

REPORT
FINAL YEAR PROJECT
CHAPTER 4

ONLINE RECRUITMENT MANAGEMENT SYSTEM

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CHAPTER 4

ANALYSIS AND DESIGN

This chapter discusses on analysis design of the proposed system. The analysis is review more details about the behaviour of the system while design is produced a design as a sketch of actual system. Section 4.1 discusses about the introduction of analysis and Section 4.2 described the requirement analysis in use case diagram, sequence diagram and activity diagram. While, Section 4.3 explains the system analysis in use case diagram, sequence diagram, activity diagram and use case specification. In addition, section 4.4 explains the system design in flowchart and presents the database design in entity relationship diagrams (ERDs), class diagram, and data dictionaries in Section 4.4. Consequently, Section 4.5 described the interface design of the system. Finally, the summary of this chapter was explained in Section 4.6.

4.1 Introduction

Analysis phase was the phase where the developer gathered all the requirements to develop the system. In this project, the developer gathered all the requirements through interviews with human resource coordinator of registrar office UTHM, analysed the existing systems and did research. All the analysed data were then translated in UML Diagrams. Each use case was specified by use case specifications. Then, requirement traceability matrix (RTM) was produced. The requirement analysis was important for the developer to fulfil users' requirement and reduce the risk of system failure and.

4.2 System Requirement Analysis

Requirements analysis is a process to determine user expectations outcome from the proposed system. During the system development, system requirements will be formed to depict what the users need to do (user requirements); what the system should do (functional requirements); specify the criteria that can be used to judge the system operation and specific behaviours (non-functional requirements); and how the system should be develop (system requirements) (Alan et. Al., 2012).

4.2.1 User Requirement Analysis

User requirements is an element of the systems design which lead to the successful of the interactive systems. In this case, the understanding of user requirements is important to avoid system failure due to insufficient requirement system failed happen. The reason of conducting a user requirements analysis is to improved user satisfaction, increased productivity and enhanced quality of work. Table 4.1 shows the user requirements for the proposed system.

Table 4.1 User requirement for the proposed system

No	User requirements
1.	User should be able to input the user id and password for register and login purpose.
2.	User should be able to search the job based on job position.
3.	User should be able to update their personal information.
4.	User should be able to fill up the application form.
5.	User should be able to view the application form.
6.	User should be able to prepare the job requirement.
7.	User should be able to update the interview status.

4.2.1.1 Functional Requirement Analysis

A functional requirement defined what has been done by identifying the necessary activity, task or action that must be accomplished (Sofia, 2010). It describes how the system will process the user inputs to provide the desired output for the user. The functional requirements of the proposed system are shown in Table 4.2.

Table 4.2 Functional requirements of the proposed system

No	Modules	Functionalities
1.	Login Module	<ul style="list-style-type: none"> The system should allow the users to login into the system using id and password. The system should allow the user to input the valid id and password to be logged in as user. The system should alert the user for any invalid input. The system should redirect user to dashboard once successful login.
2.	Registration Module	<ul style="list-style-type: none"> The system should allow the new user to register before login.
3.	Application Form	<ul style="list-style-type: none"> The system should allow the applicant to fill up the application form once they find the interest job.
4.	Job Requirement	<ul style="list-style-type: none"> The system should allow the human resource officer able to add, update and delete the certain job position and its requirement. The system should provide the basic requirement of each job position for the applicant.
5.	Notification	<ul style="list-style-type: none"> The system should allow the human resource officer to send a notification to applicant whether their interview successful or not. The system should allow the human resource manager to send a notification to the applicant who are interview successfully.
6.	Generate Report	<ul style="list-style-type: none"> The system should allow the human resource manager to generate report based on the number of applicants applied and the number of applicants who got selected can be generate and show the trend of applicant with certain criteria.
7.	Application Evaluation	<ul style="list-style-type: none"> The system should be able check automatically whether the applicant fulfil the requirement of job position or not once they submit application form. The system can filter the applicant's list based on minor and major job requirement. The system should allow the human resource officer to do checking, allow the human resource manager to do approval once the system finished checking.

4.2.1.2 Non-Functional Requirement Analysis

Non-functional requirements are requirements that specify criteria that can be used to judge the operation of a system, rather than specific behaviours (Sofia, 2010). It depicts variety of system characteristics such as performance, operational and security. Table 4.3 shows the non-functional requirements for the proposed system.

Table 4.3 Non-functional requirements of the proposed system

No	Requirements	Descriptions
1.	Performance	<ul style="list-style-type: none"> The interaction between the user and the system should not be more than 10 minutes. The system should be able for use anytime.
2.	Operational	<ul style="list-style-type: none"> The system should be user friendly. The system should be easily maintained and updated. The system should be able to work on any web browser.
3.	Security	<ul style="list-style-type: none"> Only the human resources manager can generate the report. Users can only access their own account with user id and password.

4.2.2 Hardware and Software Requirements Analysis

Computer hardware and software systems are essential to the success of a system development. Therefore, hardware components and software requirements analysis are required to defined what hardware and software are needed to support the system. Hardware requirements deal with identifying the hardware needed to support the proposed system while software requirements deal with identifying the software resource requirements that need to be installed on a computer to provide optimal functioning of a system. Hardware and software requirements specification are shown in Table 4.4 and 4.5 respectively.

Table 4.4 Hardware requirements specification

No	Hardware	Specification
1.	CPU (Central Processing Unit)	Intel Core i7-7500U 2.7GHz with Turbo Boost up to 3.5GHz with 1.6GHz speed or higher
2.	RAM (Random Access Memory)	4 Gigabyte (GB) or more
3.	Hard drive	128 GB SSD + 1 TB HDD

Table 4.5 Software requirements specification

No	Type	Software	Functionality
1.	Programming tool	Notepad++	Develop system
2.	Programming Language	Hypertext Pre-processor (PHP)	Development environment for building system and components using the PHP programming language.
3.	Design tool	Microsoft Visio Professional 2016	Create and edit flow chart, use case, sequence diagram, activity diagram and entity relationship diagram.
4.	Server application	XAMPP	Web server building and used as a platform for access to the database.

Table 4.5(Continued)

No	Type	Software	Functionality
5.	Database	MySQL	Design and build database.
6.	Operating system	Microsoft Window 10	An operating system that has been used for the development of proposed application.

4.3 System Analysis

Systems analysis is the process of observing systems for problem solving or development goals. It is used for information technology, where a computer-based system needs a predetermined analysis according to their makeup and design.

4.3.1 Use Case Diagram

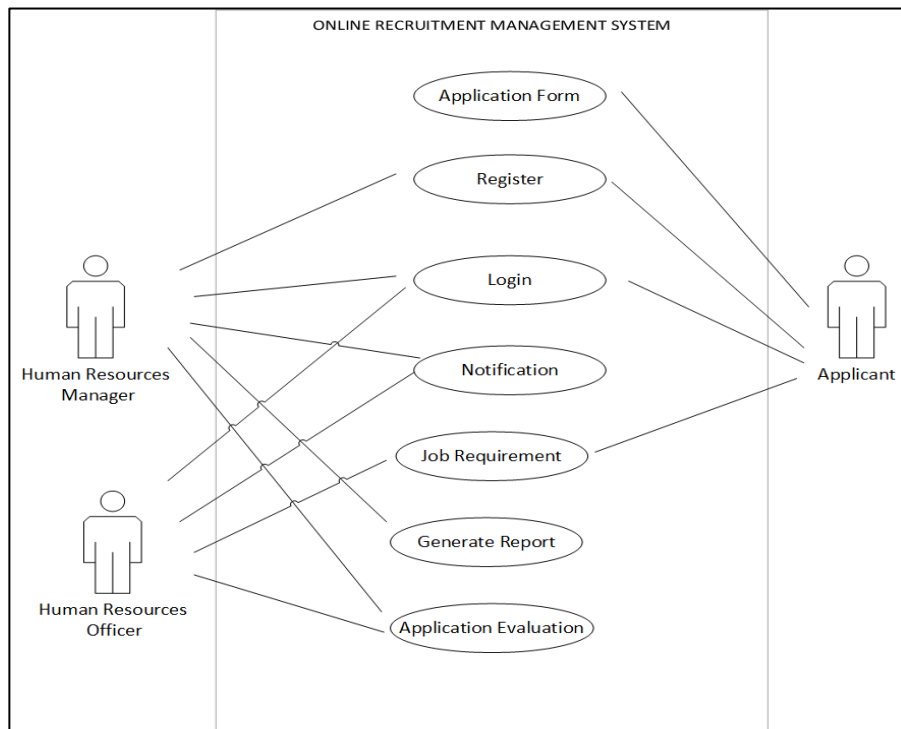


Figure 4.1 Use case diagram

Use case diagram was a standard notation used to identify, clarify and organize system requirements of Online Recruitment Management System. Use case model captured the role of actors to an action. Actors act as external entities that interact with the system. Based on Figure 4.1, the external entities of this use case diagram were Human Resources Manager, Human Resources Officer and Applicant. Meanwhile, the use case described the functionalities or behaviour of the system. There were five main use cases for this system namely application form, login, register, job requirement, notification, generate report and application evaluation.

These use cases were the functionalities in Online Recruitment Management System. Each of the use case interacted with external entities to build interactions between users and system. The details of each use case were described in the following section.

Use Case 1: Login

This use case was used by human resources manager, human resources officer and applicant to access the system by insert the user ID and password. By login process, users redirected to the main page. The specification of login use case was detailed out in Table C.1 below.

Table C.1 Login Use Case Specification

History Log	1.0.0	1. Create initial use case	
	1.0.1	1. Fixed alternative flow in normal flow 2. Changed ID for alternative flow and exceptions.	
	2.0.0	1. Added history log. 2. Functional requirements are added 3. Constraints are added. 4. Quality requirements are added.	
Version	2.0.0		
Use Case ID	UC-1		
Use Case Name	Login		
Created By	Ch'ng Shu Wen	Updated By	Ch'ng Shu Wen
Date Created	27 Oct 2018	Last Revision Date	31 Oct 2018
Actors	Applicant, Human Resources Officer, Human Resources Manager		
Description	Users login to access system		
Preconditions	Applicant and human resources manager need to insert user ID and password		
Post conditions	The users will be redirect to the homepage		
Normal Flow	1.0 Verify the users		

	<ol style="list-style-type: none"> 1. Users need to insert valid user ID and password. (See E.1, E.2) 2. If applicant and human resources manager want to register account, see A.1. 3. If human resources officer wants to change password see A.2. 4. System redirects users to the own homepage. 		
Alternative flow	<p>A.1 Create Account</p> <ol style="list-style-type: none"> 1. Applicant and human resources manager insert user ID and password. 2. Clicks 'Create' to create the account. 3. System display 'Account successfully created' pop up message. 4. Applicant and human resources manager redirect to the login page. 5. Return to step 1 in normal flow. (see NF 1.0) <p>A.2 Change Password</p> <ol style="list-style-type: none"> 1. Human resources officer inserts register ID, new password and confirmation of new password. (See E.3) 2. Clicks 'Change' button to change the password. 3. System displays 'Password has been changed' pop up message. 4. Human resources officer redirect to login page. 		
Exceptions	<p>E.1 Fail to login</p> <ol style="list-style-type: none"> 1. System display pop up to inform users that the staff ID or password is invalid. <p>E.2 Users cancel to login</p> <ol style="list-style-type: none"> 1. The system reset the user ID and password text fields. <p>E.3 Unmatched password</p> <ol style="list-style-type: none"> 1. System display unmatched password pop up message. 		
Related requirement	ID	Requirement	Priority
	FR01-01	The system able to verify the users	Basic
	FR01-02	The system shall save details of the applicant and human resources managers' new account	Basic
	FR01-03	The system able to update new human resources officers' new password	Basic
	CR01-01	The system reset the login forms when cancellation occurs	Performance
	QR01-01	The system able to inform users for a sustained period of time	Basic

Table C.1 (Continued)

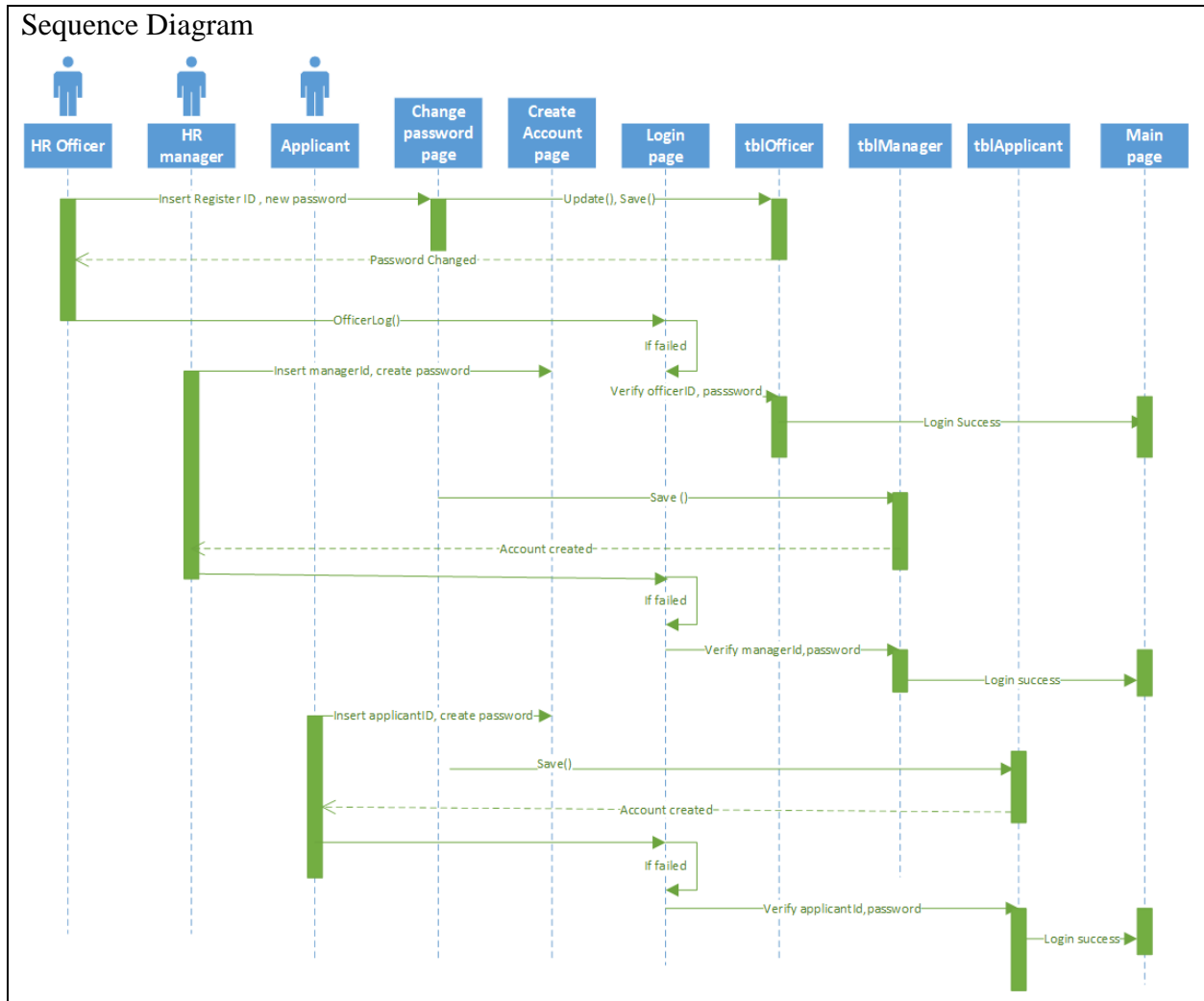
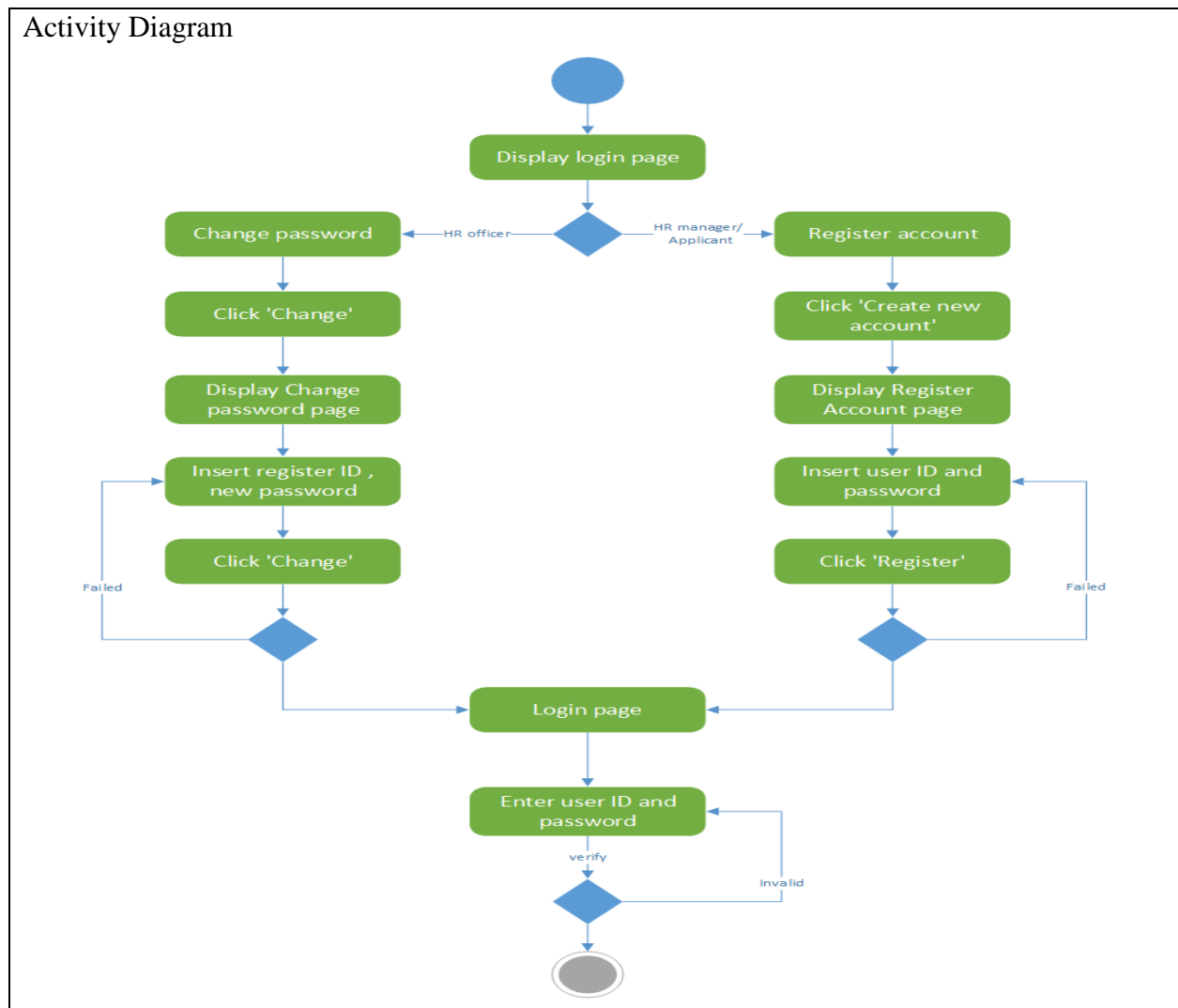


Table C.1 (Continued)

Activity Diagram



Use Case 2: Register Human Resources Officer

This use case was used by human resources manager. The registrations of the human resource officer were made by human resources manager who only had the authority to register the human resource officer. The manager was needed to fill in the text fields with the officers' details. The details in the registration form were name, register ID, identification card number, address, email and phone number. The data were saved in the database. The specification of register human resources officer use case was detailed out in Table C.2 below.

Table C.2 Register Human Resources Officer Use Case Specification

History Log	1.0.0	1. Create initial use case	
	1.0.1	1. Fixed alternative flow in normal flow 2. Changed ID for alternative flow and exceptions.	
	2.0.0	1. Added history log. 2. Functional requirements are added 3. Constraints are added. 4. Quality requirements are added.	
Version	2.0.0		
Use Case ID	UC-2		
Use Case Name	Register Human Resources Officer		
Created By	Ch'ng Shu Wen	Updated By	Ch'ng Shu Wen
Date Created	27 Oct 2018	Last Revision Date	31 Oct 2018
Actors	Human Resources Manager		
Description	Manager register the Human Resources Officer		
Preconditions	Only manager have authority to register the Officers		
Post conditions	The manager needs to fill in all the officers' details		
Normal Flow	1.0 Register Officers 1. Manager needs to fill in the officers' details in the required fields. 2. Click 'Save' to save the data in the database. 3. System saves the officers' details in database. 4. If Manager want to add new registration see A.1 5. If Manager want to remove registered officers, see A.2 6. If Manager want to update registered officers, see A.3 7. System displays the updated list of registered members in 'List of Registered Officers'.		
Alternative flow	A.1 Add new registration 1. Officer click 'Add' to add registration of the members. 2. System display new registration form. 3. Return to step 1 in normal flow. (See NF 1.0)		

	<p>A.2 Remove registered officers</p> <ol style="list-style-type: none"> Officer clicks 'Remove' to delete the registered officers in database. System display pop up message to remove the registered officers. Return to step 7 in normal flow. (See NF 1.0) <p>A.3 Update registered officers</p> <ol style="list-style-type: none"> Manager clicks 'Update' to update the registered officers in database. Return to step 1 in normal flow. (See NF 1.0) 		
Related requirement	ID	Requirement	Priority
	FR02-01	The system able to show officers registration form to officer	Basic
	FR02-02	The system shall save details of the officers	Basic
	FR02-03	The system able to delete the registered officers	Basic
	FR02-04	The system able to update the registered officers	Basic
	FR02-05	The system able to enter details of new officers	Performance
	FR02-06	The system should display registered officers' details.	Performance
	CR02-01	The system shall not allow registration of same register ID	Basic
	QR02-01	The system able to inform users for a sustained period of time every 2 seconds	Basic

Sequence Diagram

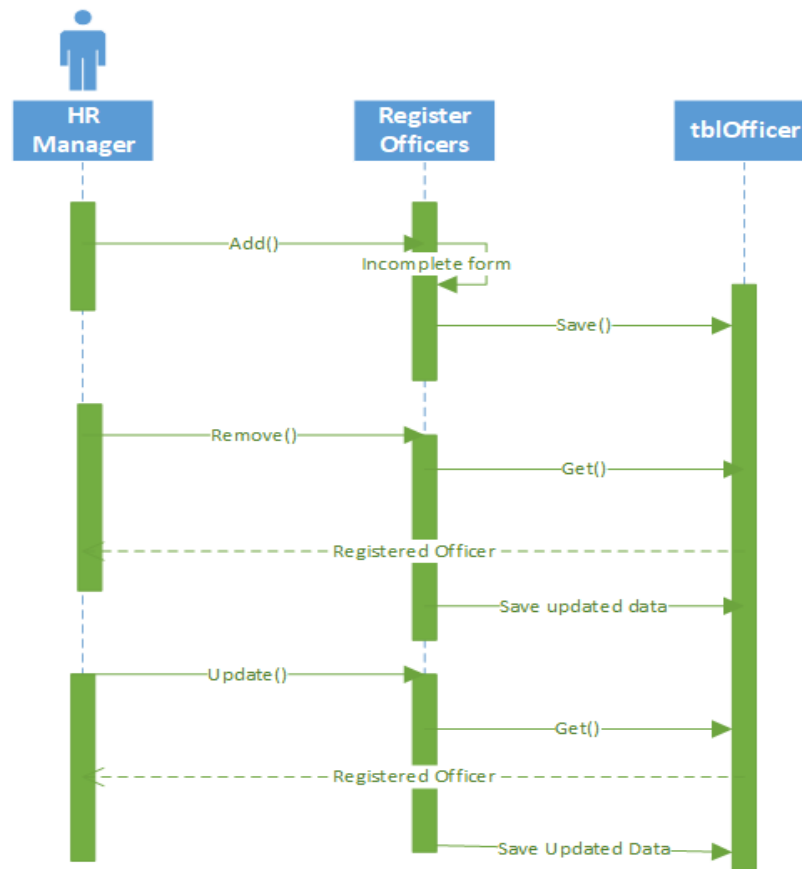
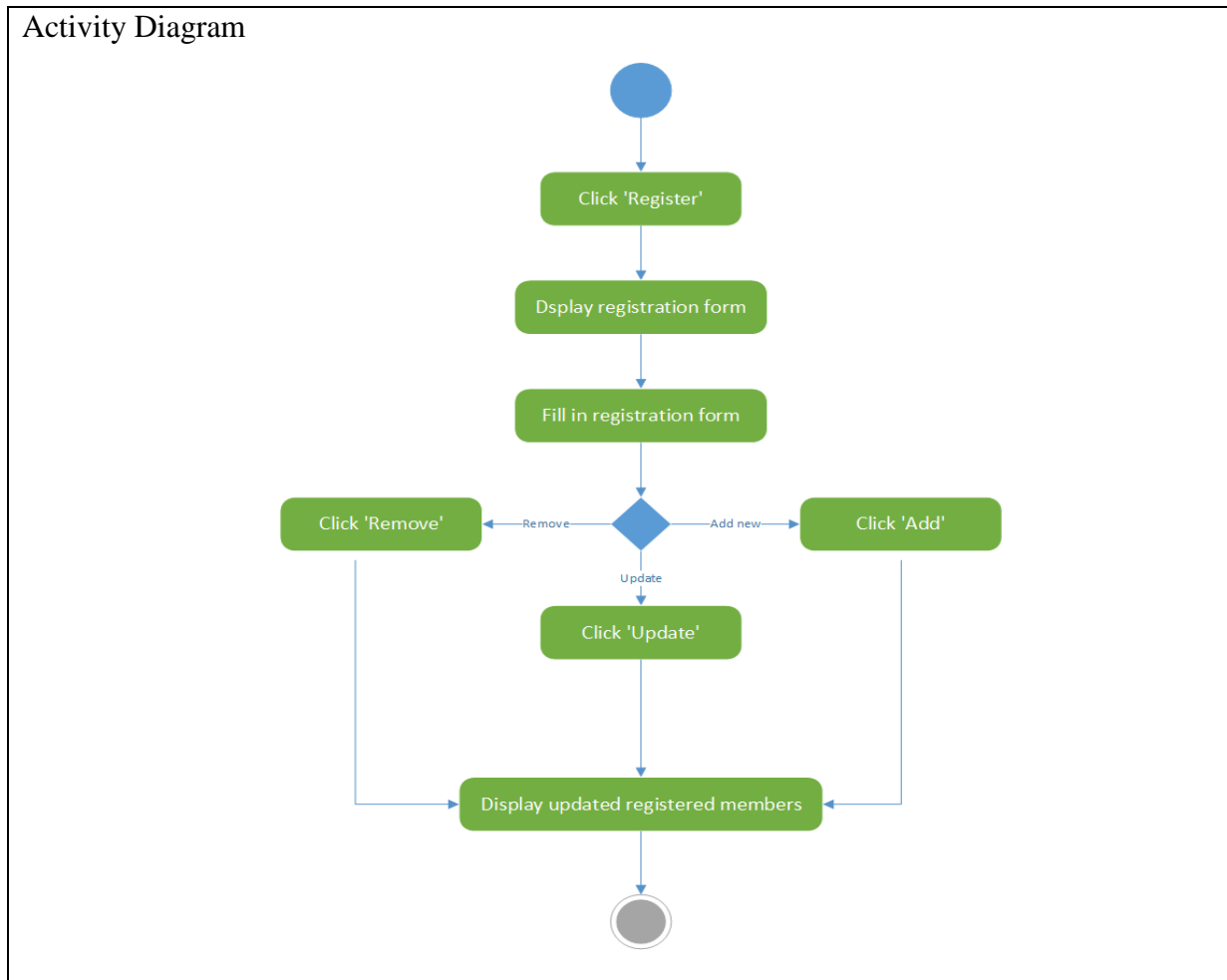


Table C.2 (Continued)



Use Case 3: Job Requirement

This use case involved human resource officer and applicant. The human resource officer was needed to insert the required details of the job position in specified fields. Only the human resource officer had the authority to insert, delete the job position and update the job requirement. At the end of the process, applicant was able to view all the job position and its job requirement. Then, the applicant can search all the job position present in the system. Once selected a requisition, applicant can apply for the post. The specification of job requirement use case was detailed out in Table C.3 below.

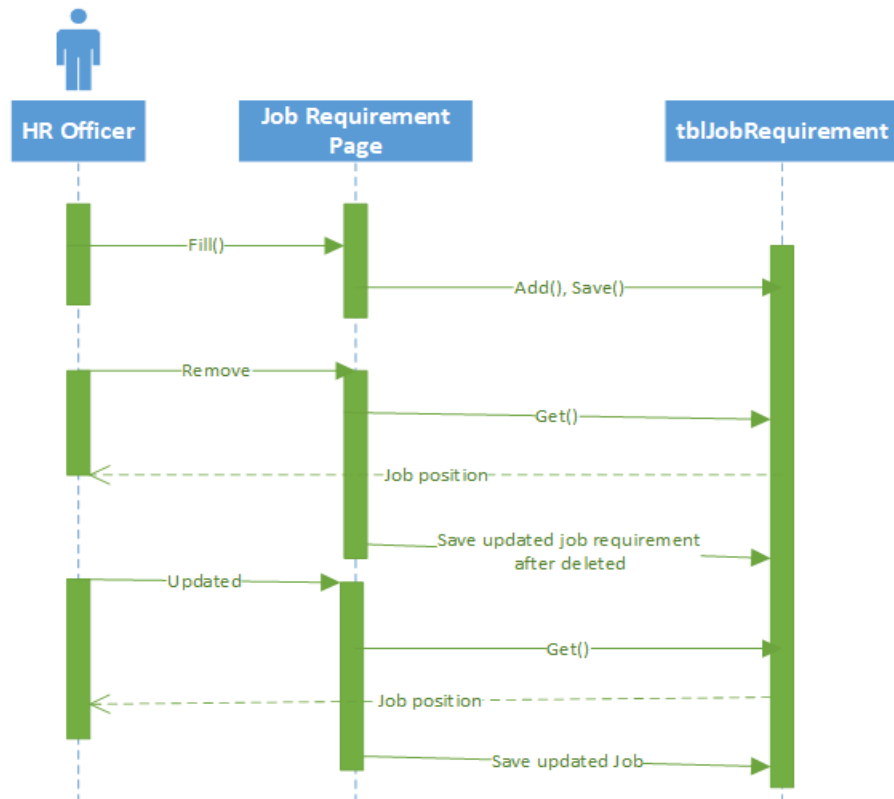
Table C.3 Job Requirement Use Case Specification

History Log	1.0.0	1. Create initial use case	
	1.0.1	1. Fixed alternative flow in normal flow 2. Changed ID for alternative flow and exceptions.	
	2.0.0	1. Added history log. 2. Functional requirements are added 3. Quality requirements are added.	
Version	2.0.0		
Use Case ID	UC-3		
Use Case Name	Job Requirement		
Created By	Ch'ng Shu Wen	Updated By	Ch'ng Shu Wen
Date Created	27 Oct 2018	Last Revision Date	31 Oct 2018
Actors	Human Resources Officer		
Description	The requirement of each job positions is recorded in the database		
Preconditions	Only officer have authority to insert, update, delete job position		
Post conditions	The officer needs to fill in all the requirements of each job position		
Normal Flow	1.0 Manage Job Requirement 1. Officer needs to fill in the job positions' requirement in the required fields. 2. Click 'Save' to save the data in the database. 3. System saves the job positions' requirement in database. 4. If Officer want to add new job position, see A.1 5. If Officer want to remove job position, see A.2 6. If Officer want to update job positions' requirement, see A.3 7. System displays the updated list of job positions in 'List of Job Positions.		
Alternative flow	A.1 Add new job position 1. Officer click 'Add' to add new job position. 2. System display new job position form. 3. Return to step 1 in normal flow. (See NF 1.0)		
	A.2 Remove job position 1. Officer clicks 'Remove' to delete the job position in database. 2. System display pop up message to remove the job position. 3. Return to step 7 in normal flow. (See NF 1.0)		
	A.3 Update job position 1. Officer clicks 'Update' to update the job positions' requirement in database. 2. Return to step 1 in normal flow. (See NF 1.0)		

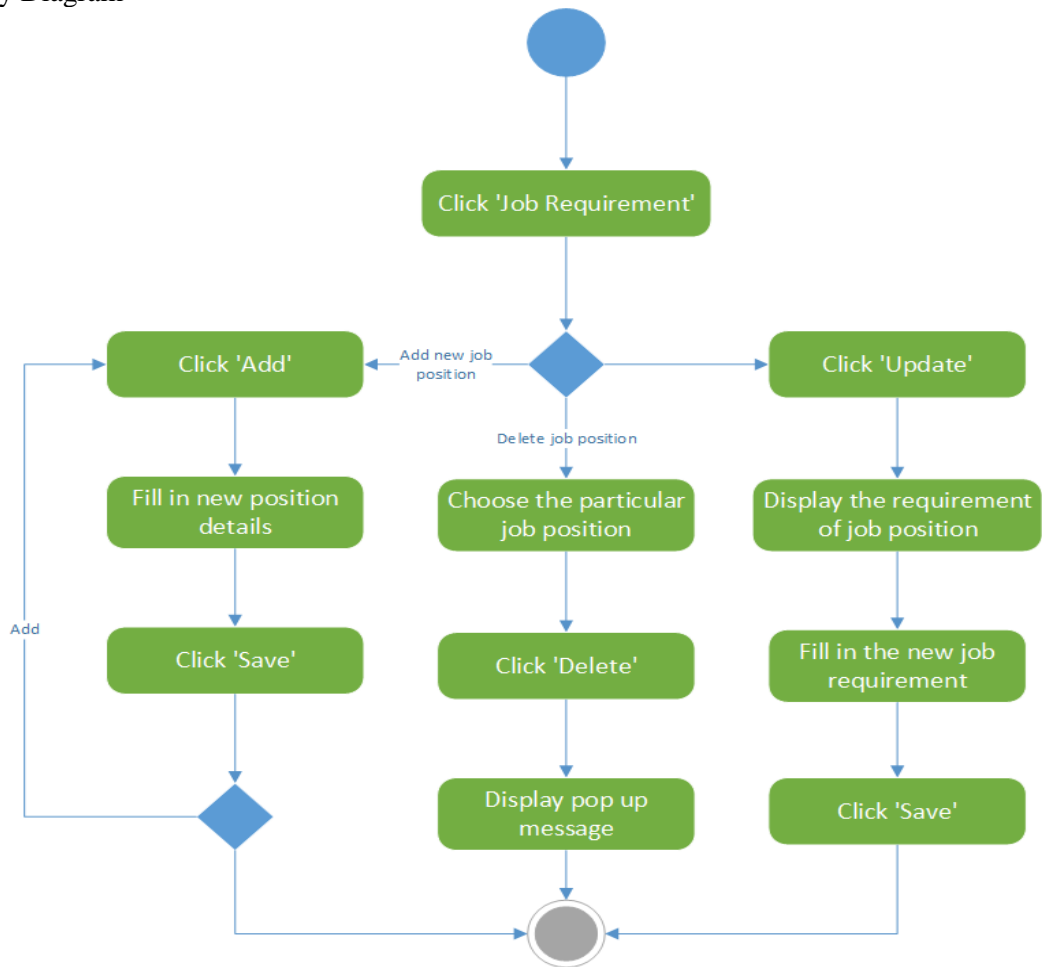
Table C.3 (Continued)

Related Requirement	ID	Requirement	Priority
	FR03-01	The system able to show job position form to officer	Basic
	FR03-02	The system shall save requirement of the job position	Basic
	FR03-03	The system able to delete the job position	Basic
	FR03-04	The system able to update the job position	Basic
	FR03-05	The system able to enter job requirement of job position	Performance
	FR03-06	The system should display all the job positions' requirement.	Performance
	QR03-01	The system able to inform users for a sustained period of time every 2 seconds	Basic

Sequence Diagram



Activity Diagram



Use Case 4: Application Form

The Application Form use case involved applicant as the actor only. The applicant who has registered themselves in the system and interest in certain job position enable to fill up the form. The specification of application form use case was detailed out in Table C.4 below.

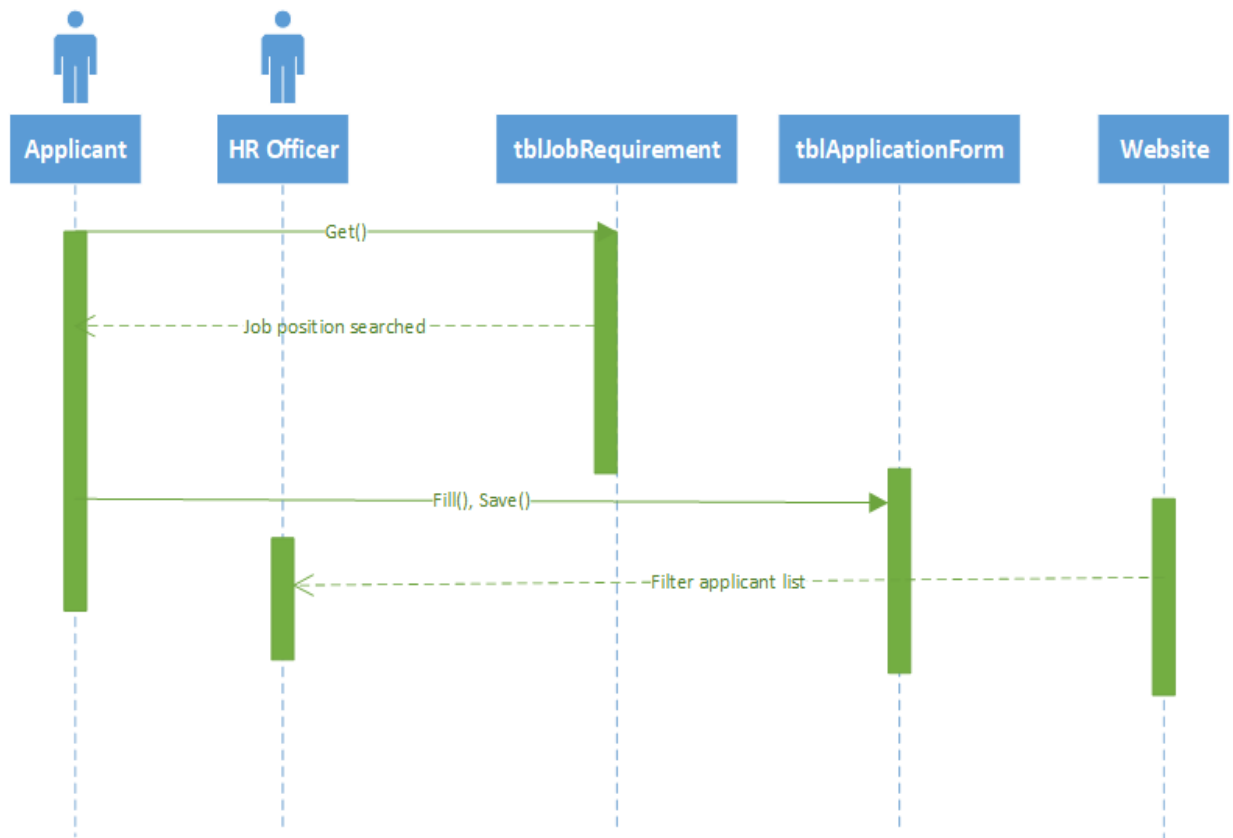
Table C.4 Application Form Use Case Specification

History Log	1.0.0	1. Create initial use case	
	1.0.1	1. Fixed alternative flow in normal flow 2. Changed ID for alternative flow and exceptions.	
	2.0.0	1. Added history log. 2. Functional requirements are added 3. Quality requirements are added.	
Version	2.0.0		
Use Case ID	UC-4		
Use Case Name	Application Form		
Created By	Ch'ng Shu Wen	Updated By	Ch'ng Shu Wen
Date Created	27 Oct 2018	Last Revision Date	31 Oct 2018
Actors	Applicant, Human Resources Officer		
Description	The application form was prepared in the search job interface		
Preconditions	The officer has authority see the application form when the application form was submitted.		
Post conditions	The applicant needs to search the job position before filling in the application form		
Normal Flow	1.0 Fill in Application Form 1. Applicant needs to search the job through fill in the suitable job position. 2. Click 'Search' to search the job position from the database. (See E.1) 3. If applicant want to apply the job position, see A.1 4. System will filter applicants list based on job requirement 5. If fulfil, applicant list sends to human resource officer. 6. If not fulfil, applicant enter waiting list. 7. Click 'Home' icon to go to the homepage. 8. System will redirect officer to the homepage.		
Alternative flow	A.1 Apply job position 1. Applicant click 'Apply' to fill in the applicant information. 2. Applicant click 'Apply' again once finished fill up the application form. 3. System display pop up message 'Apply successful'. 4. Return to step 1 in normal flow.		
Exception	E.1 Search unsaved data 1. System display unbound data in table. 2. Return to step 2 in normal flow.		

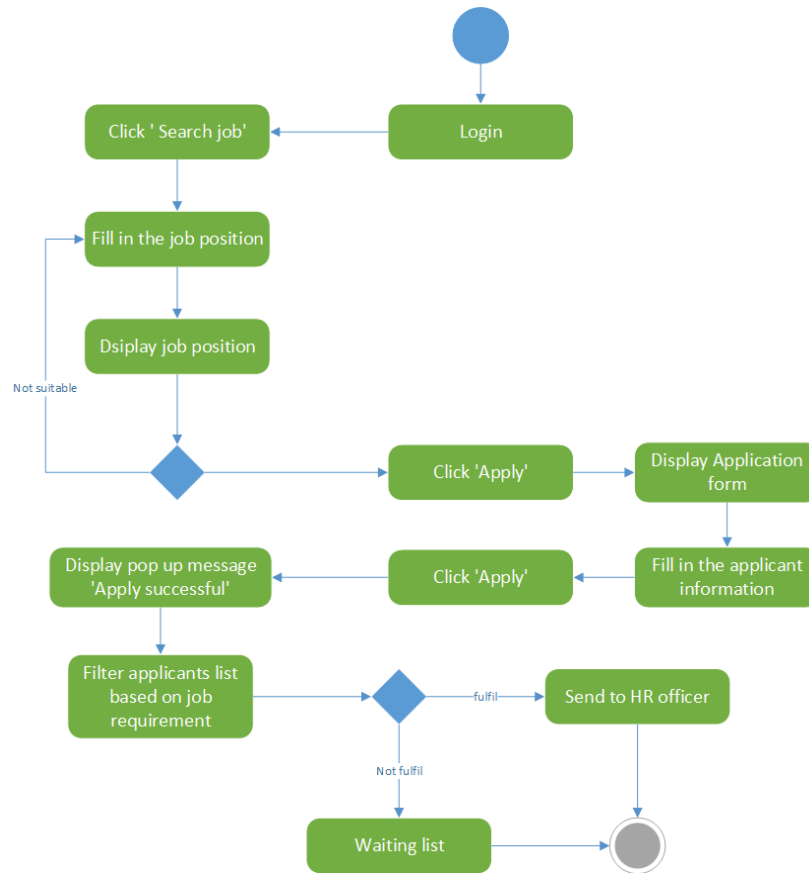
Table C.4 (Continued)

Related Requirement	ID	Requirement	Priority
	FR04-01	The system able to search job position	Basic
	FR04-02	The system shall able the applicant to fill up the application form	Basic
	FR04-03	The system shall be able to handle exception	Performance
	FR04-04	The system be able to filter the applicant list based on the job requirement	Performance
	QR04-01	The system able to inform users for a sustained period of time every 5 seconds	Basic

Sequence Diagram



Activity Diagram



Use Case 5: Application Evaluation

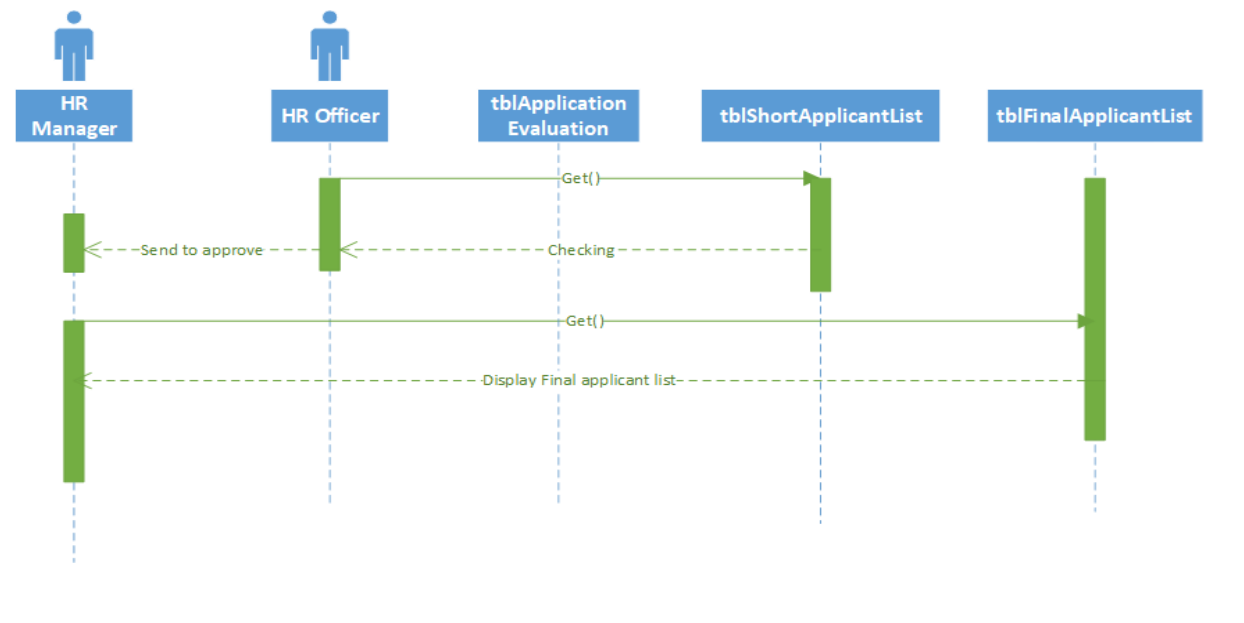
The Application Evaluation use case involved human resource manager and human resource officer as the actor. The human resource officer will be able to do checking once the system finished check automatically. Then the human resource manager will do approval. After that, the manager can view the final list applicant after the selected applicant being interview. The specification of application evaluation use case was detailed out in Table C.5 below.

Table C.5 Application Evaluation Use Case Specification

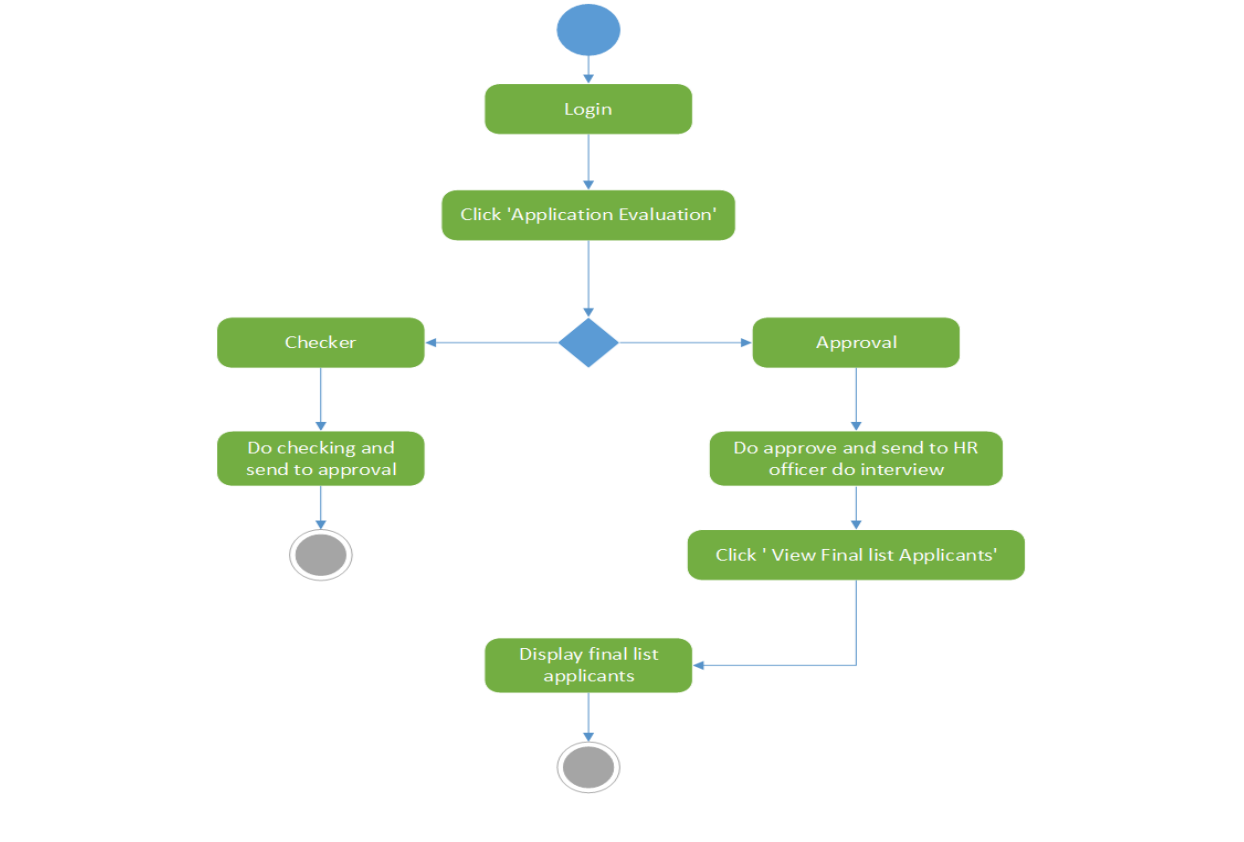
History Log	1.0.0	1. Create initial use case	
	1.0.1	1. Fixed alternative flow in normal flow 2. Changed ID for alternative flow and exceptions.	
	2.0.0	1. Added history log. 2. Functional requirements are added 3. Quality requirements are added.	
Version	2.0.0		
Use Case ID	UC-5		
Use Case Name	Application Evaluation		
Created By	Ch'ng Shu Wen	Updated By	Ch'ng Shu Wen
Date Created	27 Oct 2018	Last Revision Date	31 Oct 2018
Actors	Human Resources Manager, Human Resources Officer		
Description	The process of officer does check, and manager do approval once the system finished checking.		
Preconditions	The system has authority to check automatically whether the applicant fulfil the requirement of job position or not		
Post conditions	The applicant needs to search the job position before filling in the application form		
Normal Flow	1.1 Officer do check 1. The officer needs to do checking and send to approval 1.2 Manager do approval 1. The manager receives the short applicant list from officer 2. Manager send back to officer for interviewing 3. Click 'View Final list' to show the final list of applicants after interviewing		
Related Requirement	ID	Requirement	Priority
	FR05-01	The system able to check automatically the application form	Performance
	FR05-02	The system shall able the officer as checker	Basic
	FR05-03	The system shall be able the manager as approval	Basic
	QR05-01	The system able to inform users for a sustained period of time every 5 seconds	Basic

Table C.5 (Continued)

Sequence Diagram



Activity Diagram



Use Case 6: Notification

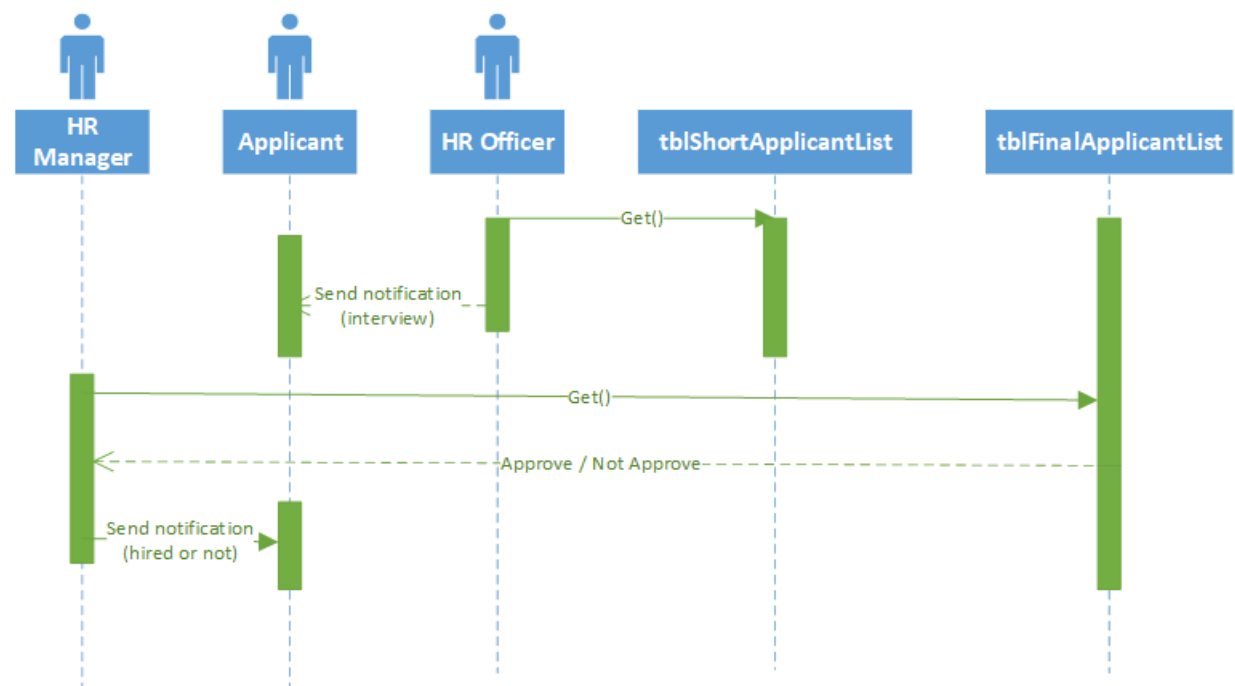
This use case involved human resource officer and human resources manager. The human resource officer be able to send a notification to the applicant whether their interview successful or not once the applicant finished interviewing. The human resource manager be able to do approves for those the applicant interviewing successful and send notification to the applicant. The specification of notification use case was detailed out in Table C.6 below.

Table C.6 Notification Use Case Specification

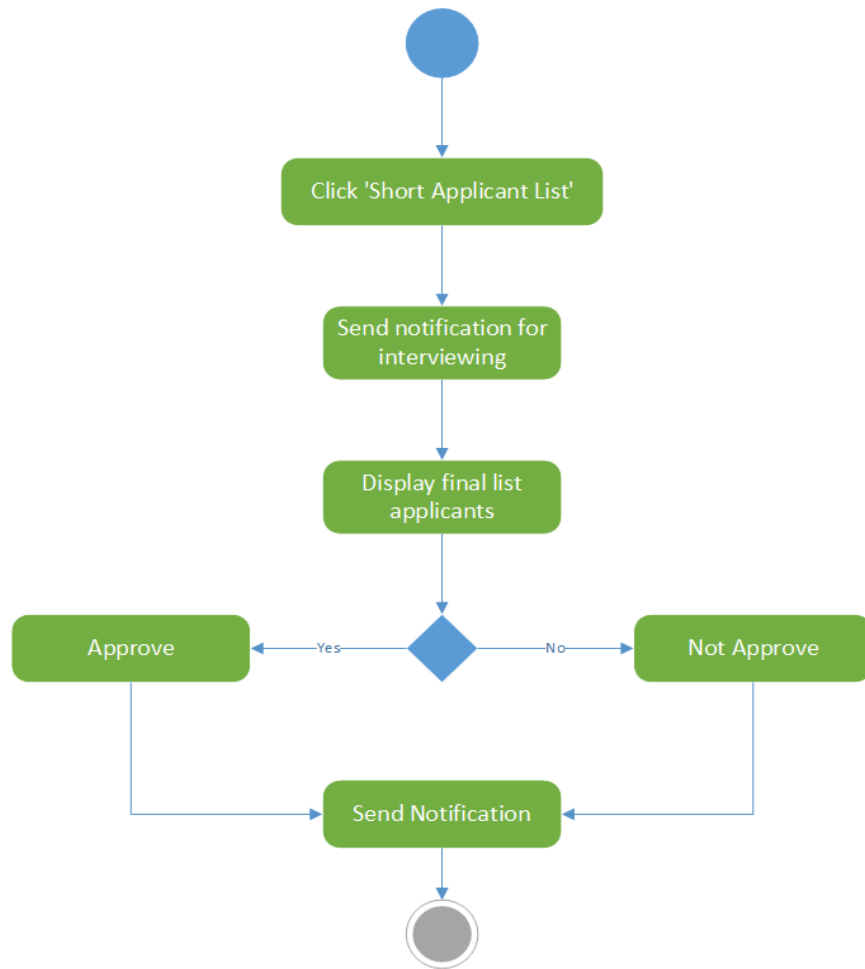
History Log	1.0.0	1. Create initial use case	
	1.0.1	1. Fixed alternative flow in normal flow 2. Changed ID for alternative flow and exceptions.	
	2.0.0	1. Added history log. 2. Functional requirements are added 3. Constraints are added. 4. Quality requirements are added.	
Version	2.0.0		
Use Case ID	UC-5		
Use Case Name	Notification		
Created By	Ch'ng Shu Wen	Updated By	Ch'ng Shu Wen
Date Created	27 Oct 2018	Last Revision Date	31 Oct 2018
Actors	Human Resources Manager, Human Resources Officer		
Description	The process of officer send notification for interviewing and the manager send notification for successful or unsuccessful hired.		
Preconditions	Only manager has authority to approve or not approve the final applicant list		
Post conditions	The final decision on whether the applicant is hired will be determined by the manager.		
Normal Flow	1.1 Officer's notification 1. The officer needs to send notification to the applicant who have chances to do interviewing see A.1 1.2 Manager's notification 1. The manager receives the final applicant list from officer which the list contains the applicant who have chances to do interviewing. 2. Manager send notification for those applicants who successful approve by them.		
Alternative flow	A.1 Update interview Condition 1. Officer click 'Update' to update the interview condition of the applicants when the applicants finished interview. 2. Officer click 'Save' to produce the final applicant list.		

Related Requirement	ID	Requirement	Priority
	FR06-01	The system be able to send notification to the applicant for interviewing	Basic
	FR06-02	The system shall able to send notification to applicant for successful or unsuccessful be hired	Basic
	FR06-03	The system shall be able to update the interview condition	Basic
	QR06-01	The system able to send notification to applicant within 5 seconds	Performance

Sequence Diagram



Activity Diagram



Use Case 7: Generate Report

The `Generate Report` use case involved human resource manager as the actor. The manager can generate the report in this recruitment management system where it was generated the number of applicants applied and the number of applicants who got selected can be generate and show the trend of applicant with certain criteria. The specification of login use case was detailed out in Table C.7 below.

Table C.7 Generate Report Use Case Specification

History Log	1.0.0	1. Create initial use case	
	1.0.1	1. Fixed alternative flow in normal flow 2. Changed ID for alternative flow and exceptions.	
	2.0.0	1. Added history log. 2. Functional requirements are added 3. Constraints are added. 4. Quality requirements are added.	
Version	2.0.0		
Use Case ID	UC-7		
Use Case Name	Generate Report		
Created By	Ch'ng Shu Wen	Updated By	Ch'ng Shu Wen
Date Created	27 Oct 2018	Last Revision Date	31 Oct 2018
Actors	Human Resource Manager		
Description	Manager generate applicant report monthly		
Preconditions	Manager login the system		
Post conditions	The report for the recruitment of applicant are generated		
Normal Flow	1.2 Generate report 1. Manager clicks 'Generate Report' at the homepage. 2. System display report tab. 3. If Manager wants to generate number of applicants applied see A.1. 4. If Manager wants to generate number of applicants who got selected see A.2. 5. If Manager wants to generate the trend of applicants based on certain criteria see A.3. 6. System display the data in the table 7. Manager can search the data by insert data in search text field. (See E.1) 8. System display the selected option. 9. Manager click 'Home' icon to go to homepage		
Alternative flow	A.1 Generate number of applicants applied 1. Manager click 'Number of applicants applied' tab in the report page. 2. Return to step 6 in normal flow. (See NF 1.0) A.2 Generate number of applicants who got selected 1. Manager click 'Number of applicants who got selected' tab in the report page. 2. Return to step 6 in normal flow. (See NF 1.0) A.3 Generate the trend of applicants based on certain criteria 1. Manager clicks 'Trend of applicants based on certain criteria' tab in the report page. 2. Return to step 6 in normal flow. (See NF 1.0)		
Exception	E.1 Search unsaved data 1. System display unbound data in table. 2. Return to step 7 in normal flow. (See NF 1.0)		

Related Requirement	ID	Requirement	Priority
	FR07-01	The system able to generate report	Basic
	CR07-01	System not allow manager to edit the data	Basic
	QR07-01	Data is retrieved within 5 seconds.	Performance

Sequence Diagram

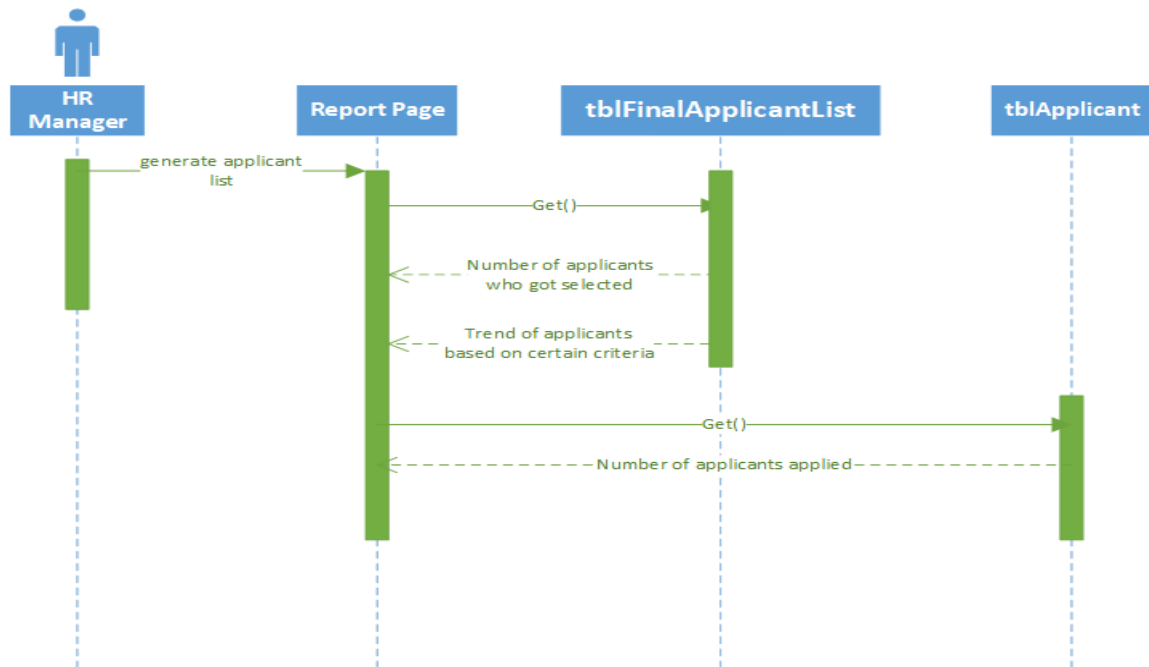
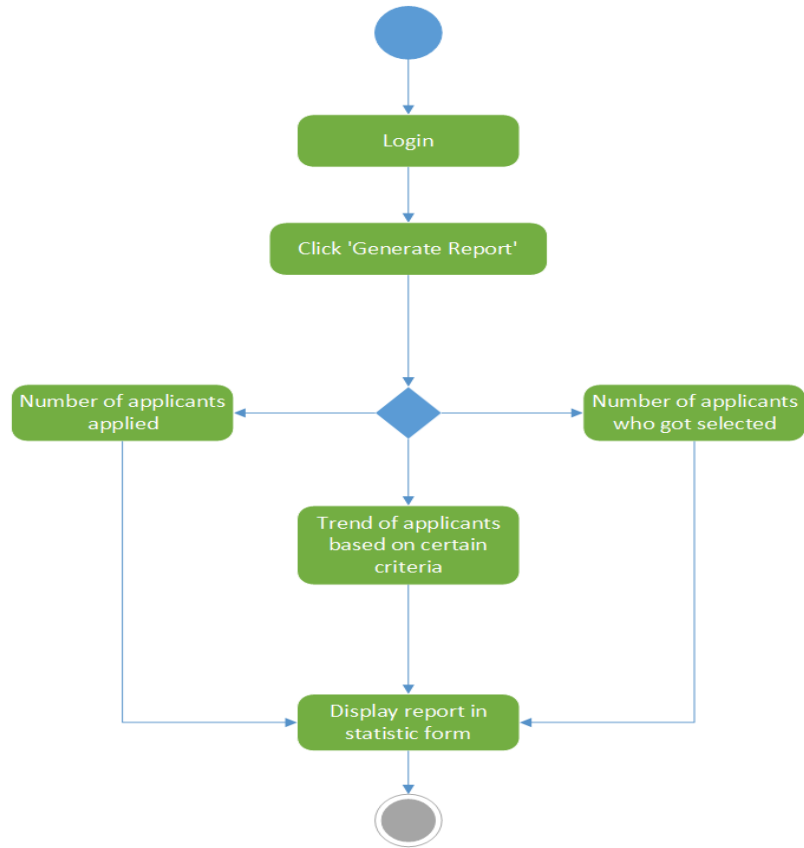


Table C.7 (Continued)

Activity Diagram



4.4 System Design

System design is a phase that considers graphical interface usage or how the design can interact with the user. The design phase can be divided into two types: interface design and database design. Both designs provide the overall visual help of the system to users. It also acts as a medium in helping users to interact with the system. There are easy-to-understand design features, user interactive and good functionality and system usability.

4.4.1 TO-BE Model

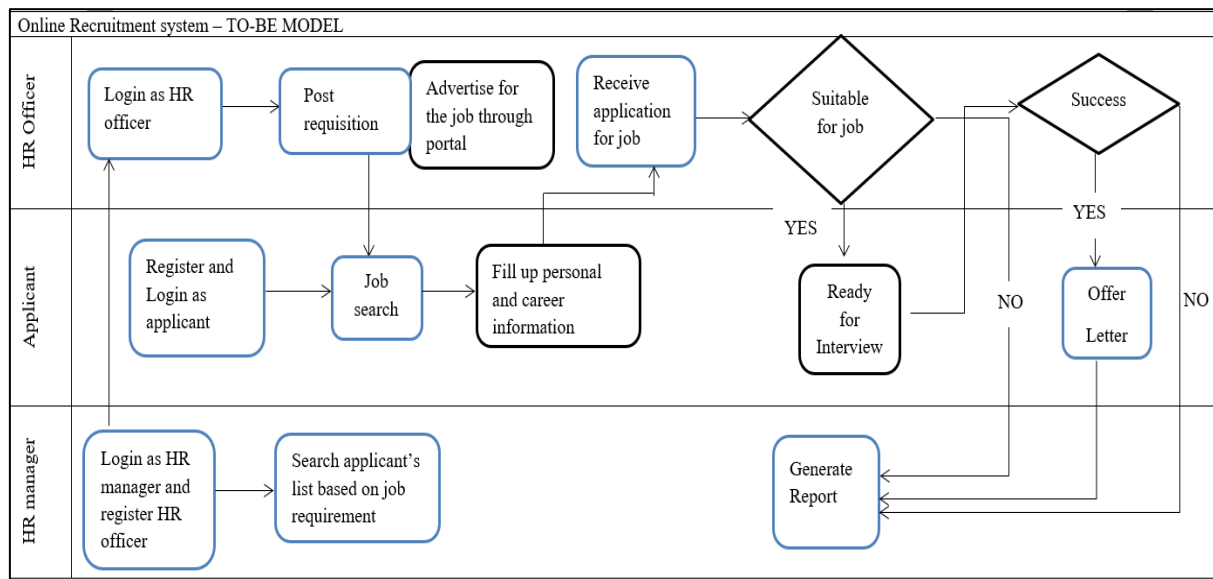


Figure 4.2 TO-BE Model

At the end of this project, a recruitment management system will be developed and contains 7 functional modules. For this developed system, it can create the new record for the new applicant. Moreover, deletion of the record which already exist in the system based on the HR manager request. It also can be do changes on the requirement of job position for the applicant. Each applicant can apply for the job and see the further details. HR manager handles the job posts that post by officer, this function eases the process of management. Moreover, HR manager also can generate report based on the number of applicants applied and the number of applicants who got selected. In addition, once the applicant submits the applicant form, the HR officer will check the

whether the applicant fulfil the requirement of job's position or not. Then, the HR manager will do approval after officer's checking.

The employer can recruit the applicant based on their experience and the further interviews easily. The process of recruiting run smoothly and time saving since it is difficult using the manual system as the information is scattered, can be redundant and collecting relevant information may be very time-consuming. The HR officer who has registered by HR manager in the system can post the requirement of the job position. In addition, the HR officer able to do changes of requirement for each job position based on the current situation.

Besides that, this system helps the applicant to get every information required for the process. Moreover, applicant can search all the requisition present in the system and they can filter the search based on their skill and experience of the job. In addition, HR manager was able to generate the report based on the number of applicants applied and the number of applicants who got selected.

4.4.2 Flowchart

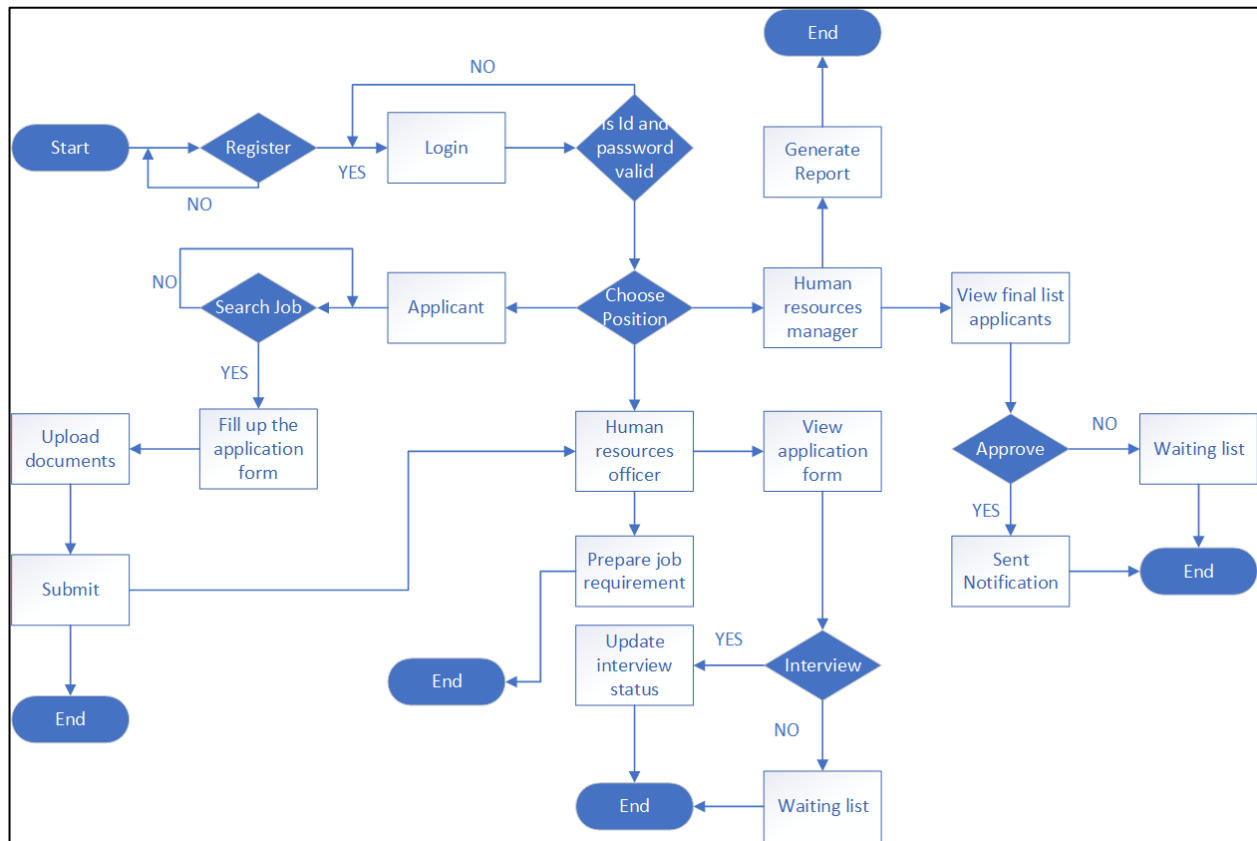


Figure 4.3 Flowchart

Figure 4.3 shows the sequence of processes for the three users which are applicant, human resources officer and human resources manager where they will log in to access the system, then will be linked to the main page. There are seven modules which are login module, registration module, application form, job requirement, notification, generate report and application evaluation.

The users shall be to login into the system using user id and password. Only the users with valid id and password can only login to their respective accounts. It will help the authentication of the user entering the system. If the authentication fails, the system displays error messages. Before login, the three users must register. The human resource manager was responsible to register the

human resource officer. The other parts are that the applicant need to create their new account to register themselves. The applicant can search the job. If the applicant searches the job successfully, they can fill up the application form and upload the documents, then submit. Else if the applicant fails to search the suitable job, they can search again. Once the application form submits, the human resource officer will be received.

While for the human resource officer, they can prepare the job requirement. They can also view the application form. If the applicant's requirement match, then the applicant can do interviewing. Else the applicant didn't fulfil the requirement, they will move to waiting list first. If the applicant interviews successfully, the human resource officer will update the interview status.

The human resource manager responsible to view the final list of applicants. Once the human resource manager approves, they will send the notification to applicant. If the human resource manager didn't approve, the applicants will move to waiting list first. Finally, the human resources manager can generate the report based on the number of applicants applied and the number of applicants who got selected.

4.5 Database design

The database design was the list of detailed data that was included in the database. It included selected information that was important to the system. In database design, the relationships of the entities and attributes can be determined.

4.5.1 Class Diagram

The class diagram was illustrated the structures, attributes, methods and relationships among objects in the online recruitment management system. The relationships of the classes can refer in Figure 4.3.

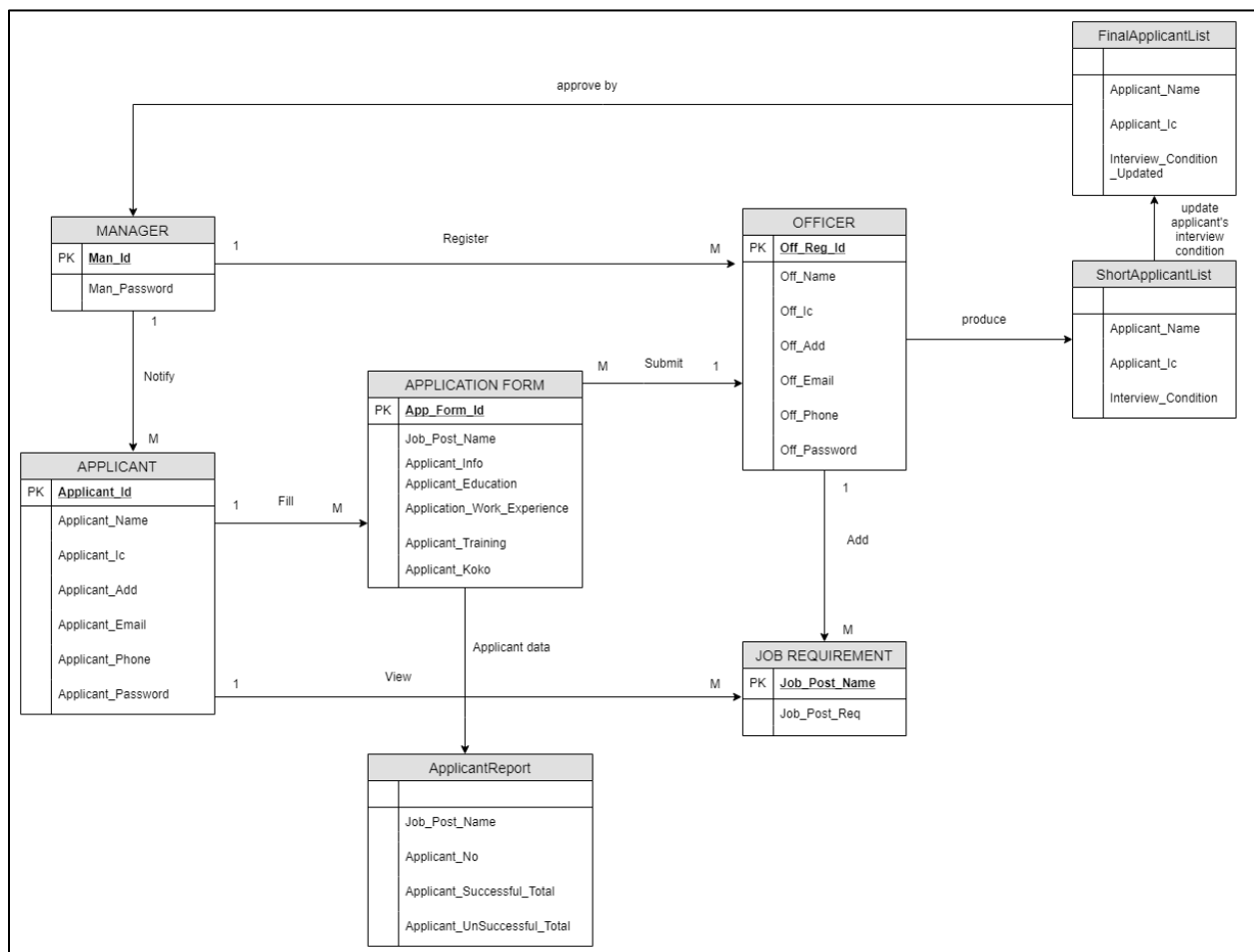


Figure 4.4 Class diagram of Online Recruitment Management System

Based on the Figure 4.4, there are eight classes which were MANAGER, OFFICER, APPLICANT, APPLICATION FORM, JOB REQUIREMENT, ApplicantReport, ShortApplicantList and FinalApplicantList. Each class holds its own attribute value and can be linked to another class.

One manager can register many officers. Many applicants can fill in application form and submit to the many officers. One officer can add many job requirements of job position. The officer can produce the short applicant list after checking the application form with interview status. Then, the short applicant list will be update to the final applicant list with the updated applicant's interview status. The final applicant list will be approved by the manager. One manager can send many notifications to many applicants. One applicant can view many job position's requirement. The application form class can provide the applicant data to generate the applicant report.

4.5.2 Data Dictionary

The Online Recruitment Management System used eight tables which were table MANAGER, table OFFICER, table APPLICANT, table APPLICATION FORM, table JOB REQUIREMENT, table SHORT APPLICANT LIST and table FINAL APPLICANT LIST. The schema tables can be referred to Table 4.6 to Table 4.12.

Based on Table 4.6, the attributes of MANAGER table were Man_Id and Man_Password. The manager ID of the manager was unique value which it can identify each manager. The managers' details were saved in MANAGER table after had been registered.

Table 4.6: MANAGER table

Attribute	Data Type	Size	Key	Descriptions
Man_Id	Varchar	15	Primary	Unique ID for the manager and used in login
Man_Password	Varchar	8	No	Password for login purpose

Based on Table 4.7, the attributes of OFFICER table were Off_Name, Off_Reg_Id, Off_Ic, Off_Add, Off_Email, Off_Phone and Off_Password. The register ID of the officers was unique value which it can identify each officer. The officers' details were saved in OFFICER table after they had been registered.

Table 4.7: OFFICER table

Attribute	Data Type	Size	Key	Descriptions
Off_Name	Varchar	100	No	Full name of human resources officer
Off_Reg_Id	Varchar	15	Primary	Unique ID for each officer and used in login
Off_Ic	Varchar	13	No	Identification card number of officers
Off_Add	Varchar	100	No	Current address of the officers
Off_Email	Varchar	30	No	Email address of officers
Off_Phone	Int		No	Mobile phone of officers
Off_Password	Varchar	8	No	Password for login purpose

Based on Table 4.8, the attributes of APPLICANT table were Applicant_Name, Applicant_Id, Applicant_Ic, Applicant_Add, Applicant_Email, Applicant_Phone and Applicant_Password. The applicant ID of the applicants was unique value which it can identify each applicant. The applicants' details were saved in APPLICANT table after they had been registered.

Table 4.8: APPLICANT table

Attribute	Data Type	Size	Key	Descriptions
Applicant_Name	Varchar	100	No	Full name of applicant
Applicant_Id	Varchar	15	Primary	Unique ID for each applicant and used in login
Applicant_Ic	Varchar	13	No	Identification card number of applicants
Applicant_Add	Varchar	100	No	Current address of the applicants

Applicant_Email	Varchar	30	No	Email address of applicants
Applicant_Phone	Int		No	Mobile phone of applicants
Applicant_Password	Varchar	8	No	Password for login purpose

Based on Table 4.9, the attributes of APPLICATION FORM table were App_Form_Id, Job_Post_Name, Applicant_Info, Applicant_Education, Applicant_Work_Experience, Applicant_Training and Applicant_Koko. The application form ID of the application form was unique value which it can identify each application form of applicant. The application form details were saved in APPLICATION FORM table.

Table 4.9: APPLICATION FORM table

Attribute		Data Type	Size	Key	Descriptions
App_Form_Id		Varchar	15	Primary	Unique ID for the application form
Job_Post_Name		Varchar	50	Primary	Name of the job position
Applicant_Info	Applicant_Name	Varchar	100	No	Full name of applicant
	Applicant_Ic	Varchar	13	No	Identification card number of applicants
	Applicant_Old	Varchar	10	No	Age of applicant
	Applicant_Gender	Varchar	10	No	Gender of applicant
	Applicant_Dob	Date		No	Date of birth of applicant
	Applicant_Pob	Varchar	50	No	Place of birth of applicant
	Applicant_Citizen	Varchar	50	No	Citizen of applicant
	Applicant_Religion	Varchar	50	No	Religion of applicant

	Applicant_Nation	Varchar	50	No	Nation of applicant
	Applicant_Marry_Status	Varchar	50	No	Married status of applicant
	Applicant_Height	Int		No	Height of applicant
	Applicant_Weight	Int		No	Weight of applicant
	Applicant_Veh_License	Varchar	10	No	Vehicle license class of applicant
	Applicant_Add	Varchar	100	No	Current address of the applicants
	Applicant_Phone	Int		No	Mobile phone of applicants
	Applicant_Couple_Name	Varchar	100	No	Full name of applicant's couple
	Applicant_Mom_Name	Varchar	100	No	Full name of applicant's mother
	Applicant_Mom_Ic	Varchar	13	No	Identification card number of applicant's mother
	Applicant_Dad_Name	Varchar	100	No	Full name of applicant's father
	Applicant_Dad_Ic	Varchar	13	No	Identification card number of applicant's father
Applicant_Education					
Applicant_Work_Experience	Emp_Name	Varchar	100	No	Full name of applicant's employer
	Emp_Add	Varchar	100	No	Current address of the employer
	Applicant_Post	Varchar	50	Primary	Name of the job position
	Applicant_Month_Salary	Double		No	Month salary of applicant
	Work_Start_Date	Date		No	Start date of applicant's work
	Work_End_Date	Date		No	End date of applicant's work

	Work_Contract	Int		No	Duration of work contract of applicant
	Reason_Stop	Varchar	100	No	Reason applicant stop
Applicant_Training					
Applicant_Koko					

Based on Table 4.10, the JOB REQUIREMENT table was consisted of job positions' requirement. All the job positions' requirement was saved based on the attributes in the JOB REQUIREMENT table which were Job_Post_Name and Job_Post_Req.

Table 4.10: JOB REQUIREMENT table

Attribute	Data Type	Size	Key	Descriptions
Job_Post_Name	Varchar	50	Primary	Name of the job position
Job_Post_Req	Varchar	15	No	Job requirement for each job position

Based on Table 4.11, the SHORT APPLICANT LIST table was consisted of the short applicant list. All the short applicant list was saved based on the attributes in the SHORT APPLICANT LIST table which were Applicant_Name, Applicant_Ic And Applicant_Interview_Condition.

Table 4.11: SHORT APPLICANT LIST table

Attribute	Data Type	Size	Key	Descriptions
Applicant_Name	Varchar	100	No	Full name of applicant
Applicant_Ic	Varchar	13	No	Identification card number of applicants
Applicant_Interview_Condition	Varchar	50	No	The interview condition of applicant based on application form checking

Based on Table 4.12, the FINAL APPLICANT LIST table was consisted of the short applicant list. All the short applicant list was saved based on the attributes in the FINAL APPLICANT LIST table which were Applicant_Name, Applicant_Ic and Applicant_Interview_Condition_Updated.

Table 4.12: FINAL APPLICANT LIST table

Attribute	Data Type	Size	Key	Descriptions
Applicant_Name	Varchar	100	No	Full name of applicant
Applicant_Ic	Varchar	13	No	Identification card number of applicants
Applicant_Interview_Condition_Updated	Varchar	50	No	Update the interview condition of applicant and send notification

4.6 Interface Design (Menu and screen design, System navigation and content design)

4.7 Chapter summary

This chapter illustrates the entire system development process of analysis and design. Among the processes involved are the design of user interfaces and databases, generating flow charts, use case diagram, sequence diagram, activity diagram and class diagram that describe the processes involved from the beginning of the system to the end. System requirements are listed in detail to meet user requirements. Additionally, based on the processes that have been carried out, it can be used as a guideline to continue the development of a complete system. In the next chapter, the implementation and testing phase was being described.

References

1. Sofia. (2010). Requirement Analysis. Retrieved on 20th October 2018 from https://www.uacg.bg/filebank/acadstaff/userfiles/publ_bg_397_SDP_activities_and_steps.pdf