities List (Admin & User)



Figure 50: Laporan Tempahan

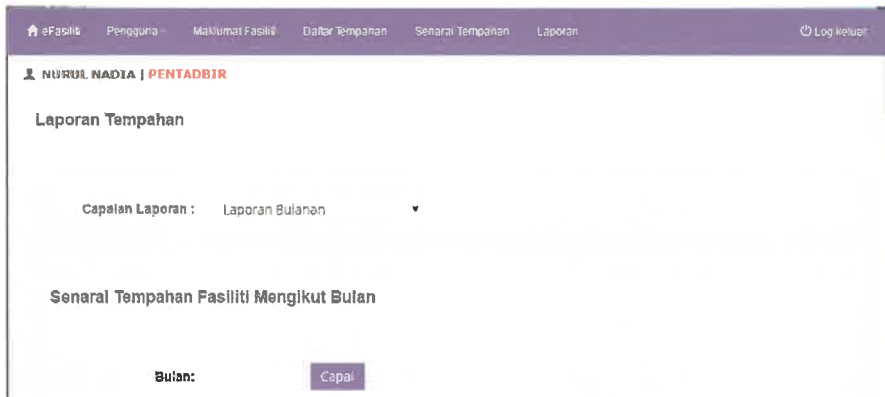


Figure 51: Laporan Tempahan (Bulanan)



Figure 52: Laporan Tempahan mengikut fasiliti

### **3.2.2 Survey on user satisfaction indexes towards NAHRIM's mobile application**

The supervisor at the organization ask the trainee to make a survey which is the title of the survey is Survey on user satisfaction indexes towards NAHRIM's mobile application.

The details of the report of the survey is at appendix.

## CHAPTER 4

### CONCLUSIONS

#### 4.1 Application of knowledge, skills, and experience in undertaking the task

During five months internship at National Hydraulic Research Institute of Malaysia (NAHRIM), the trainee had gained a lot of precious knowledge that the trainee can applied the knowledge gained in the real world of working environment. Besides, the trainee use all the knowledge that they had learnt at the university and apply it to the organization. The knowledge that the trainee get from the university give many benefit to the trainee to handle work given by the organization and department. Moreover, during the internship, it make the trainee discover their own potential and ability and faced the challenging working environment in real world. Internship is the medium where the trainee use the knowledge that they have learned and gained and show their ability to the organization. Besides, some knowledge that the trainee get from the organization also can be benefit to the trainee because it can give the trainee new knowledge that the trainee can use it in their real working environment. Below is the trainee's summary of knowledge, skills, and experiences.

Table 4: Application of knowledge, skills, and experience in undertaking the task

Project/Activity	Knowledge	Skills	Experience	Related Course
I. Find, collect and compile document for Audit (Inspectorate ICU).	The trainee should know the location of the document and list the document required for Audit Activity. The trainee get the information from the staff that manage the project.	Technical skills, Management skills.	The trainee had learnt on how to collect and find document in subject Record management during study. The subject help the trainee on how to find and collect document properly.	IMR 451, Management of Records.
II. Handle the document given by the staff which is the trainee should update and record the document in the file.	This task make the trainee be more alert to the document that the trainee need to update and record. Besides, the trainee must have good management on record so that any important document do not missed.	Management skills	The staff teach the trainee on how to arrange the document depend on their department' file number. The trainee should alert the file number of the document and place it into the correct file.	IMR 455, Administration of Record

<p><b>III. Migrate data for Website Gedung 1Nahrim (National Hydraulic Research Institute of Malaysia (NAHRIM) and Official website of National Hydraulic Research Institute of Malaysia (NAHRIM)</b></p>	<p>This task was given by the staff and vendor that develop these system/website and the trainee need to migrate the data at the old system/website into the new system/website. This is the first trainee experience in migrating data.</p>	<p>Technical Skills/ Computer Skills</p>	<p>This is the first trainee experience in migrating data. It is quite challenging because the trainee should know how to use the tools to migrate the data and need the staff teach the trainee to use the tools.</p>	<p>IMS 502/IMS 655- Information system IMS607- Advanced Web Design</p>
<p><b>IV. Secretariat (Assembly)</b></p> <ul style="list-style-type: none"> <li>- Promote Nahrim's mobile application</li> <li>- Distribute and collect survey question</li> </ul>	<p>The trainee was assigned by the supervisor to be a secretariat for National Hydraulic Research Institute of Malaysia (NAHRIM) assembly.</p>	<p>Management skills</p>	<p>During the assembly, the trainee was assigned to promote the mobile application by the organization then need to distribute and collect the survey question.</p>	<p>IMS 654- Information System</p>

<p><b>V. Analysis survey</b></p> <ul style="list-style-type: none"> <li>- <b>Survey for user satisfaction toward mobile application by National Hydraulic Research Institute of Malaysia (NAHRIM)</b></li> </ul>	<p>The trainee met a lot of people that come from different organization.</p>	<p>Technical Skills, Communication Skills</p>	<p>During distribute the survey, the trainee need to explain the information of the mobile application to the people. It need the trainee communicate well with people.</p>	<p>IMS 654- Information System IMS 502- Information Analysis for Decision Making</p>
<p><b>VI. Help desk</b></p>	<p>The trainee was teach by the staff to fix printer</p>	<p>Technical Skills</p>	<p>At first the staff teach how to fix printer if certain problem occur then the trainee manage to fix it by own.</p>	<p>IMD 203 Support service and maintenance</p>



#### **4.2 Personal thought and opinion**

During internship at National Hydraulic Research Institute, the trainee had noticed that this organization has ten (10) departments that have different job scope and responsibilities. There are Water resources and climate change research centre, Water Quality and environment research centre, River Basin Research Centre, Hydraulic and Instrumentation Laboratory, Water Quality Laboratory, Hydrology Research Centre, Management services Division, Corporate Planning Division, Information Management Division and lastly is Coastal Management and Oceanography Research Centre. Each department and research centre has its own director that responsible to lead their staff in working. The trainee can see that it was the organization strength because the staff have a leader to assist them in doing their job. Furthermore, the organization has good and supportive environment that can be benefit to the staff and what the trainee and in the trainee view, there are enough facilities and equipment provided for the staff and definitely it can make the staff feel in comfort zone while doing their job.

Besides, the trainee noticed at the department that the trainee undergo the internship is the director willing and ready to listen the problem faced by his staff and try to solved it together and also the staff give their own opinion to settle the problem. There are great teamwork spirit between staff and it can be praised. In addition, it also will make the work of staff become more efficient and systematic and feel energetic because they have support from each other. Next, what the trainee notice is there is no problem in communication between staff at National Hydraulic Research Institute because there have multi race and religious workers such as Chinese, Indian, and others. Although the organization has multi race and religious worker, they do not have any problem in term of miscommunication or understanding but have good and close relationship between each other. They can understand and respect each other and also they can work together regardless of race and religious.

In addition, the staff also friendly to the trainee and willing to guide the trainee in any job given by them. Beside, when doing the job given by the supervisor or staff, the trainee has apply the knowledge and skills that already provided by faculty and it is very useful to the trainee. Therefore, it can make the trainee can do the job given easily and the new knowledge that the trainee get will be the benefit to the trainee that can be used in future.

From the trainee opinion, some improvement can be done by the organization in term of hire more staff in the department that the trainee undergo the internship. This is because, the trainee noticed that the department lack of staff that make some staff at the department have too much work load. Hiring new staff can reduce the work load that the staff faced and also can make their job done on time.

Next, the trainee suggests if any junior student want to intern at the organization because the department that the trainee doing the intern is very suitable for information technology field. Moreover, the staff and the trainee supervisor willing to guide and spend time to any student that want to do internship at the department. They can exposed the internship student to information technology and share what actually they do in their job. So the internship student will be exposed to the real job that the staff need to do.

### **4.3 Lesson learnt**

Throughout the trainee doing internship at National Hydraulic Research Institute of Malaysia for five (5) months starting from August 2016 until December 2016, there are many things and lesson that the trainee get. All the lesson that the trainee discovered very helpful for the trainee because the trainee can practice it for future and in real working environment. Even many things and lesson that the trainee get but the trainee still want to explore more and gain knowledge. There are lesson learn that the trainee has discovered.

#### **4.3.1 Communication skills**

Communication to people that we do not recognise is quite challenging for trainee. When the trainee do the internship at National hydraulic Research Institute of Malaysia, the trainee has meet many people and need to communicate with them such as vendors that come at the organization. It can improve the trainee communication skills in term of speaking in English and increase the trainee confident level. Besides, it is important to communicate because if anything that the trainee do not know, the trainee should ask to other staff to complete the trainee job.

#### **4.3.2 Problem solving**

During finishing the job given by the staff, the trainee also face some problem. From that problem, the trainee need to think and learn on how to solve it by referring to the trainee's supervisor or staff at the department. It is important to get the right way to solve the problem because it can prevent from any bad effect to the job given and organization too. Besides, it can ensure that the problem can be solved in correct way.

#### **4.3.3 Teamwork**

The other valuable lesson that the trainee get is teamwork in working. Teamwork is important because it can make their job can be done effectively and efficiently. Teamwork spirit between the staff at the organization are very strong and it make the trainee can do the job

given smoothly. The trainee notice that strong teamwork between staff can give benefit to them because their work will be more quality.

#### **4.3.4 Time management**

Time management is important because the trainee should have good time management so that the trainee can do the given job on time. Besides, the staff also remind the trainee about time management for example come to work at the appointed time and also do the job given by them on time that they have set. The trainee must ensure the work given finish on time and do not postponed in finishing the job.

#### **4.3.5 Respect each other**

The trainee should have good behaviour and attitude so that the staff or people around can feel comfortable to work with us. The trainee should respect each other so that it can build good relationship between them. Besides, the trainee meet a lot of people that come from different background, race and religious, so the trainee should know the limit and sensitivity.

#### **4.3.6 Expose in real working environment**

When doing internship, the trainee was exposed to the real working environment which is the trainee do not feel and see during study. The trainee will faced workload and have responsibility to the work given to us so it can give experience to the trainee and also can gain knowledge on how to handle work. Besides, the trainee can apply all the experience and knowledge in the future.

#### **4.3.7 Courageous**

The trainee should be courageous because for example the trainee has face some problem while finishing the job given and it need help from the staff, the trainee must ask the staff to help in solving the problem.

#### **4.4 Limitation and Recommendations**

During internship for five month at National Hydraulic Institute of Malaysia, the trainee noticed that there are some limitation occurs. First, the organization face problem when some of the staff lack of IT awareness skills. This is because the trainee notice that some of the staff do not know how to use the system for example do not know the function available in the system. It make the staff need to get the information at the information management department and the staff that handle the system need to guide again even they had make training for the staff at the organization.

The trainee recommendation is the organization need to enhance the IT training skills among the staff. During the organization hold training for the staff, the in charge officer that handle the training need to guide every staff that join the training by make the staff follow every step so that they will not miss the information and after the training they know how to use the system. Besides, user manual need to distribute to all the staff so that they it can assist them in accessing the system.

## REFERENCES

National Hydraulic Research Institute of malaysia. (2016). Retrieved from

<http://www.nahrim.gov.my/en.html>

Network Diagram. (2016). Retrieved from <https://www.smartdraw.com/network-diagram/>

Planning in system development. (2016). Retrieved from

<http://www.ganttchart.com/>

# APPENDIXES



# LAPORAN KAJIAN KEPUASAN PELANGGAN APLIKASI MOBIL NAHRIM

**INSTITUT PENYELIDIKAN HIDRAULIK KEBANGSAAN MALAYSIA**

---

Disediakan oleh:  
BAGIAN PENGURUSAN MAKLUMAT  
INSTITUT PENYELIDIKAN HIDRAULIK KEBANGSAAN MALAYSIA

---



## 1.0 PENGENALAN

Institut Penyelidikan Hidraulik Kebangsaan Malaysia (NAHRIM) merupakan sebuah institusi kerajaan yang bergiat aktif dalam usaha-usaha Penyelidikan dan Pembangunan (R&D) berkaitan dengan pengurusan sumber asli air serta pemuliharaan alam sekitarnya. Data dan maklumat hasil penemuan daripada R&D yang dijalankan oleh NAHRIM perlu dikongsi dan dihebah kepada umum bagi tujuan perkongsian maklumat, kesedaran dan juga pembelajaran selain untuk tujuan-tujuan lain. Justeru itu, dengan kemajuan teknologi yang wujud pada zaman sekarang, NAHRIM telah menggunakan pendekatan aplikasi mobil untuk memudahkan pengguna mengguna pakai dan memahami dengan lebih mendalam R&D yang telah dijalankan oleh NAHRIM.

Melalui portal Jabatan Perangkaan Malaysia (<https://www.statistics.gov.my>)<sup>1</sup> satu kajian berkenaan akses dan penggunaan ICT terhadap individu dan isi rumah telah dijalankan di mana penggunaan telefon pintar terhadap individu berumur 15 tahun ke atas di Malaysia telah meningkat daripada 94.2% (tahun 2013) kepada 97.5% (tahun 2015). Aktiviti internet yang dilakukan pada tahun 2015 pula termasuk mengambil bahagian dalam media sosial (84.3%), mencapai maklumat berkenaan barang dan perkhidmatan (79.6%), memuat turun imej, filem, video, muzik, dan permainan mobil (76.1%) serta menghantar atau menerima email (68.4%). Kajian ini menunjukkan penggunaan telefon pintar sudah menjadi semakin lazim di kalangan pengguna Malaysia. Justeru itu, keputusan NAHRIM memilih pendekatan aplikasi mobil adalah tepat dengan matlamat supaya pengguna, tidak kira pengguna dalaman dan luaran dapat mengakses maklumat yang diperlukan dengan cepat dan berkesan.

Sebanyak lima (5) buah aplikasi mobil telah dihasilkan oleh NAHRIM secara umumnya dan Bahagian Pengurusan Maklumat (BPM) NAHRIM secara khususnya. Aplikasi mobil ini merupakan salah satu output dan produk inovasi yang dihasilkan untuk mengintegrasikan mengaplikasikan ICT dalam bidang R&D. Berikut merupakan aplikasi mobil yang telah dihasilkan NAHRIM:

1. Aplikasi mobil (Andorid): NAHRIM *Sea Level Rise Projection for Malaysia*;
2. Aplikasi mobil (Andorid): NAHRIM *Hydroclimate Projection for Malaysia*;
3. Aplikasi mobil (Andorid dan iOS): NAHRIM *Modelling Calculator*;
4. Aplikasi permainan mobil (Android dan iOS): *MyPlop*; dan
5. Aplikasi permainan mobil (Android dan iOS): *Clean the Water*.

Aplikasi mobil yang telah dibangunkan ini merupakan kolaborasi antara beberapa Pusat Kajian dan Makmal NAHRIM dengan BPM bagi memastikan proses penyampaian dan perkongsian data dan maklumat dilakukan menggunakan kaedah yang efektif dan efisien.

Dalam usaha meningkatkan tahap kepuasan pengguna terhadap aplikasi mobil yang telah dibangunkan oleh NAHRIM, soal selidik Kajian Kepuasan Pelanggan telah dilaksanakan bagi mendapat pandangan dan pendapat pengguna aplikasi mobil mengenai aspek kebolegunaan sebagai input untuk penambahbaikan pada masa hadapan. Borang soal selidik

<sup>1</sup>Jabatan Perangkaan Malaysia. (2015). ICT use and access by individuals and households survey report <https://www.statistics.gov.my/index.php?r=column/pdfPrev&id=Q3l3WXJFbG1PNjRwcHZQTvISR1UrQT09> [10 November 2016]

telah diedarkan kepada pengguna menerusi beberapa siri program yang dijalankan NAHRIM dalam usaha mendapat input yang bervariasi dan lebih komprehensif.

### 1.1 APLIKASI MOBIL (ANDROID): NAHRIM SEA LEVEL RISE PROJECTION FOR MALAYSIA

NAHRIM *Sea Level Rise Projection for Malaysia* ini adalah sebuah aplikasi mobil yang dibangunkan secara kolaborasi antara Pusat Kajian Pantai dan Oseanografi (PKPO) dengan BPM. Aplikasi mobil yang berasaskan Android ini dibangunkan bertujuan untuk menyediakan data unjuran perubahan aras laut di sepanjang pantai Malaysia untuk abad ke-21 kesan daripada perubahan iklim melalui kajian yang dijalankan oleh PKPO. Aplikasi ini dibangunkan pada tahun September 2013 dan dilancarkan di Google Play Store pada 1 Januari 2014.

Melalui aplikasi ini, data dan maklumat penyelidikan yang dijalankan oleh NAHRIM dapat dikongsi bersama pengguna. Antara contoh data dan maklumat yang dikongsi di dalam aplikasi ini adalah data asimilasi unjuran melalui *Atmosphere-Ocean Global Circulation Models (AOGCM)*.

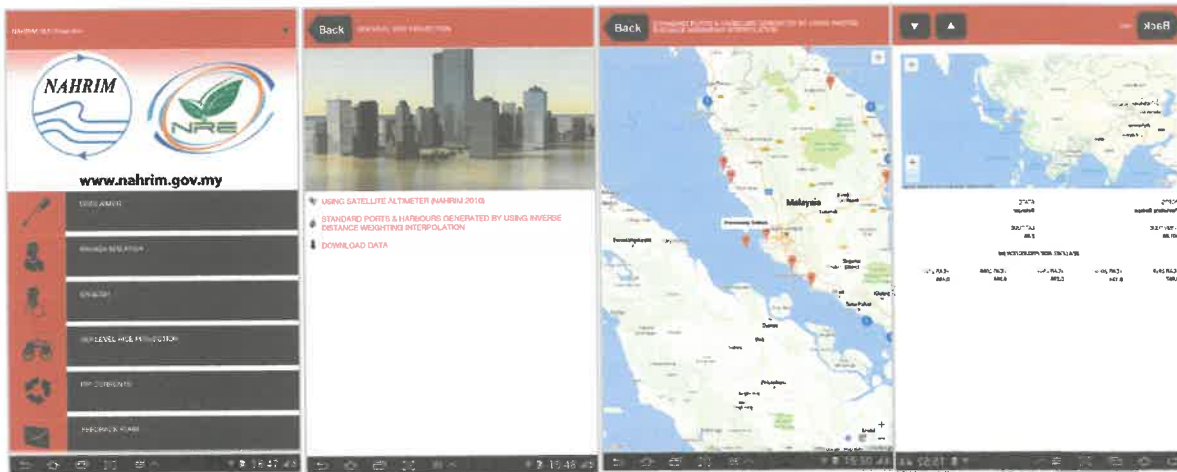
Data unjuran Purata Kenaikan Aras Laut pula menggunakan Satelit Altimeter menerusi kajian yang dijalankan oleh NAHRIM pada tahun 2010 meliputi 13 lokasi kajian di Semenanjung Malaysia dan 17 lokasi di Sabah dan Sarawak seperti Jadual 1.1.

Lokasi	Nama Kawasan
Semenanjung Malaysia	<ol style="list-style-type: none"> <li>1. Perairan Laut Andaman</li> <li>2. Sempadan Malaysia (Perlis-Thailand)</li> <li>3. Perairan Selat Melaka</li> <li>4. Sempadan P. Pinang-Perak</li> <li>5. Selat Johor</li> <li>6. Perairan Mersing</li> <li>7. Pulau Tioman</li> <li>8. Persisiran Pantai Pekan</li> <li>9. Cherating</li> <li>10. Pulau Perhentian, Terengganu</li> <li>11. Perairan Thailand</li> <li>12. Sempadan Malaysia (Kelantan Thailand)</li> <li>13. Perairan Kelantan</li> </ol>
Sabah & Sarawak	<ol style="list-style-type: none"> <li>1. Perairan Kuching dan Bau</li> <li>2. Perairan Sarikei-Sibu</li> <li>3. Luar Persisir Sarawak</li> <li>4. Perairan Bintulu</li> <li>5. Perairan Mukah</li> <li>6. Perairan Brunei</li> <li>7. Perairan Miri</li> <li>8. Luar Persisir Miri- Brunei</li> <li>9. Persisiran Pantai Kota Kinabalu</li> <li>10. Perairan Labuan</li> <li>11. Teluk Marudu, Kota Marudu-Kudat</li> </ol>

- 12. Perairan Pitas
- 13. Laut Sulu
- 14. Beluran
- 15. Perairan Sandakan
- 16. Perairan Lahad Datu
- 17. Perairan Tawau

Jadual 1.1 Senarai Lokasi Kajian di Semanjung, Sabah dan Sarawak Menggunakan Satelit Altimeter (NAHRIM, 2010)

Kumpulan sasaran pengguna untuk aplikasi mobil ini adalah penyelidik (awam & swasta), ahli akademik, pelajar dan juga orang awam yang berminat untuk mendapatkan data dan maklumat mengenai kajian perubahan aras laut di Malaysia yang dijalankan oleh PKPO NAHRIM. Aplikasi mobil ini boleh dimuat turun di *Google Play Store* melalui kata carian NAHRIM SLR *Projection*. Berikut merupakan beberapa contoh syot layar aplikasi mobil NAHRIM SLR *Projection*.



Rajah 1.1 Contoh syot layar aplikasi mobil NAHRIM *Sea Level Rise Projection for Malaysia*

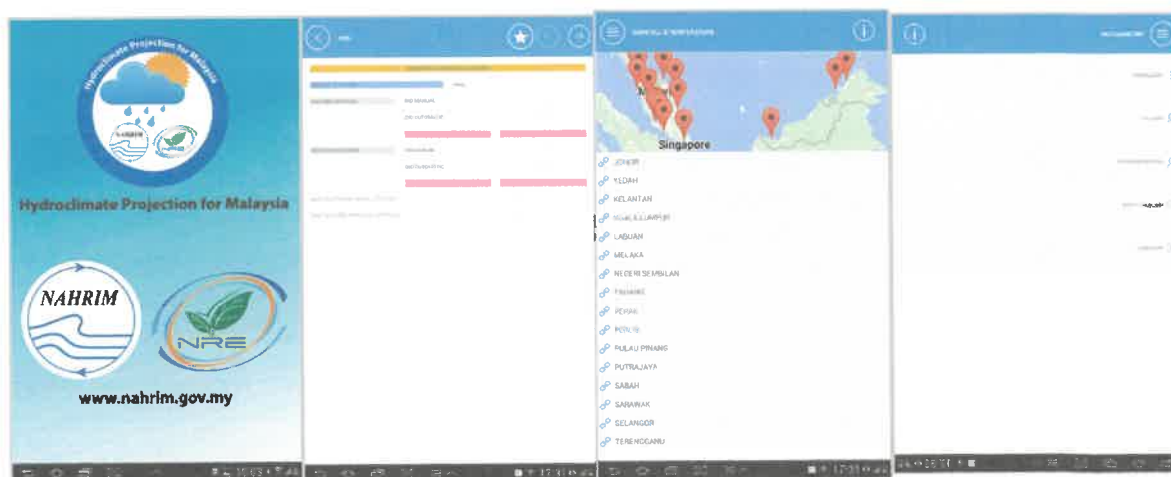
## 1.2 APLIKASI MOBIL (ANDROID): NAHRIM HYDROCLIMATE PROJECTION FOR MALAYSIA

Aplikasi mobil kedua yang dibangunkan oleh NAHRIM juga berasaskan Android yang dibangunkan secara kolaborasi antara Pusat Kajian Sumber Air dan Perubahan Iklim (PKSA) dan BPM bertujuan untuk menyediakan platform bagi data anggaran intensiti hujan dan suhu udara di beberapa lokasi dan tempat yang terpilih di Malaysia.

Aplikasi mobil ini memberi nilai anggaran purata hujan dan suhu udara bagi tahun 1970-2000, 2011-2040, 2041-2070 dan 2071-2100 untuk beberapa bandar dalam Malaysia. Selain itu, melalui fungsi MyCDDI (*Malaysia Climate Data & Database Interactive*) ia menyediakan data taburan hujan dan suhu udara pada sebarang kedudukan telefon pintar dan tablet berpandukan GPS pengguna. Untuk menggunakan fungsi ini, pengguna hanya perlu aktifkan GPS telefon dan menerusi aplikasi mobil NAHRIM *Hydroclimate Projection ini*, ia akan mencari

nilai hujan dan suhu yang berdasarkan *Regional Hydroclimate Model-Peninsular Malaysia* yang dibangunkan oleh NAHRIM.

Aplikasi mobil ini dibangunkan pada September 2013 dan dilancarkan di *Google Play Store* pada 1 Januari 2014. Kumpulan sasaran pengguna untuk aplikasi mobil ini adalah penyelidik (awam & swasta), ahli akademik, pelajar dan juga orang awam yang berminat untuk mendapatkan data dan maklumat unjuran hidrogeologi untuk bandar-bandar di Malaysia. Aplikasi mobil ini boleh dimuat turun di *Google Play Store* melalui kata carian NAHRIM *Hydroclimate Projection*. Berikut merupakan beberapa contoh syot layar aplikasi mobil NAHRIM *Hydroclimate Projection for Malaysia*.



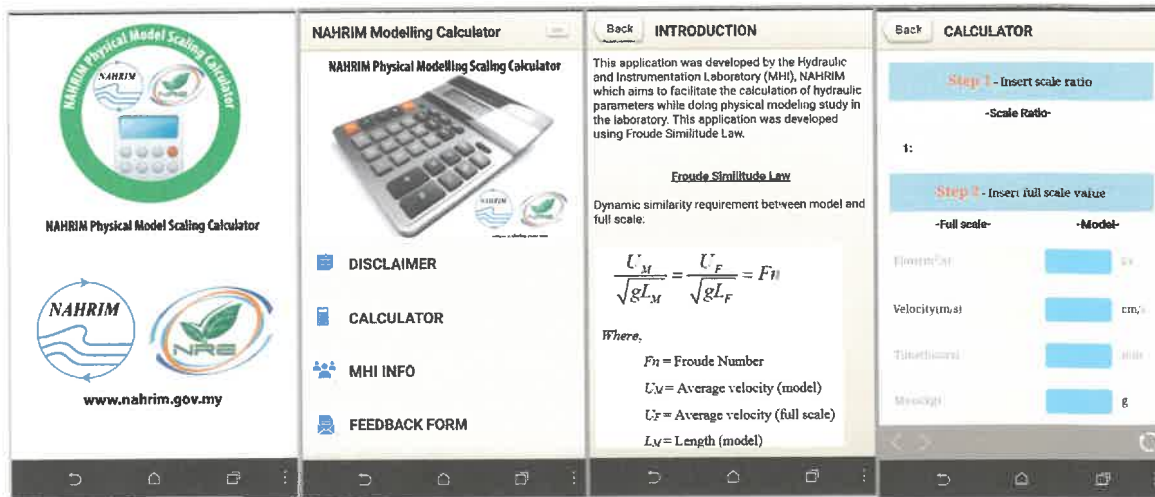
Rajah 1.2 Contoh syot layar aplikasi mobil NAHRIM *Hydroclimate Projection for Malaysia*

### 1.3 APLIKASI MOBIL (ANDROID DAN IOS): NAHRIM MODELLING CALCULATOR

Aplikasi mobil NAHRIM *Modelling Calculator*, merupakan sebuah aplikasi yang berfungsi untuk menukar sesuatu ukuran/parameter dari saiz sebenar kepada saiz model mengikut skala tertentu untuk kajian pemodelan fizikal di makmal. Aplikasi ini merupakan kolaborasi antara Makmal Hidraulik dan Instrumentasi (MHI) dan BPM.

Aplikasi ini dibangunkan bertujuan untuk membantu pengguna dalam proses pengiraan secara automatik serta mudah. Hukum Penyerupaan Froude digunakan sebagai asas pengiraan pemodelan ini. Bagi menggunakan aplikasi ini, pengguna perlu memasukkan nilai ratio yang diinginkan, dan kemudian nilai Aliran ( $m^3/s$ ), Halaju (m/s), Masa (jam) atau Jisim (kg) air. Aplikasi ini akan memberi nilai baru berdasarkan nilai ratio yang telah dimasukkan. Melalui aplikasi mobil ini, kumpulan sasaran pengguna khususnya penyelidik dan jurutera boleh membuat pengiraan di lapangan dengan mudah dan cepat.

Aplikasi yang dibangunkan pada Disember 2014 ini boleh dimuat turun dan digunakan untuk pengguna Android dan iOS dengan kata carian NAHRIM atau *Modelling Calculator*. Berikut merupakan beberapa contoh syot layar aplikasi mobil NAHRIM *Modelling Calculator*.



Rajah 1.3 Contoh syot layar aplikasi mobil NAHRIM Modelling Calculator

#### 1.4 APLIKASI PERMAINAN MOBIL (ANDROID DAN IOS): MYPLOP

Aplikasi permainan mobil *MyPlop* dibangunkan dengan kerjasama Pusat Kajian Hidrogeologi (PKH) dan BPM. Aplikasi ini dikategorikan sebagai aplikasi edutainment yang merupakan gabungan *education* dan *entertainment*. Kumpulan sasaran pengguna untuk aplikasi ini adalah golongan muda dan penggemar aplikasi permainan mobil.

Aplikasi ini berkisahkan tentang air bawah tanah di mana pengguna perlu memastikan air hujan yang turun ke bumi dapat disimpan di dalam akuifer supaya air tersebut boleh digunakan oleh hidupan. Had masa diberikan untuk pengguna melaksanakan tugas dan pada masa yang sama, pengguna perlu memastikan tiada agen pencemaran yang masuk ke dalam akuifer dengan meneutralkan agen pencemaran tersebut menggunakan titisan air hujan.

Tujuan aplikasi ini dibangunkan adalah memberi pendidikan dan pengetahuan mengenai air bawah tanah dan proses-proses yang terlibat dalam kitaran air bawah tanah. Selain daripada elemen permainan, fakta-fakta berkaitan air bawah tanah turut disertakan bagi menambah pengetahuan pengguna. Aplikasi mobil ini siap sepenuhnya pada Julai 2015 sedia untuk dimuat turun dan digunakan oleh pengguna Android dan iOS dengan kata carian NAHRIM atau *MyPlop*. Berikut merupakan beberapa contoh syot layar aplikasi permainan mobil *MyPlop*.





Rajah 1.4 Contoh syot layar aplikasi permainan mobil My Plop

### 1.5 APLIKASI PERMAINAN MOBIL (ANDROID DAN IOS): CLEAN THE WATER

Aplikasi permainan mobil *Clean the Water* merupakan sebuah aplikasi edutainment yang merupakan gabungan *education* dan *entertainment*. Aplikasi ini dibangunkan dengan kerjasama Makmal Kualiti Air (MKA) dan BPM. Aplikasi ini merupakan sebuah permainan yang dibangunkan bertujuan untuk memberi pendedahan mengenai punca-punca pencemaran air dan kaedah rawatan yang boleh digunakan mengikut jenis pencemaran. Kumpulan sasaran untuk aplikasi ini adalah golongan muda dan pengemar permainan aplikasi mobil.

Jalan cerita permainan ini memerlukan pengguna memandu bot mengelilingi sungai dan mengutip agen pencemaran yang terapung dengan melupuskan agen pencemaran tersebut dengan menggunakan teknik yang betul. Agen pencemaran tersebut terdiri daripada bahan plastik, minyak, kertas, najis haiwan, tanah dan baja tumbuhan. Teknik yang disediakan pula ialah teknik kitar semula, mikroorganisma, 'boom' dan penggumpal. Markah diberi berdasarkan ketepatan teknik yang digunakan pengguna untuk melupuskan agen pencemaran dalam had masa yang telah ditetapkan.

Selain daripada elemen permainan, fakta-fakta berkaitan teknik rawatan air turut disertakan untuk menambah pengetahuan pengguna. Aplikasi mobil yang dibangunkan pada Julai 2015 ini sedia untuk dimuat turun dan digunakan oleh pengguna Android dan iOS dengan kata carian NAHRIM atau *Clean the Water*. Berikut merupakan beberapa contoh syot layar aplikasi permainan mobil *Clean the Water*.



Rajah 1.5 Contoh syot layar aplikasi permainan mobil *Clean the Water*

## 2.0 OBJEKTIF DAN SKOP KAJIAN

Bagi mendapatkan maklum balas berkenaan kebolehgunaan (*usability*) aplikasi mobil ini, soal selidik telah dibangunkan berdasarkan objektif dan skop kajian berikut.

### 2.1 OBJEKTIF KAJIAN

Dalam menjalankan kajian ini, objektif yang ingin dicapai adalah:

- Mendapatkan input, maklum balas dan memahami keperluan serta kehendak pelanggan-pelanggan NAHRIM;
- Meninjau tahap kepuasan pelanggan terhadap kebolehgunaan, kemudahan dan perkhidmatan berkaitan dengan aplikasi mobil yang terdapat di NAHRIM;
- Mengenal pasti aspek positif mengenai aplikasi mobil NAHRIM yang telah dibangunkan oleh NAHRIM sama ada mempunyai manfaat atau sebaliknya; dan
- Untuk menerima pendapat dan cadangan penambahbaikan daripada pengguna terhadap aplikasimobil NAHRIM.

### 2.2SKOP KAJIAN

Skop kajian ini hanya memberi tumpuan kepada lima (5) buah aplikasi mobil NAHRIM yang telah dibangunkan seperti berikut:

- a. Aplikasi mobil (Android): *Sea Level Rise Projection for Malaysia*;
- b. Aplikasi mobil (Android): *Hydroclimate Projection for Malaysia*;
- c. Aplikasi mobil (Android dan iOS): *Modelling Calculator*;
- d. Aplikasi permainan mobil (Android dan iOS): *MyPlop*; dan
- e. Aplikasi permainan mobil (Android dan iOS): *Clean the Water*.

Dalam kajian ini, aspek kebolegunaan merupakan skop kajian yang memberi fokus kepada pengalaman dan tahap penerimaan serta penggunaan sistem aplikasi NAHRIM kepada pengguna. Berdasarkan input dan maklum balas yang diterima daripada responden, ia akan digunakan untuk membantu dalam mendapatkan indeks kepuasan pelanggan serta pelaporan penilaian *outcome*.

### 3.0 METODOLOGI

Metodologi yang digunakan dalam kajian ini adalah dengan mengedarkan borang kajian soal selidik mengenai kelima-lima aplikasi mobil NAHRIM pada dua lokasi dan tarikh yang berbeza. Seramai 128 orang responden terlibat sebagai sampel dalam kajian soal selidik ini. Bagi setiap aplikasi, terdapat 17 soalan disediakan di dalam borang kajian soal selidik tersebut.

Kajian soal selidik pertama di lakukan pada 9 November 2016, di Kementerian Sumber Asli dan Alam Sekitar (NRE) sempena program Perhimpunan Bulanan NRE bagi November 2016 dan Sambutan Hari Inovasi 2016. Seramai 106 orang responden yang terlibat sebagai sampel dan memberi maklum balas melalui borang soal selidik yang diedarkan. Kajian soal selidik yang kedua pula dilaksanakan pada 17 November 2016 bertempat di Fakulti Teknologi dan Sains Maklumat, Universiti Kebangsaan Malaysia. Seramai 22 orang responden yang terlibat sebagai sampel dan memberi maklum balas melalui borang soal selidik yang diedarkan.

Memandangkan setiap aplikasi mobil mempunyai skop pengguna yang berbeza, kami memberi kebebasan kepada responden untuk memilih aplikasi mobil yang mereka ingini dan menjawab soal selidik berdasarkan pilihan aplikasi mobil mereka. Ini menjadikan responden untuk setiap aplikasi berbeza mengikut skop pengguna.

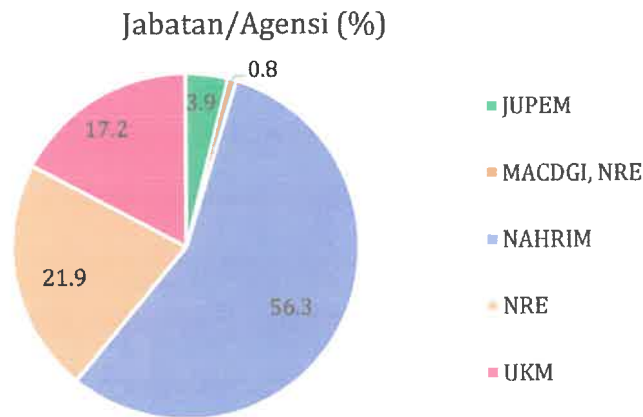
Berdasarkan input yang diterima, analisis dilakukan untuk setiap aplikasi mobil untuk mendapatkan maklumat kepuasan pelanggan terdapat semua aplikasi. Dapatan dan analisis dihuraikan pada Bab 4.0 Dapatan Hasil Kaji Selidik.

### 4.0 DAPATAN HASIL SOAL SELIDIK

Soal selidik yang dibangunkan dibahagi kepada dua (2) seksyen iaitu Seksyen A: Demografi Pengguna dan Seksyen B: Indeks Kepuasan Pelanggan. Seksyen A mengambil kira demografi responden seperti jabatan/agensi, jantina, umur dan kategori pengguna. Ini adalah untuk

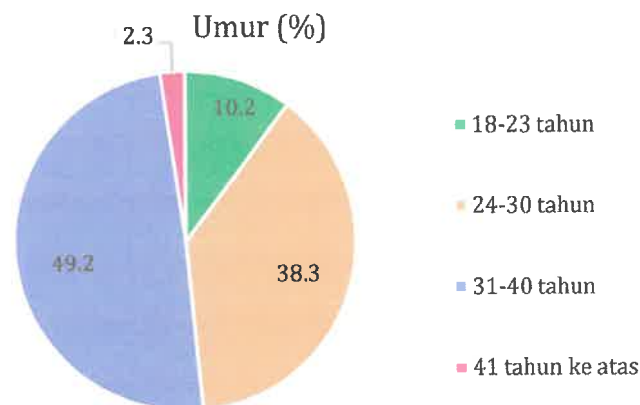


menganalpasti latar belakang responden untuk menentukan kesesuaian pengguna dalam penggunaan aplikasi mobil kategori teknikal (*Sea Level Rise Projection for Malaysia, Hydroclimate Projection for Malaysia, Modelling Calculator*) dan penggunaan aplikasi mobil kategori permainan (*MyPlop* dan *Clean the Water*). Seramai 27 responden lelaki dan 101 responden perempuan telah mengambil bahagian dalam soal selidik ini.



Rajah 4.1 Agensi/ Jabatan responden

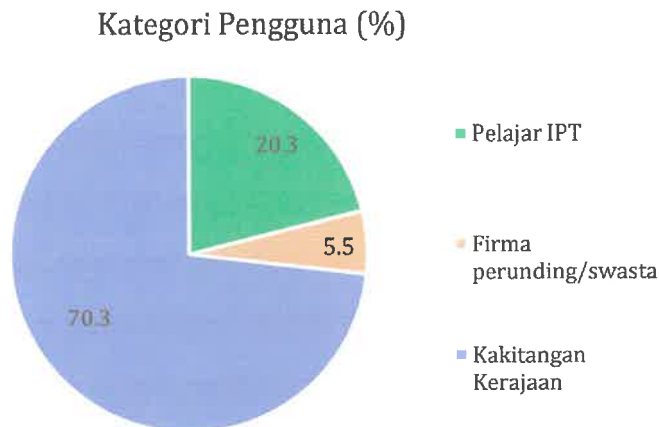
Rajah 4.1 menunjukkan keahlian responden mengikut jabatan/agensi. Majoriti pengguna ialah daripada NAHRIM sendiri iaitu sebanyak 56.3% bersamaan dengan 72 orang daripada jumlah keseluruhan responden. Nilai peratusan kedua tertinggi diikuti dengan responden daripada NRE iaitu sebanyak 21.9%. UKM pula diwakili seramai 22 orang (17.2%) dan diikuti dengan JUPEM sebanyak 3.9% (5 orang) dan MACDGI, NRE sebanyak 0.8% (1 orang).



Rajah 4.2 Umur responden

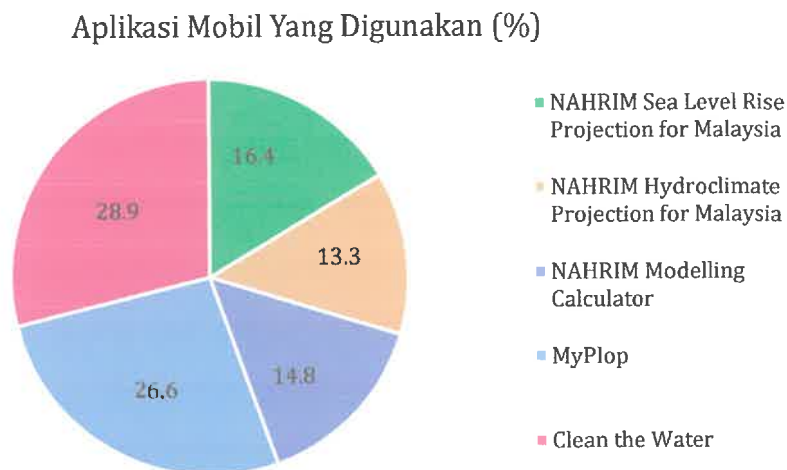
Rajah 4.2 menunjukkan jumlah bilangan responden mengikut umur bagi soal selidik yang telah dilaksanakan. Majoriti responden bagi kajian ini adalah pengguna berumur 31-40 tahun iaitu sebanyak 63 orang (49.2%) manakala pengguna yang berumur 41 tahun ke atas pula adalah paling sedikit iaitu sebanyak 3 orang (2.3%). Selebihnya merupakan

responden yang berumur diantara 24 -34 tahun (49 orang; 38.3%) dan 18-23 tahun (13 orang; 2.3%).



Rajah 4.3 Kategori responden

Rajah 4.3 menunjukkan kategori responden yang mengambil bahagian dalam soal selidik ini. Majoriti daripada responden ialah kakitangan kerajaan iaitu sebanyak 70.3% (90 orang) dan diikuti dengan pelajar IPT seramai 20.3% (26 orang). Kategori firma perunding/swasta paling sedikit mengambil bahagian dalam soal selidik ini dengan hanya 5.5% (7 orang).

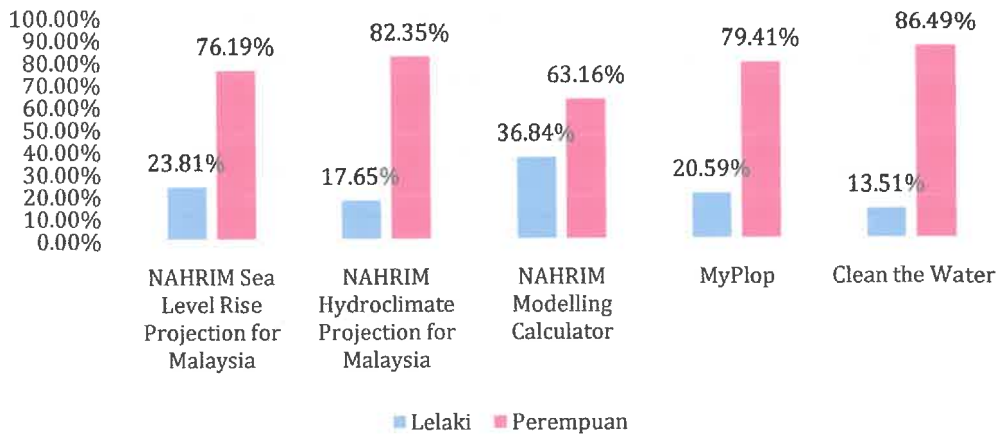


Rajah 4.4 Aplikasi mobil yang digunakan

Berdasarkan Rajah 4.4, sebanyak 28.9% atau 37 orang responden telah mengguna dan menjawab soal selidik berkaitan permainan mobil *Clean the Water*. Permainan mobil *MyPlop* pula telah diguna oleh 26.6% responden (34 orang) sepanjang soal selidik dijalankan. Peratusan ini disusuli dengan aplikasi mobil *NAHRIM Sea Level Rise Projection for Malaysia*

dengan 16.4% responden (21 orang), NAHRIM *Modelling Calculator* dengan 14.8% responden (19 orang) dan NAHRIM *Hydroclimate Projection for Malaysia* dengan 13.3% (17 orang).

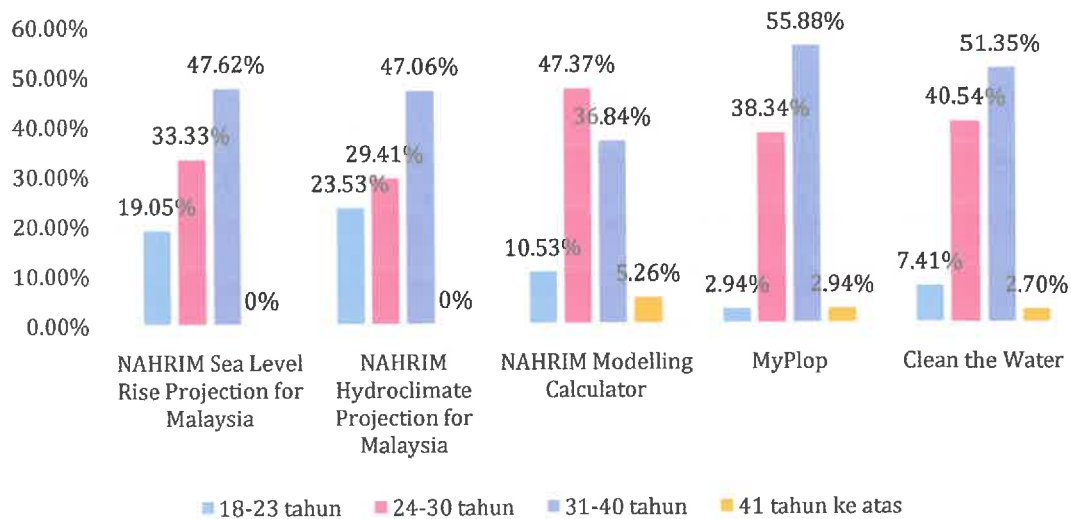
### Kekerapan Jantina Terhadap Penggunaan Aplikasi Mobil NAHRIM



Rajah 4.4 Kekerapan penggunaan aplikasi mobil berdasarkan jantina

Rajah 4.4 menunjukkan kekerapan penggunaan aplikasi mobil berdasarkan jantina responden. Sebanyak 23.81% responden untuk aplikasi mobil NAHRIM *Sea Level Rise Projection for Malaysia* ialah lelaki (5 orang) manakala 76.19% (16 orang) responden ialah perempuan. Untuk aplikasi NAHRIM *Hydroclimate Projection for Malaysia* pula, sebanyak 17.65% (3 orang) responden ialah lelaki dan 82.35% (14 orang) responden ialah perempuan. NAHRIM *Modelling Calculator* pula digunakan oleh 7 orang responden lelaki (36.84%) dan 12 orang responden perempuan (63.16%) sepanjang soal selidik dijalankan. Aplikasi permainan mobil *MyPlop* pula telah mendapat maklum balas daripada 20.59% responden lelaki (7 orang) dan 79.41% responden perempuan (27 orang) manakala *Clean the Water* pula mendapat maklum balas daripada 13.51% responden lelaki (5 orang) dan 86.49% responden perempuan (32 orang).

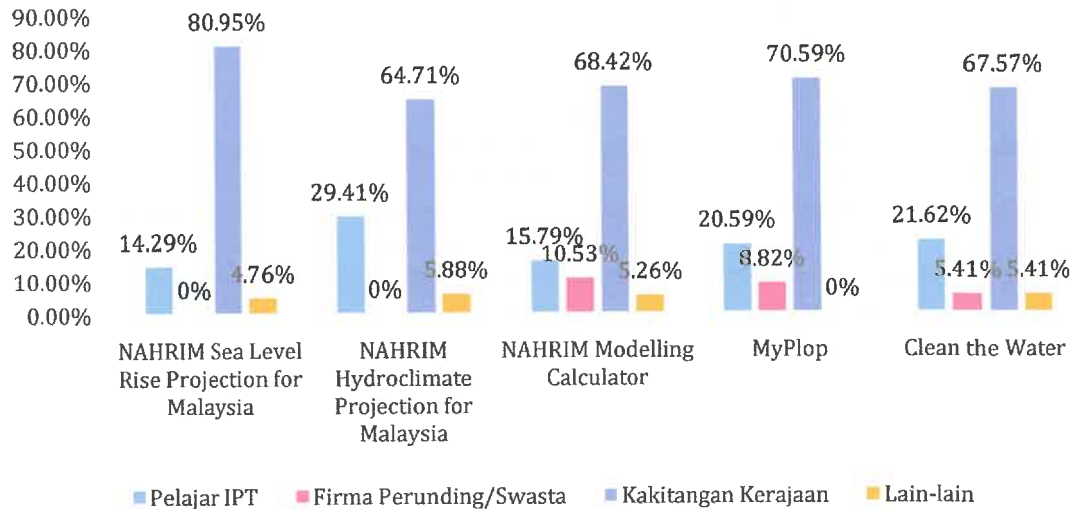
## Kekerapan Umur Terhadap Penggunaan Aplikasi Mobil NAHRIM



Rajah 4.5 Kekerapan penggunaan aplikasi mobil berdasarkan umur

Rajah 4.5 pula menunjukkan kekerapan penggunaan aplikasi mobil berdasarkan umur responden. Majoriti responden untuk aplikasi mobil NAHRIM *Sea Level Rise Projection for Malaysia* ialah berumur 31-40 tahun iaitu sebanyak 47.62% (10 orang), diikuti dengan responden berumur 24-30 tahun sebanyak 33.33% (7 orang) dan responden berumur 18-23 tahun (19.05%, 4 orang). Untuk aplikasi mobil NAHRIM *Hydroclimate Projection for Malaysia* pula telah digunakan oleh 47.06% responden (8 orang) berumur 31-40 tahun, 29.41% responden (14 orang) berumur 24-30 tahun dan 23.53% responden (4 orang) berumur 18-23 tahun. NAHRIM *Modelling Calculator* pula digunakan majoriti oleh sembilan (9) orang responden berumur 24-30 tahun (47.37%) diikuti oleh tujuh (7) orang responden berumur 31-40 tahun (36.84%), dua (2) orang responden berumur 18-23 tahun (10.53%) dan seorang responden berumur 41 tahun ke atas (5.26%). Aplikasi permainan mobil *MyPlop* pula telah mendapat maklum balas daripada 55.88% responden berumur 31-40 tahun (19 orang), 38.34% responden berumur 24-30 tahun (13 orang), dan responden berumur 18-23 tahun dan 41 tahun ke atas masing-masing diwakili sebanyak 2.94% atau seorang responden untuk aplikasi permainan mobil ini. Manakala *Clean the Water* pula mendapat maklum balas daripada 51.35% responden berumur 31-40 tahun (19 orang), 40.54% responden berumur 24-30 tahun (15 orang), 7.41% responden berumur 18-23 tahun (2 orang) dan 2.70% responden berumur 41 tahun ke atas (1 orang).

### Kekerapan Kategori Pengguna Terhadap Penggunaan Aplikasi Mobil NAHRIM



Rajah 4.6 Kekerapan penggunaan aplikasi mobil berdasarkan kategori pengguna

Berdasarkan Rajah 4.6, seramai 80.95% responden (17 orang) yang diwakili oleh kakitangan kerajaan telah memberi maklum balas terhadap aplikasi mobil NAHRIM *Sea Level Rise Projection for Malaysia* diikuti dengan 14.29% responden dari kalangan pelajar IPT (3 orang) dan seorang daripada lain-lain kategori pengguna (4.76%). Aplikasi NAHRIM *Hydroclimate Projection for Malaysia* pula mendapat maklum balas daripada 64.71% responden daripada kakitangan kerajaan bersamaan dengan 11 orang, 29.41% responden daripada pelajar IPT (5 orang) dan 5.88% responden daripada lain-lain kategori (1 orang). Untuk aplikasi mobil NAHRIM *Modelling Calculator*, majoriti seramai 13 orang kakitangan kerajaan bersamaan dengan 68.42% responden telah menggunakan aplikasi mobil ini diikuti dengan tiga orang responden daripada kalangan pelajar IPT (15.79%), dua orang responden daripada firma perunding/swasta (10.53%) dan seorang responden daripada lain-lain kategori (5.26%). Aplikasi permainan mobil *MyPlop* pula telah mendapat maklum balas daripada 70.59% responden dari kalangan kakitangan kerajaan (24 orang), 20.59% responden dari kalangan pelajar IPT (7 orang), dan 8.82% atau tiga orang responden dari kalangan firma perunding/swasta. Seramai 25 orang responden yang diwakili oleh kakitangan kerajaan bersamaan dengan 67.57% pula telah menggunakan aplikasi permainan mobil *Clean the Water*, diikuti dengan lapan orang responden (21.62%) daripada pelajar IPT, dan dua orang responden (5.41%) masing-masing untuk kategori firma perunding/swasta dan lain-lain.

Bahagian seterusnya merupakan input dan maklum balas yang diterima terhadap aplikasi mobil dan telah dikelaskan kepada dua (2) kategori iaitu, maklum balas responden terhadap aplikasi mobildan aspek positif mengenai aplikasi mobilyang terlibat dalam kajian ini.

#### 4.1 APLIKASI MOBIL (ANDROID): NAHRIM SEA LEVEL RISE PROJECTION FOR MALAYSIA

Berdasarkan borang soal selidik yang diedarkan, berikut adalah maklum balas 21 orang responden mengenai Aplikasi Mobil NAHRIM *Sea Level Rise Projection for Malaysia* seperti di Jadual 4.1.

<b>Aplikasi Mobil (Android): NAHRIM Sea Level Rise Projection for Malaysia</b>			
<b>Q1</b>	Saya Akan Menggunakan Sistem Ini Dengan Kerap.	52%	Sebanyak 11 orang responden yang terlibat dengan kajian ini akan menggunakan sistem ini dengan lebih kerap.
<b>Q2</b>	Saya Mendapati Sistem Ini Tidak Perlu Kompleks.	71%	15 orang responden bersetuju sistem yang telah dibangunkan tidak perlu kompleks
<b>Q3</b>	Saya Berpendapat Sistem Ini Mudah Untuk Digunakan.	76%	16 orang responden berpendapat sistem ini mudah digunakan
<b>Q4</b>	Saya Akan Memerlukan Sokongan Teknikal Untuk Dapat Menggunakan Sistem Ini.	48%	Seramai 10 orang responden merasakan mereka memerlukan sokongan teknikal untuk menggunakan sistem tersebut.
<b>Q5</b>	Saya Dapati Pelbagai Fungsi Dalam Sistem Ini Telah Bersepadu.	81%	17 orang responden bersetuju fungsi di dalam sistem ini telah bersepadu
<b>Q6</b>	Saya Dapati Terlalu Banyak Yang Tidak Konsisten Dalam Sistem Ini.	10%	Hanya dua(2) orang responden merasakan sistem ini tidak konsisten.
<b>Q7</b>	Pengguna Akan Belajar Untuk Menggunakan Sistem Ini Dengan Cepat.	81%	Pengguna seramai 17 orang responden bersetuju proses pembelajaran untuk menggunakan sistem ini adalah cepat
<b>Q8</b>	Sistem Ini Rumit Untuk Digunakan.	10%	Hanya dua (2) orang responden merasakan sistem ini rumit untuk digunakan.
<b>Q9</b>	Saya Berasa Amat Yakin Untuk Menggunakan Sistem Ini.	67%	14 orang responden yang terlibat berasa yakin dengan sistem yang telah dibangunkan ini
<b>Q10</b>	Saya Perlu Belajar Banyak Perkara Sebelum Saya Boleh Menggunakan Sistem Ini.	38%	Hanya lapan (8) orang responden perlu belajar berkenaan sistem tersebut sebelum menggunakannya.

Jadual4.1: Maklum balas responden untuk Aplikasi Mobil (Android): NAHRIM *Sea Level Rise Projection for Malaysia*

Jadual 4.2 menunjukkan pendapat positif responden mengenai aplikasi mobil tersebut.

Sistem Aplikasi	Aspek Positif
Aplikasi Mobil (Android): NAHRIM <i>Sea Level Rise for Malaysia</i>	<ul style="list-style-type: none"> <li>a. Boleh digunakan oleh pelbagai lapisan umur serta kepelbagaian penggunaan;</li> <li>b. Dapat menarik minat dan memberi pengetahuan berkaitan SLR di Malaysia untuk masa kini dan akan datang;</li> <li>c. Antara muka yang menarik dan ringkas;</li> <li>d. Maklumat data yang tepat dan bermaklumat;</li> <li>e. Maklumat yang ditunjukkan mudah difahami;</li> <li>f. Mudah diakses di mana-mana dengan teknologi terkini;</li> <li>g. Boleh dikomersialkan;</li> <li>h. Satu inisiatif yang baik untuk perkongsian data; dan</li> <li>i. Tidak rumit;</li> </ul>

Jadual 4.2: Maklum balas responden mengenai aspek positif Aplikasi Mobil (Android): *NAHRIM Sea Level Rise Projection for Malaysia*

#### 4.2 APLIKASI MOBIL (ANDROID): NAHRIM HYDROCLIMATE PROJECTION FOR MALAYSIA

Berdasarkan borang soal selidik yang diedarkan, berikut adalah maklum balas 17 orang responden mengenai Aplikasi Mobil *NAHRIM Hydroclimate Projection for Malaysia* seperti di Jadual 4.3.

Aplikasi Mobil (Android): <i>NAHRIM Hydroclimate Projection for Malaysia</i>			
Q1	Saya Akan Menggunakan Sistem Ini Dengan Kerap.	35%	35% atau 6 orang responden daripada akan menggunakan sistem ini dengan kerap.
Q2	Saya Mendapati Sistem Ini Tidak Perlu Kompleks.	71%	71% (12 orang) responden merasakan sistem yang telah dibangunkan tidak perlu kompleks.
Q3	Saya Berpendapat Sistem Ini Mudah Untuk Digunakan.	59%	Sebanyak 59% (10 orang) responden bersetuju sistem yang telah dibangunkan ini mudah untuk digunakan
Q4	Saya Akan Memerlukan Sokongan Teknikal Untuk Dapat Menggunakan Sistem Ini.	53%	Hanya 53% (9 orang) responden memerlukan sokongan teknikal untuk dapat menggunakan sistem yang telah dibangunkan.

Q5	Saya Dapati Pelbagai Fungsi Dalam Sistem Ini Telah Bersepadu.	59%	59% peratus responden (50 orang) bersetuju pelbagai fungsi dalam sistem ini telah bersepadu.
Q6	Saya Dapati Terlalu Banyak Yang Tidak Konsisten Dalam Sistem Ini.	0%	Tiada seorang responden (0%) yang merasakan sistem ini tidak konsisten
Q7	Pengguna Akan Belajar Untuk Menggunakan Sistem Ini Dengan Cepat.	65%	11 orang responden (65%) merasakan proses pembelajaran untuk menggunakan sistem ini adalah cepat.
Q8	Sistem Ini Rumit Untuk Digunakan.	18%	Hanya 3 orang responden (18%) pengguna merasakan sistem ini rumit untuk digunakan
Q9	Saya Berasa Amat Yakin Untuk Menggunakan Sistem Ini.	65%	Seramai 11 orang responden (65%) berasa yakin untuk menggunakan sistem ini.
Q10	Saya Perlu Belajar Banyak Perkara Sebelum Saya Boleh Menggunakan Sistem Ini.	59%	Seramai 10 responden(59%) perlu belajar banyak perkara sebelum boleh menggunakan sistem ini.

Jadual 4.3: Maklum balas responden untuk Aplikasi Mobil (Android): NAHRIM *Hydroclimate Projection for Malaysia*

Jadual 4.4 menunjukkan pendapat positif responden mengenai aplikasi mobil tersebut.

Sistem Aplikasi	Aspek Positif
Aplikasi Mobil (Android): NAHRIM <i>Hydroclimate Projection for Malaysia</i>	<ul style="list-style-type: none"> <li>a. Sesuai untuk pelajar dan penyelidik;</li> <li>b. Berguna untuk ahli di dalam bidang ini;</li> <li>c. Dapat menarik minat dan memberi info berkaitan perubahan iklim di Malaysia;</li> <li>d. Pangkalan data yang berguna untuk dikongsi dengan penyelidik dalam negara;</li> <li>e. Boleh menambah ilmu pengetahuan; dan</li> <li>f. Mudah digunakan dan tidak sukar untuk memahami fungsian.</li> </ul>

Jadual4.4: Maklum balas responden mengenai aspek positif Aplikasi Mobil (Android): NAHRIM *Hydroclimate Projection for Malaysia*

#### 4.3 APLIKASI MOBIL (ANDROID DAN IOS): NAHRIM MODELLING CALCULATOR

Berdasarkan borang soal selidik yang diedarkan, berikut adalah maklum balas 19 orang responden mengenai Aplikasi Mobil NAHRIM *Modelling Calculator* seperti di Jadual 4.5.



<b>Aplikasi Mobil (Android Dan iOS): NAHRIM <i>Modelling Calculator</i></b>			
<b>Q1</b>	Saya Akan Menggunakan Sistem Ini Dengan Kerap.	<b>53%</b>	Seramai 10 orang responden (53%) akan menggunakan sistem ini dengan kerap.
<b>Q2</b>	Saya Mendapati Sistem Ini Tidak Perlu Kompleks.	<b>95%</b>	95% (18 orang) responden merasakan sistem yang telah dibangunkan ini tidak perlu kompleks.
<b>Q3</b>	Saya Berpendapat Sistem Ini Mudah Untuk Digunakan.	<b>63%</b>	12orang responden (63%) setuju sistem ini mudah untuk digunakan.
<b>Q4</b>	Saya Akan Memerlukan Sokongan Teknikal Untuk Dapat Menggunakan Sistem Ini.	<b>68%</b>	Hanya 68% iaitu 13 orang responden berpendapat mereka memerlukan sokongan teknikal untuk menggunakan sistem tersebut.
<b>Q5</b>	Saya Dapati Pelbagai Fungsi Dalam Sistem Ini Telah Bersepadu.	<b>68%</b>	13orang responden (68%) bersetuju pelbagai fungsi di dalam sistem ini telah disepadukan.
<b>Q6</b>	Saya Dapati Terlalu Banyak Yang Tidak Konsisten Dalam Sistem Ini.	<b>16%</b>	Hanya 3 orang responden (16%) berpendapat sistem ini tidak konsisten.
<b>Q7</b>	Pengguna Akan Belajar Untuk Menggunakan Sistem Ini Dengan Cepat.	<b>63%</b>	12 orang responden (63%) bersetuju, mereka akan dapat belajar menggunakan sistem ini dengan cepat.
<b>Q8</b>	Sistem Ini Rumit Untuk Digunakan.	<b>11%</b>	Hanya 2 orang responden (11%) merasakan sistem ini rumit untuk digunakan.
<b>Q9</b>	Saya Berasa Amat Yakin Untuk Menggunakan Sistem Ini.	<b>63%</b>	Seramai 12 orang responden(63%) merasa yakin untuk menggunakan sistem ini.
<b>Q10</b>	Saya Perlu Belajar Banyak Perkara Sebelum Saya Boleh Menggunakan Sistem Ini.	<b>47%</b>	9 orang responden (47%) merasakan mereka perlu belajar sebelum menggunakan sistem tersebut.

Jadual 4.5: Maklum balas responden untuk Aplikasi Mobil (Android Dan iOS): NAHRIM *Modelling Calculator*

Jadual 4.6 menunjukkan pendapat positif responden mengenai sistem tersebut.

<b>Sistem Aplikasi</b>	<b>Aspek Positif</b>
Aplikasi Mobil (Android Dan iOS): NAHRIM <i>Modelling Calculator</i>	<ul style="list-style-type: none"> <li>a. Aplikasi yang bagus untuk mendapatkan pengiraan yang cepat;</li> <li>b. Hasi kerja yang bagus;</li> <li>c. Memberi ilmu pengetahuan dan kepantasan mendapat maklumat;</li> <li>d. Maklumat yang tersedia sangat padat dan yang bukan bidang boleh</li> </ul>

	<p>mempelajari fungsian dari bahagian informasi;</p> <p>e. Mudah untuk pengguna mengetahui informasi berkenaan air; dan</p> <p>f. Pengguna memerlukan lebih banyak aplikasi teknikal seperti ini.</p>
--	---

Jadual 4.6: Maklum balas responden mengenai aspek positif Aplikasi Mobil (Android Dan iOS):  
NAHRIM Modelling Calculator

#### 4.4 APLIKASI PERMAINAN MOBIL (ANDROID DAN IOS): MYPLOP

Berdasarkan borang soal selidik yang diedarkan, berikut adalah maklum balas 34 orang responden mengenai Aplikasi Permainan Mobil *MyPlop* seperti di Jadual 4.7.

Aplikasi Permainan Mobil (Android Dan iOS): <i>MyPlop</i>			
Q1	Saya Akan Menggunakan Sistem Ini Dengan Kerap.	74%	Seramai 25 orang responden (74%) akan menggunakan sistem ini dengan kerap.
Q2	Saya Mendapati Sistem Ini Tidak Perlu Kompleks.	85%	Seramai 29 orang responden (85%) merasakan sistem yang telah dibangunkan ini tidak perlu kompleks.
Q3	Saya Berpendapat Sistem Ini Mudah Untuk Digunakan.	76%	26 orang responden (76%) setuju sistem ini mudah untuk digunakan.
Q4	Saya Akan Memerlukan Sokongan Teknikal Untuk Dapat Menggunakan Sistem Ini.	41%	Hanya 41% iaitu 14 orang responden berpendapat mereka memerlukan sokongan teknikal untuk menggunakan sistem tersebut.
Q5	Saya Dapati Pelbagai Fungsi Dalam Sistem Ini Telah Bersepadu.	56%	19 orang responden(56%) bersetuju pelbagai fungsi di dalam sistem ini telah disepadukan.
Q6	Saya Dapati Terlalu Banyak Yang Tidak Konsisten Dalam Sistem Ini.	9%	Hanya 3 orang responden(9%) berpendapat sistem ini tidak konsisten.
Q7	Pengguna Akan Belajar Untuk Menggunakan Sistem Ini Dengan Cepat.	71%	24 orang responden(71%) bersetuju, mereka akan dapat belajar menggunakan sistem ini dengan cepat.
Q8	Sistem Ini Rumit Untuk Digunakan.	15%	Hanya 5 orang responden (15%) merasakan sistem ini rumit untuk digunakan.
Q9	Saya Berasa Amat Yakin Untuk Menggunakan Sistem Ini.	82%	Seramai 28 orang responden (82%) merasa yakin untuk menggunakan sistem ini.
Q10	Saya Perlu Belajar Banyak	41%	14 orang responden(41%) merasakan mereka

Perkara Sebelum Saya Boleh Menggunakan Sistem Ini.	perlu belajar sebelum menggunakan sistem tersebut.
--	--

Jadual 4.7: Maklum balas responden untuk Aplikasi Permainan Mobil (Android Dan iOS): *MyPlop*

Jadual 4.8 menunjukkan pendapat positif responden mengenai sistem tersebut.

Sistem Aplikasi	Aspek Positif
Aplikasi Permainan Mobil (Android Dan iOS): <i>MyPlop</i>	<ul style="list-style-type: none"> <li>a. Memberi banyak informasi berkaitan air bawah tanah;</li> <li>b. Aplikasi yang menarik, bagus dan mempunyai grafik yang cantik;</li> <li>c. Menyeronokkan;</li> <li>d. Interaktif dan mudah digunakan;</li> <li>e. Dapat menambah kemahiran berfikir/ skil motor untuk bermain permainan yang mempunyai ilmu yang bermanfaat untuk disampaikan;</li> <li>f. Mudah digunakan;</li> <li>g. Memberi kesedaran tentang pentingnya penjagaan alam sekitar;</li> <li>h. Sangat bagus; dan</li> <li>i. Sangat menarik dan informatif, dapat berhibur sambil memahami air bawah tanah;</li> </ul>

Jadual 4.8: Maklum balas responden mengenai aspek positif Aplikasi Permainan Mobil (Android Dan iOS): *MyPlop*

#### 4.5 APLIKASI PERMAINAN MOBIL (ANDROID DAN IOS): CLEAN THE WATER

Berdasarkan borang kaji selidik yang diedarkan, berikut adalah maklum balas 37 orang responden mengenai Aplikasi Permainan Mobil *Clean the Water* seperti di Jadual 4.9.

Aplikasi Permainan Mobil (Android Dan iOS): <i>Clean the Water</i>			
Q1	Saya Akan Menggunakan Sistem Ini Dengan Kerap.	68%	Seramai 25 orang responden (68%) akan menggunakan sistem ini dengan kerap.
Q2	Saya Mendapati Sistem Ini Tidak Perlu Kompleks.	86%	Seramai 32 orang responden (86%) merasakan sistem yang telah dibangunkan ini tidak perlu kompleks.
Q3	Saya Berpendapat Sistem Ini	84%	31 orang responden (84%) setuju sistem ini mudah untuk digunakan.

	Mudah Untuk Digunakan.		
Q4	Saya Akan Memerlukan Sokongan Teknikal Untuk Dapat Menggunakan Sistem Ini.	41%	Hanya 41% iaitu 15 orang responden berpendapat mereka memerlukan sokongan teknikal untuk menggunakan sistem tersebut.
Q5	Saya Dapati Pelbagai Fungsi Dalam Sistem Ini Telah Bersepadu.	86%	32 orang responden (86%) bersetuju pelbagai fungsi di dalam sistem ini telah disepadukan.
Q6	Saya Dapati Terlalu Banyak Yang Tidak Konsisten Dalam Sistem Ini.	22%	Hanya 8 orang responden (22%) berpendapat sistem ini tidak konsisten.
Q7	Pengguna Akan Belajar Untuk Menggunakan Sistem Ini Dengan Cepat.	81%	30 orang responden (81%) bersetuju, mereka akan dapat belajar menggunakan sistem ini dengan cepat.
Q8	Sistem Ini Rumit Untuk Digunakan.	16%	Hanya 6 orang responden (16%) merasakan sistem ini rumit untuk digunakan
Q9	Saya Berasa Amat Yakin Untuk Menggunakan Sistem Ini.	76%	Seramai 28 orang responden (76%) merasa yakin untuk menggunakan sistem ini
Q10	Saya Perlu Belajar Banyak Perkara Sebelum Saya Boleh Menggunakan Sistem Ini.	30%	Hanya 11 orang responden (30%) merasakan mereka perlu belajar sebelum menggunakan sistem tersebut.

Jadual4.9: Maklum balas responden untuk Aplikasi Permainan Mobil (Android Dan iOS): *Clean the Water*

Jadual 4.10 menunjukkan pendapat positif responden mengenai sistem tersebut.

Sistem Aplikasi	Aspek Positif
Aplikasi Permainan Mobil (Android Dan iOS): <i>Clean the Water</i>	<ul style="list-style-type: none"> <li>a. Aplikasi yang baik untuk memberi kesedaran orang ramai dengan cara kasual, disamping dapat mempromosi NAHRIM sebagai agensi yang menguruskan air;</li> <li>b. Menarik dan secara tidak langsung memberi banyak informasi berkaitan air dan pemuliharaan;</li> <li>c. Bagus dalam mengajar pengguna cara menjaga kebersihan air;</li> <li>d. Dapat memberi pendedahan berkaitan kebersihan air dan penjagaan alam sekitar kepada kanak-kanak;</li> <li>e. Memberi pendidikan berkaitan pencemaran air;</li> </ul>

	<p>f. Memberi pengetahuan tentang kaedah rawatan punca air;</p> <p>g. Menghiburkan;</p> <p>h. Sangat interaktif; dan</p> <p>i. Sangat mudah digunakan dan memberi manfaat kepada pengguna;</p>
--	--

Jadual 4.10: Maklum balas responden mengenai aspek positif Aplikasi Permainan Mobil (Android dan iOS): *Clean the Water*

#### 4.6 RINGKASAN MAKLUM BALAS PENGGUNA TERHADAP APLIKASI MOBIL NAHRIM

SISTEM/APLIKASI	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Aplikasi Mobil (Android): NAHRIM <i>Sea Level Rise Projection for Malaysia</i>	4	4	4	3	4	2	4	2	4	3
Aplikasi Mobil (Android): NAHRIM <i>Sea Level Rise for Malaysia</i>	3	4	4	4	4	3	4	2	4	4
Aplikasi Mobil (Android Dan IOS): NAHRIM <i>Modelling Calculator</i>	4	4	4	4	4	2	4	2	4	3
Aplikasi Permainan Mobil (Android Dan iOS): <i>MyPlop</i>	4	4	4	3	4	2	4	2	4	3
Aplikasi Permainan Mobil (Android dan iOS): <i>Clean the Water</i>	4	4	4	3	4	3	4	2	4	3

Jadual 4.11: Ringkasan Maklum Balas Pengguna Terhadap Sistem Aplikasi NAHRIM

Skala Penilaian: 1– Sangat tidak bersetuju 2– Tidak Bersetuju 3– Neutral 4– Bersetuju 5– Sangat Bersetuju

#### 4.6.1 RUMUSAN DAPATAN HASIL SOAL SELIDIK

Berdasarkan soalan dan responden pengguna mengenai aplikasi tersebut, berikut adalah senarai rumusan awal daripada dapatan hasil soal selidik yang perlu diberi perhatian dan tindakan:

- a. Aplikasi mobil NAHRIM berkategori teknikal sesuai digunakan untuk kumpulan sasaran dalam bidang berkenaan manakala aplikasi mobil NAHRIM berkategori permainan sesuai digunakan oleh semua lapisan masyarakat.
- b. Majoriti responden merupakan golongan wanita; berkerja sebagai kakitangan kerajaan; dan berumur 31-40 tahun. Salah satu faktor yang menyumbang kepada pengkategorian responden ini ialah lokasi soal selidik iaitu di sekitar premis kerajaan.
- c. Aplikasi mobil NAHRIM yang telah dibangunkan berpontensi untuk dikembangkan fungsi dan kepenggunaannya dan masih relevan sebagai salah satu medium untuk perkongsian data, maklumat dan pengetahuan R&D yang telah dijalankan dengan kumpulan sasaran;
- d. Aplikasi mobil NAHRIM yang dibangunkan iniperlu dikekalkan ringkas bagi memudahkan pengguna memahami tujuan aplikasi dibangunkan dan mudah untuk diguna pakai oleh kumpulan sasaran;
- e. Kumpulan sasaran (*beginner*) memerlukan sedikit masa untuk memahami aplikasi tersebut untuk diintegrasikan dengan keperluan kumpulan sasaran;
- f. Kumpulan sasaran yang mempunyai dan memahami kepentingan data daripada aplikasi tersebut merupakan antara kumpulan pengguna yang perlu diberi pendedahan; dan
- g. Aspek positif yang disenaraikan membuktikan objektif dan *outcome* pembangunan aplikasi ini mencapai sasaran.

## 5.0 CADANGAN PENAMBAHBAIKKAN & PERBINCANGAN APLIKASI MOBIL NAHRIM

Hasil dari kajian soal selidik Indeks Kepuasan Pengguna Aplikasi Mobil NAHRIM mendapati terdapat beberapa perkara yang perlu diperbaiki daripada pelbagai aspek bagi semua aplikasi mobil NAHRIM yang terlibat dalam soal selidik ini. Berikut adalah cadangan penambahbaikan bagi kelima-lima Aplikasi Mobil NAHRIM:

Sistem Aplikasi	Cadangan Penambahbaikan
<p>Aplikasi Mobil (Android): NAHRIM <i>Sea Level Rise Projection for Malaysia</i></p>	<ol style="list-style-type: none"> <li>a. Teknologi aplikasi ini perlu dikomersialkan;</li> <li>b. Aplikasi ini boleh dipatenkan;</li> <li>c. Kandungan aplikasi ini perlu dikemaskini dari semasa ke semasa;</li> <li>d. Menggunakan bahasa yang mudah difahami supaya banyak pihak dapat menggunakan aplikasi ini;</li> <li>e. Reka bentuk antara muka perlu lebih mesra pengguna terutama pada butang di dalam peta;</li> <li>f. Bilangan data perlu ditambah; dan</li> <li>g. Promosi perlu dilakukan untuk diperluaskan kepada masyarakat tentang aplikasi ini.</li> </ol>
<p>Aplikasi Mobil (Android): NAHRIM <i>Sea Level Rise for Malaysia</i></p>	<ol style="list-style-type: none"> <li>a. Mengguna pakaisebaikanya ruang yang ada terutamanya dalam jadual kerana data kelihatan bercampur aduk tanpa garisan di dalam jadual tersebut;</li> <li>b. Aplikasi ini perlu dikomersialkan;</li> <li>c. Masa capaian untuk aplikasi ini perlu lebih pantas;</li> <li>d. Menggunakan bahasa yang mudah difahami supaya banyak pihak dapat menggunakan aplikasi ini;</li> </ol>

	<p>e. Kandungan aplikasi ini perlu dikemaskini dari semasa ke semasa; dan</p> <p>f. Perlu diberi penerangan jelas mengenai fungsi aplikasi.</p>
<p>Aplikasi Mobil (Android Dan IOS): NAHRIM Modelling Calculator</p>	<p>a. Aplikasi ini perlu diperluaskan lagi fungsi seperti pengiraan cerun dan lain-lain yang berkaitan;</p> <p>b. Grafik untuk aplikasi ini perlu lebih menarik, dikekalkan susun atur kalkulator dan kesederhanaan (<i>simplicity</i>);</p> <p>c. Reka bentuk antara muka perlu lebih mesra pengguna terutama pada butang yang agak mengelirukan; dan</p> <p>d. Berguna kepada pengguna yang berkenaan sahaja, pengguna yang disasarkan boleh memahami cara menggunakan aplikasi ini.</p>
<p>Aplikasi Permainan Mobil (Android Dan iOS): <i>MyPlop</i></p>	<p>a. Aplikasi ini memerlukan aras (<i>level</i>) permainan dengan menambahkan cabaran pada setiap aras;</p> <p>b. Arahkan, demo atau tutorial perlu ada dalam aplikasi ini dan diletakkan sebelum permainan bermula;</p> <p>c. Jenis permainan perlu dipelbagaikan dalam aplikasi ini;</p> <p>d. Penerangan watak adalah perlu supaya pengguna dapat mengenal pasti watak yang baik dan watak yang jahat;</p> <p>e. Aplikasi ini perlu dijadikan sebagai salah satu produk NAHRIM untuk dikomersial dan dipasar;</p> <p>f. Perlu ada penambahan fitur 3D; dan</p> <p>g. Petunjuk bantuan untuk setiap pergerakan aktiviti perlu ada pada permulaan permainan sebagai keperluan pemain baru.</p>
<p>Aplikasi Permainan Mobil (Android</p>	<p>a. Terdapat beberapa agen pencemaran (<i>pollutant</i>) yang tidak dapat dikesan oleh</p>



<p>dan iOS): <i>Clean the Water</i></p>	<p>sistem aplikasi membuatkan aliran permainan terganggu;</p> <ul style="list-style-type: none"> <li>b. Arahan untuk menggunakan aplikasi perlu jelas;</li> <li>c. Masa untuk permainan perlu ditunjukkan dengan jelas;</li> <li>d. Aplikasi ini memerlukan aras (<i>level</i>) permainan dengan menambahkan cabaran pada setiap aras;</li> <li>e. Grafik untuk aplikasi ini perlu lebih cantik dan menarik;</li> <li>f. Penggunaan butang "BACK" mengelirukan, perlu ditukar kepada ikon yang lebih mudah difahami;</li> <li>g. Penerangan mengenai fungsi NAHRIM perlu ditambah sebagai cara promosi; dan</li> <li>h. Fitur 3D perlu ditambah lagi dalam permainan ini.</li> </ul>
---	--

Jadual 5.1: Cadangan Penambahbaikan & Perbincangan Aplikasi Mobil NAHRIM

## 6.0 RUMUSAN

NAHRIM telah membangunkan lima aplikasi mobil yang terdiri daripada tiga aplikasi mobil berkategori teknikal dan dua aplikasi mobil berkategori permainan. Kelima-lima aplikasi mobil ini dibangunkan untuk memenuhi hasrat NAHRIM dalam berkongsi data dan maklumat hasil penyelidikan kepada orang awam. Dalam usaha untuk memastikan pembangunan aplikasi mobil NAHRIM ini mencapai sasaran, objektif dan menepati *outcome*, KajianKepuasan Pelanggan telah dijalankan untuk membantu NAHRIM dalam menjustifikasikan keperluan dan kepentingan serta kebolegunaan aplikasi mobilyang telah dibangunkan. Setiap maklum balas dan cadangan yang diterima melalui kajian ini adalah penting dalam usaha untuk memastikan kehendak dan keperluan pengguna (kumpulan sasaran) untuk setiap aplikasi mobil dipenuhi.

Berdasarkan keputusan Kajian Kepuasan Pelanggan yang dijalankan ini, maklum balas daripada responden berkenaan aspek kebolegunaan akan diambil kira dalam usaha untuk menambah baik aplikasi mobil yang telah dibangunkan oleh NAHRIM. Setiap aplikasi mobil yang telah dibangunkan mempunyai tahap kebolegunaan yang berlainan, namun masih boleh membuktikan aplikasi mobil tersebut mempunyai kepentingan dalam membantu NAHRIM berkongsi maklumat dan data.

Perkongsian data dan maklumat R&D NAHRIM melalui pelbagai platform merupakan antara inisiatif dan usaha yang dijalankan oleh NAHRIM bagi memastikan maklumat dan data R&D yang diperoleh dikongsi dan divisualisasi dalam pelbagai medium bagi memudahkan kefahaman pengguna berkaitan dengan R&D dalam bidang air dan alam sekitar.