



WIF3005 SOFTWARE MAINTENANCE AND EVOLUTION

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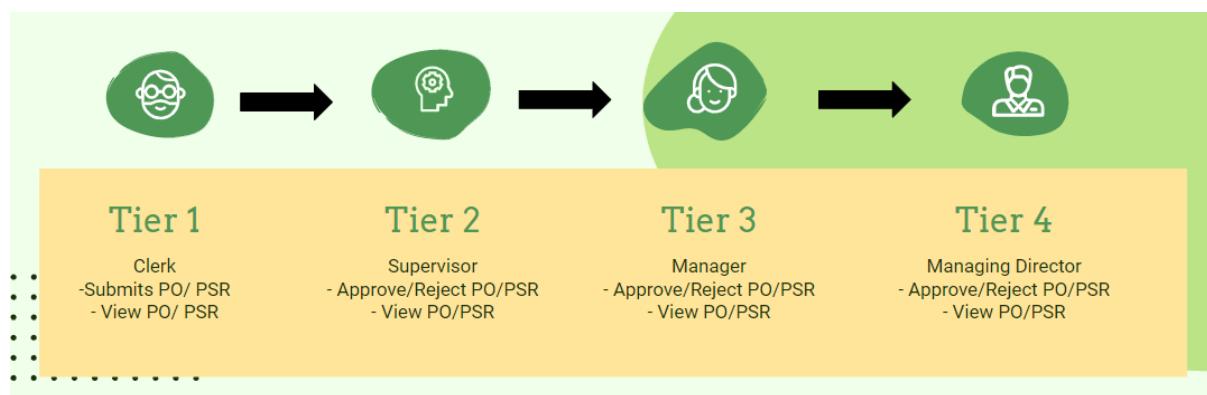
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1 Introduction

For this project, we have chosen a Purchase Order and Purchase Requisition Management system. This system mainly deals with creating a purchase order for the items that the user has bought and when the user creates a purchase requisition. This system has multiple actors which includes an accountant, administrator, and users. Users are split into four different tiers and each tier have different functionalities. The administrator can register new users, view all existing users, reset password, view purchase order (PO) list and view purchase service requisition (PSR) list. Besides that, they are also able to edit the information of registered users, delete them and change their passwords. The default features of all actors are viewing the PSR, PO list and resetting their passwords. They can also filter both the PO and PSR lists.



The users from all tiers can add a PO or PSR. However, only users in tier two, three and four can approve them. Any PO and PSR must be approved by all users from different tiers. POs and PSRs can also be declined by the users. The status of the PO and PSR will change depending on the approval and rejection of the users. Any creation, approval and rejection of the PO or PSR are also shown when the users click on the status. The PO and PSR can also be downloaded to PDF.

2 Project's Tasks:

For this project, we have the following tasks:

1. Create a repository on Github.

Team leader creates a new repository on Github. This repository will clone the repository of the system that we selected for maintenance and evolution.

2. Analysis the existing code.

We will perform code analysis on the system to have a better understanding on the system, determine the components and their dependencies.

3. Identify the components that required maintenance and evolution.

We will identify the components that are required for maintenance and evolution after we perform the code analysis. All components that need to be modified will be classified into their respective classification of maintenance activities. Justifications for their classification will also be added.

4. Carry on impact analysis on the components that required maintenance and evolution.

We will perform impact analysis on the components identified to determine whether other components will be affected by the component that undergoes maintenance. The ripple effect of the maintenance activities will also be determined.

5. Review the code changes and approves it.

Team leader will review the code changes and approve it if the code change is acceptable.

6. Build and test the code continuously.

We will build and test the code continuously to make sure that there is no error after changes. If there are any errors, we will roll back the system to the previous working state.

7. Deploy the application on preferred environment.

We will deploy the application on preferred environment for acceptance testing.

8. Set a baseline for any code changes.

We will set a baseline for code change so that we are able to roll back to preferred version if the system experiences any failure.

2.1 Software Maintenance and Evolution Model

Software maintenance and evolution could be separated from the Software Development Lifecycle, thus Software Maintenance Lifecycle (SMLC) was introduced. SMLC provides the abstraction of the maintenance processes. Software maintenance models use different approaches and techniques to simplify the process of maintenance stated in SMLC as well as to make it cost effective.

The reuse-oriented model is chosen for this project. The parts of the chosen system will be analyzed, modified, and possibly adding new components to produce a new version of the chosen system. In the reuse-oriented model, the full reuse model is more suited for this project where the main artifacts (source code) are available for the project teams. This model brings the benefits of saving the cost, time, and effort. The following activities are performed:

1. Identify the components of the old system that are candidates for reuse and maintain.
2. Understand and perform analysis of the identified system components.
3. Implement the maintenance and evolution by modifying the old source code.
4. Integrate the modified components to produce a new version of system.

2.2 System Requirements

Below is the requirement for this system:

1. User Tier 1 should be able to create Purchase Order (PO), Purchase & Service Requisition and send it for higher tier user to approve.
2. User Tier 3 and User Tier 4 should be able to receive the PO and PSR first after its creation.
3. User Tier 4 will receive the PO and PSR after both User Tier 2 and User Tier 3 approved it.
4. Approved PO or PSR should be able to be generated as PDF file.
5. User Tier 2, User Tier 3 and User Tier 4 should be able to approve or decline the PO and PSR applications once received the applications.
6. User Tier 1 shall be able to monitor the progress of their applications and reasons if the application declined.
7. Users should be able to create leave application for approval.
8. The leave application will be approved by higher tier user.

9. System admin should be able to register new user along with their designations and credentials.

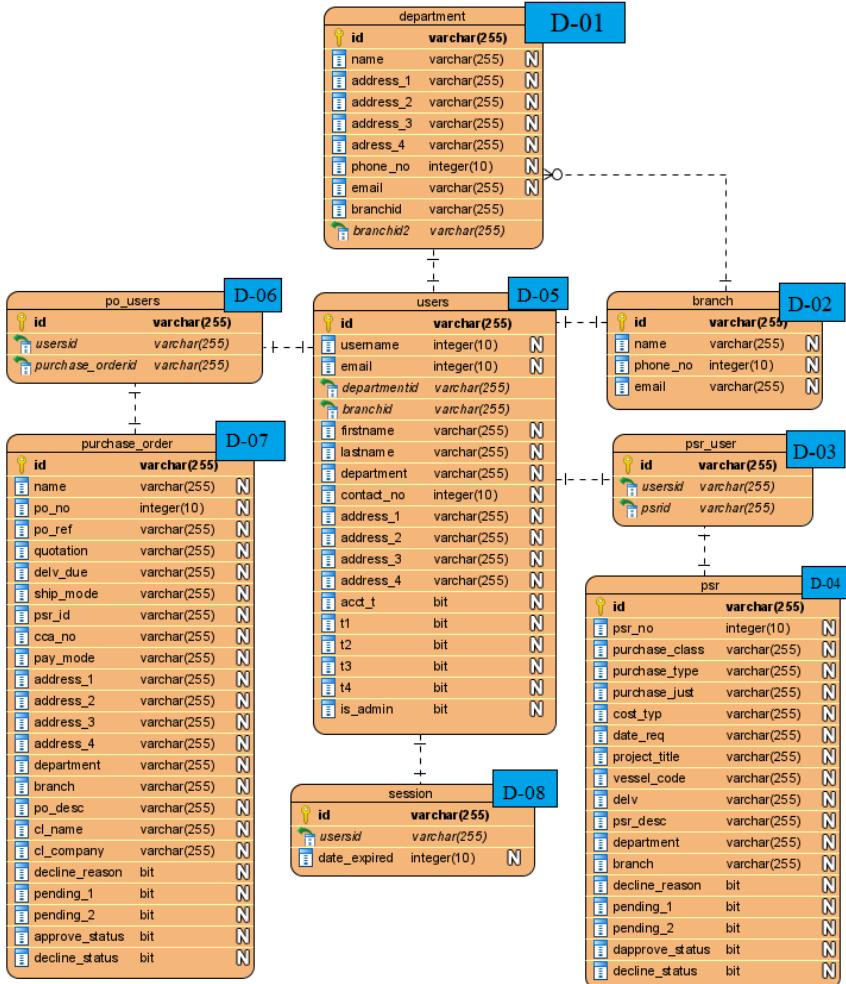
2.3 Reengineering

Reengineering is the examination, analysis, and restructuring of an existing software system to reconstitute it in a new form, and the subsequent implementation of the new form. (Tripathy & Naik, 2015) Reengineering is important in software maintenance and evolution of a system which helps the maintenance teams to understand the existing software system design, implementation, and the documentations. After understanding the required parts of the system, it will enhance the process of maintenance and evolution. For example, it will be easier for the maintainers to find the correct location to execute the maintenance tasks. There are two types of reengineering: forward engineering and reverse engineering. Forward engineering is a normal sequence like software development: it begins with identifying the system requirements and implementing the design. On the other hand, reverse engineering is the reverse of forward engineering.

In this project, reverse engineering is applied. An existing system is chosen. The system source code will be analyzed by the teams. The existing source code of the system will be the input of the reengineering process and in the end, it will produce the maintained and renovated system source code. Evolutionary reengineering approaches are better in describing our current project. The advantages of this approach are the resulting design is more cohesive and the scope of the individual functional module can be reduced. The reduced scope module helps the teams to distribute the maintenance tasks.

For maintenance tasks, software engineers identify functional modules and reengineer them into new components. A vertical traceability impact analysis has been conducted to identify the impact of the new changes. For the evolution tasks, an abstraction diagram is created to comprehend the back-end system. A horizontal traceability impact analysis has been conducted to identify the impact of the newly added function. Besides that, we analyzed the impact of the newly added library to the system.

ERD Diagram



2.4 Code Analysis

To understand how the application works, we have done analysis on the code. To be specific, we did a reverse engineering upon the application which enables us to analyze the software to determine its components and the relationships among the other components. The flow of code took longer to determine because the application consists of backend and frontend source codes. The code was organized in a way that is split into specific modules. Overall, there are three main modules which are the admin module, purchase order module and purchase service & requisition module. Other modules include the authentication and other reuse components.

A code analysis or static analysis will be considered in this system. The system was developed by using JavaScript as the main programming language. Hence, in the code analysis process, a community-driven tool, JSHint is chosen as the main tool to improve code analysis process in

term of cost and time. JSHint scans a program written in JavaScript and reports about commonly made mistakes and potential bugs. The potential problem could be a syntax error, a bug due to an implicit type conversion, a leaking variable, etc. (JSHint, A Static Code Analysis Tool for JavaScript, n.d.)



jshint dbaeumer:jshint
Dirk Baeumer | 1,761,883 | ★★★★★ | Repository | License | v0.11.0
Integrates JSHint into VS Code. JSHint is a linter for JavaScript
[Disable](#) [Uninstall](#) [This extension is recommended based on the files you recently opened.](#)
[Details](#) [Feature Contributions](#) [Changelog](#)

VS Code JSHint extension

Integrates [JSHint](#) into VS Code.

```
515     type: 'is-warning',
516     position: 'is-top',
517     actionText: 'OK',
518   })
519   this.$router.push({ path: `/notification/${this.id}` });
520 },
521 async decline_po() {
522   if(this.reason!=null){
523     this.isComponentModalActive = false;
524     try {
525       this.poObj.id = this.po_id;
526       this.poObj.decline_reason = this.reason;
527       const data = await po.po_decline(this.poObj);
528       console.log(data); //can be ignored
529       this.$buefy.snackbar.open({
530         duration: 3000,
531         message: 'Purchase Order Declined',
532         type: 'is-warning',
533         position: 'is-top'
534         actionText: 'OK'
535       })
536       this.$router.push({ path: `/notification/${this.id}` });
537     } catch (err) {
538       this.error = err.message;
539     }
540   }else{
541     this.isComponentModalActive = true;
542   }
543 }
```

2.4.1 Admin Module

From the analysis done, the admin module is used by the admin to view the users in the system, add, edit, or remove users and reset user's password. There are multiple tiers for users and these tiers have different access within the system. The tiers include Tier 1, Tier 2, Tier 3, Tier 4, Accountant Tier and Admin Tier.

A simple static testing shows that there are no visible mistakes or potential bugs in the code. The flow of the code is easy to understand as this flow seems to apply to the other modules as well. Whenever a feature is called by the user, a request, if needed, is sent to the backend server based on a route which calls a function in the controller to process, save, or get the information.

Unit testing was done, and a bug was found in which corrective maintenance needs to be done. The bug happens when adding a Tier 4 user. The adding form for Tier 4 user requires an unneeded variable which causes the error handling for forms to trigger.

2.4.2 Purchase Order Module

The purchase order module is used to submit purchase orders by the users and the purchase orders needs to be approved by higher tier users. To be specific, a purchase order needs to be approved by a Tier 2, Tier 3, and Tier 4 user. If there are any problems with the purchase order, the purchase order would be declined.

Static testing shows that there are no visible mistakes or potential bugs in the code. The flow of the code is like the other modules to keep the maintainability and consistency of the code.

Unit testing shows a few bugs in which corrective maintenance can be done. For example, a new set of databases without any data in would cause error to pop up. The reason is because there is no error handling for an empty database.

2.4.3 Purchase Service & Requisition Module

The purchase service & requisition module have the similar flow with the purchase order module. The difference is that the purchase order relies on the purchase service & requisition before it can be created and the data input for the purchase service & requisition is vastly different from the purchase order. Technical flow is similar for this module as with other modules.

Unit testing also revealed the similar bugs to the purchase order module as the code was reused and configured differently to fit the module. This is applied to the static testing also.

3 Components for Maintenance

After a thorough analysis of the code, we have determined the components that are required for maintenance. This section will describe the components and their respective types of maintenance activities. Each change request has been analyzed its impact before approve or reject the request. The column state explained the reject or approve the state of the request and if rejected, the reasons are provided.

Table 3-1 List of Components for Maintenance

Component	Change Request ID	Description	Type of Maintenance	Justification	Module Affected	State	Reasons	Person in-charge
Register user	CR1	Tier four users cannot be added into the system	Corrective (Intention-based)	This is intention based corrective because we have the intention to correct this defect. Adding in users are considered a requirement for the system so this defect must be corrected.	Admin module	Accepted	-	Syafiq Razak

	CR7	Input field for contact number in the register user form can increase the value inserted	Correction (Activity-based)	This is correction for activity-based maintenance as there is discrepancy between their expected behavior and the actual behavior of the system. Contact numbers are not meant to be edited by increasing their value in the input field.		Accepted	-	Syafiq Razak
	CR8	Input field for password cannot accept numbers and special characters	Correction (Activity-based)	This is correction for activity-based maintenance as there is discrepancy between their expected behavior and the actual behavior of the system. Password should be able to accept a combination of special		Rejected	Upon testing the system, no such problem is found.	Syafiq Razak

				characters, characters, and numbers to enable the creation of strong passwords.				
Add purchase order (PO)	CR9	An empty list of items can be inserted to the database when adding a PO	Preventive (Intention-based)	An empty item list can cause problems in the future because a PO must consist of items to be complete. Missing or empty data will cause unnecessary POs that need to be deleted. Doing this maintenance, we can prevent this situation from occurring.	Purchase Order Module	Accepted	-	Syafiq Razak
	CR10	User can only delete the last item added.	Perfective maintenance (Intention-based)	To improve user experience, the delete function should be able to delete the selected item, but not	Purchase Order Module and Purchase Service and	Accepted	-	Andre Tai

				only the last item added.	Requisition Module			
	CR14	The “Back” button does not redirect to the “Enter PSR” page	Correction (Activity-based)	To enable user to change the PSR number if they select the wrong PSR in the previous page. This is correction activity based as we are correcting a defect.	Purchase Order Module and Purchase Module	Accepted	-	Syafiq Razak
	CR15	The “Previous” button does not redirect to the previous page	Correction (Activity-based)	To enable user to make changes on the PO details after going to the item listing page. This is correction activity based as we are correcting a defect.	Purchase Order Module and Purchase Module	Accepted	-	Syafiq Razak
Interface	CR11	The color of the filter button is in grey color.	Perfective maintenance (Intention-based)	To improve user experience, the color of active button should not be in grey color as	Purchase Order Module and Purchase	Accepted	-	Syafiq Razak

				user might misunderstand that the button is unable to click.	Service and Requisition Module			
CR2	The interface for the pop-up modal of request status is not user friendly.	Perfective maintenance (Intention-based)	In the pop-up modal for request status, it is difficult for user to see which user has approved or which user has rejected the request hence we redesign it avoid ambiguity.	Accepted	-	Mahirah Mansor		
CR3	In the table that display list of PSR and PO, the column name for the status of the request	Perfective maintenance (Intention-based)	The column name should change to “Status” and should have a different icon for pending request to avoid ambiguity.	Accepted	-	Syafiq Razak		

		is “Is Approved” and the icon for pending request and reject request is the same.						
Filter function	CR4	There is no date validation for filter function.	Corrective maintenance (Intention-base)	There should be a date validation for the filter section to avoid the invalid input from user. If there is no date validation, there will be a situation where the filter result is incorrect or not as expected.		Accepted	-	Syafiq Razak
Request approval	CR5	The requests are rejected	Enhancement (Activity-based)	A field to enter the reason to reject a particular request will	Approval Module	Accepted	-	Lee Peh Ting

		without a reason.		be added into the form. This activity will affect the requirement that state about the request approval.				
	CR6	There is no notification that notify the user whether the request is being approved or rejected.	Perfective maintenance (Intention-based)	A notification should be sent to the user via email when the request they created is being approved or rejected to improve the user experience		Rejected	Too many resources needed and we are unable to meet the time constraints.	Syafiq Razak
Reset Password	CR12	There is no hint for the new password field.	Perfective maintenance (Intention-based)	A hint should be added so that the user understands the requirements of the password.	Reset Password Module	Accepted	-	Syafiq Razak
Form	CR13	There is no indication for	Perfective maintenance	An indication for required field should be added so that the	Admin Module, Purchase	Accepted	-	Syafiq Razak

		the required field.	(Intention-based)	user know which field is required to fill in.	Order Module, Purchase Service and Requisition Module and Reset Password Module.			
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4 Components for Evolution

4.1 Staff Performance Evaluation Module

Our team brainstormed ideas to evolve the system that we have chosen. The accepted idea for evolution is to create a staff performance evaluation module. This module will benefit the clients in determining the staffs' performance such as the time taken for the users to approve or reject a PO and PSR. It will also help the client in determining the efficiency level in the form of infographics such as pie charts, bar charts and so on. Here, efficiency means the average time taken for a request to be approved or rejected. The following lists down the steps in creating this module:

Requirement ID	Requirement
R-01	The system should be able to record the time taken for a PO or PSR request to be approved or rejected.
R-02	The system should be able to record the timestamp when a request is assigned to the staff.
R-03	The system should be able to record the timestamp when a request is approved or rejected.
R-04	The system shall display an infographic or analytical charts to show the staffs' overall and individual performance monthly and yearly.
R-05	The system should be able to calculate the average time taken and compare the average with the standards set by the company (Key Performance Indicator).
R-06	The system should be able to calculate the total yearly purchase order and purchase service & requisition.
R-07	The system should be able to calculate the efficiency of purchase order and purchase service & requisition and compare it with the standards set by the company (Key Performance Indicator).

Table 4-1 Evolution Summary

Evolution ID	Task

E1	Frontend, Design and build an analytics dashboard to display the data in intuitive, easy to read format.
E2	Backend, Design and develop the backend to fetch and calculate the related data.
E3	Integration between E1 and E2

We determined the staff working hours to be from 9.00 a.m. to 6.00 p.m. The time taken for the PO or PSR to be approved will be calculated from the timestamp when a request is assigned to the staff and the timestamp when a request is approved or rejected. The calculated time will be recorded in hours and minutes. This is because some users will approve or reject within a few minutes or hours after the request has been assigned while some users can take a few days. Therefore, it is better to synchronize the time taken in hours and minutes. The infographic will consist of charts that visualize the efficiency of approval, performance of staff, efficiency of staff (how long they take to approve the request, how many requests they can approve) and the total approved and rejected requests within a month. Suitable charts will be chosen to better visualize the information.

Component	Evolution ID	Description	Justification	Module Affected	State	Reasons	Person in-charge
Frontend	E1	Visualize data with an analytics dashboard.	To display data intuitively and in an easy-to-read format.	<ul style="list-style-type: none"> • Login Module, • Performance Module, • Personal Performance Module, • User Performance Module 	Accepted	-	
Backend	E2	Develop the backend to compute data.	To fetch and calculate related data for use in the frontend component.	<ul style="list-style-type: none"> • Performance Controller Module 	Accepted	-	
Integration	E3	Integrate frontend and backend component.	To achieve the evolution objective by having the frontend and backend integrate.	-	Accepted	-	

5 Impact Analysis

An issue is created in the Github to inform the team of the new issue found. The description of the issue must include the steps to recreate the issue so the team can easily find where the issue is located. The modification is made by the team and committed into the branch. A pull request is created to merge the changes into the main branch. Impact analysis is conducted after the pull request is approved in the Github.

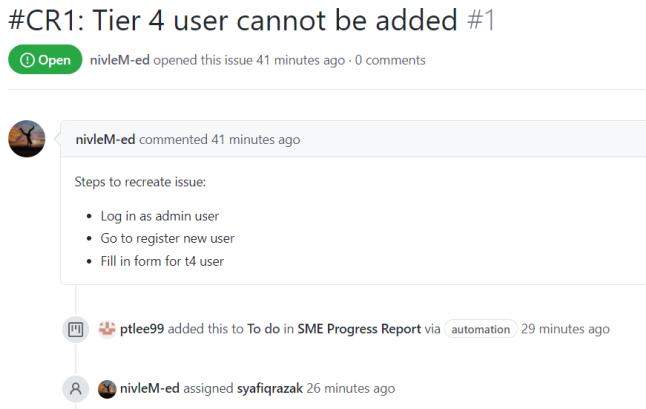


Figure 1: Example of Issue

5.1 Maintenance

5.1.1 CR1

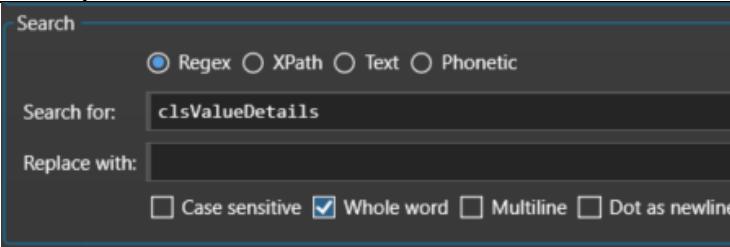
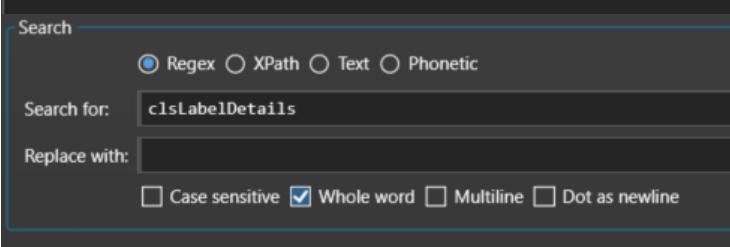
CR1 is for the issue where tier 4 users cannot be added. To determine the impact from this change request, the program dependency graph technique is being used. The block of code is analyzed to determine the effects of the change code and what is affected by the changed code.

Analysis method	Program dependency graph (Control Flow)
Analysis	
SIS	S270 to S279

	S288 to S304
CIS	S270 to S279
AIS	S270, S275
FIS	S271, S272, S273, S274, S276, S278, S279
DIS	-

5.1.2 CR2

We used dnGrep because for this CR2, it affects the user interface by editing the CSS file. Since, CSS files are usually imported by other classes, we used this tool to determine specifically where the changes done in the CSS file that affects which class. The classes used in the change part has no impact to other files.

Analysis method	dnGrep
Analysis	 <p>Search</p> <p>Regex <input checked="" type="radio"/> XPath <input type="radio"/> Text <input type="radio"/> Phonetic</p> <p>Search for: <code>clsValueDetails</code></p> <p>Replace with: <input type="text"/></p> <p><input type="checkbox"/> Case sensitive <input checked="" type="checkbox"/> Whole word <input type="checkbox"/> Multiline <input type="checkbox"/> Dot as newline</p> <p>▶ displayPSR2.vue (11 matches on 11 lines)</p> <p>▶ displayPSR.vue (13 matches on 13 lines)</p> <p>▶ displayPO.vue (13 matches on 13 lines)</p>  <p>Search</p> <p>Regex <input checked="" type="radio"/> XPath <input type="radio"/> Text <input type="radio"/> Phonetic</p> <p>Search for: <code>clsLabelDetails</code></p> <p>Replace with: <input type="text"/></p> <p><input type="checkbox"/> Case sensitive <input checked="" type="checkbox"/> Whole word <input type="checkbox"/> Multiline <input type="checkbox"/> Dot as newline</p> <p>▶ displayPSR2.vue (11 matches on 11 lines)</p> <p>▶ displayPO.vue (13 matches on 13 lines)</p> <p>▶ displayPSR.vue (13 matches on 13 lines)</p>
SIS	displayPSR2.vue displayPO.vue displayPSR.vue
CIS	displayPO.vue displayPSR.vue
AIS	displayPO.vue displayPSR.vue
FIS	-
DIS	-

5.1.3 CR3

A program dependency graph is used to determine the control of the status variable. An analysis is conducted to check what icon will be displayed according to the value of a status variable or in other words, how the status variable impacts the new changes in displaying the icon. There is no impact on the other part of the file because it only used to display the icon.

Analysis method	Program Dependency Graph (Control Flow)
Analysis	<pre> graph TD S147((S147: display Check icon)) --> S146([S146: if (status == true)]) S146 --> S149([S149: else if (status == false)]) S149 --> S150((S150: display Cross icon)) S150 --> S152([S152: else]) S152 --> S153((S153: display Hourglass icon)) S153 --> S146 </pre>
SIS	S145 to S154
CIS	S146, S147, S149, S150, S152, S153
AIS	S146, S147, S149, S150, S152, S153
FIS	-
DIS	-

5.1.4 CR4

Same changes done to PSR

Analysis method	Program slicing
Analysis	<pre> <330, canSearch> 288: var canSearch = true; 303: if(this.date){ 304: if(!this.month){ 306: canSearch = true 308: else if(!this.year){ 310: canSearch = false </pre>

	329: if(canSearch) 330: this.getPO();
SIS	288 to 330
CIS	288, 303, 304, 306, 308, 310, 329, 330
AIS	288, 303, 304, 306, 308, 310, 329, 330
FIS	-
DIS	-

5.1.5 CR5

A program dependency graph is used to keep track the effect of variable reason. Variable reason is new added variable to display the decline reason. The user needs to enter the decline reason and it will be display in the status modal.

Analysis method	Program Dependency Graph (Data Flow)
Analysis	<pre> graph TD S252((S252: this.reason)) --> S522((S522: this.reason != null)) S522 --> S526((S526: this.poObj.decline_reason = this..reason)) S523((S523: this.isComponentModalActive = false)) -.-> S522 S541((S541: this.isComponentModalActive = true)) -.-> S526 </pre>
SIS	S246 to S260 S432 S442 to S444 S522 to S526 S540 to S542
CIS	S252, S522, S523, S526, S541
AIS	S252, S522, S526, S541
FIS	S523
DIS	-

5.1.6 CR7

Analysis method	Execute the program twice
Analysis	<p>With change (Interface)</p> <p>Contact Number:<input type="text"/></p> <p>Without change (Interface)</p> <p>Contact Number:<input type="text"/></p>
SIS	-
CIS	-
AIS	-
FIS	-
DIS	-

5.1.7 CR9

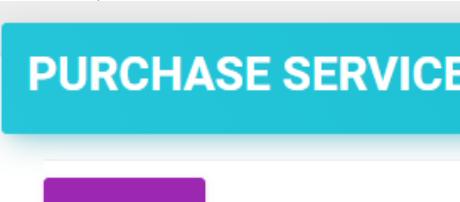
Analysis method	Program Dependency Graph (Control Flow)
Analysis	<pre> graph TD S354((S354: passed = true)) --> S355((S355: for(var i = 0; i < this.desc.length; i++))) S355 --> S356((S356: tempt = this.desc[i])) S356 --> S357((S357: if(tempt.description == null tempt.quantity == null tempt.unitPrice == null))) S357 -.-> S358((S358: passed = false)) S358 --> S363((S363: if(passed))) S363 --> S367((S367: if (!this.\$v.\$invalid))) S367 -.-> S369((S369: const po = await purchaseOrder.po_add(this.poObj))) S369 -.-> S373((S373: this.rerouteToMyApplication();)) S373 -.-> S374((S374: this.poCreated();)) </pre>

SIS	S354 to S360 S363 to S383
CIS	S354, S355, S356, S357, S358, S363, S367, S369, S373, S374
AIS	S354, S355, S358, S363
FIS	S356, S357, S367, S369, S373, S374
DIS	-

5.1.8 CR10

Analysis method	
Analysis	
SIS	
CIS	
AIS	
FIS	
DIS	

5.1.9 CR11

Analysis method	Execute twice
Analysis	<p>With change (Interface)</p>  <p>Without change (Interface)</p>

	<p>PSR INPUT METHOD:</p> <p><input type="radio"/> Enter PSR <input checked="" type="radio"/> SEARCH PSR</p> <p>FILTER</p> <p>PSR Number</p> <p>DJSB/MAR/PSR/10141</p> <p>DJSB/MAR/PSR/10138</p>
SIS	-
CIS	-
AIS	-
FIS	-
DIS	-

5.1.10 CR12

Analysis method	Execute twice
Analysis	<p>With change (Interface)</p> <p>Reset Password</p> <p>Old Password: * <input type="text"/></p> <p>New Password: * <input type="text"/> At least 8 characters for the password</p> <p>Confirm New Password: * <input type="text"/></p> <p>* indicate required field</p> <p>Without change (Interface)</p> <p>Reset Password</p> <p>Old Password: * <input type="text"/></p> <p>New Password: * <input type="text"/></p> <p>Confirm New Password: * <input type="text"/></p> <p>* indicate required field</p>

SIS	-
CIS	-
AIS	-
FIS	-
DIS	-

5.1.11 CR13

Analysis method	Execute twice
Analysis	With change (Interface)
	<p>Purchase Order Application</p> <p>Our Reference: <input type="text"/></p> <p>Your Quotation: <input type="text"/></p> <p>Delivery Due Date: <input type="date"/></p> <p>Mode of Shipment <input type="text"/></p> <p>CCA No.: <input type="text"/></p> <p>Mode of Payment: <input type="text"/></p> <p>To: <input type="text"/></p> <p>Company: <input type="text"/></p>
	Without change (Interface)
	<p>Purchase Order Application</p> <p>Our Reference: * <input type="text"/></p> <p>Your Quotation: * <input type="text"/></p> <p>Delivery Due Date: * <input type="date"/></p> <p>Mode of Shipment * <input type="text"/></p> <p>CCA No.: * <input type="text"/></p> <p>Mode of Payment: * <input type="text"/></p> <p>To: * <input type="text"/></p> <p>Company: * <input type="text"/></p> <p>Address: * <input type="text"/></p>
SIS	-
CIS	-

AIS	-
FIS	-
DIS	-

5.1.12 CR14

Analysis method	Program Dependency Graph (Data Flow)
Analysis	<pre> graph TD S12([S12: step === 1 S164: step === 2]) --> S286([S286: step:1]) S286 --> S398([S398: next() {this.step++;}]) S398 --> S405([S405: prev() {this.step--;}]) S405 --> S286 </pre>
SIS	S286, S398, S405, S12, S164, S149, S250
CIS	S286, S398, S405, S12, S164
AIS	S286, S405, S12, S164
FIS	S398
DIS	-

5.2 Evolution

A horizontal traceability graph is used to analyse the impact of new added module (staff performance evaluation module) to the current system. The graph shows the relationships among the artifacts. CC

The labeling for design is explained in the [Section reengineering](#), the labeling for requirements is explained in the [section evolution](#), and the labeling for test cases is explained in the [section test cases](#).

Directory ID	Code ID	File Location/ Name
DIR-01	C-01	DB/ALTER TABLE/CREATE CONSTRAINTS.sql
	C-02	DB/ALTER TABLE/CREATE SEQUENCES.sql
	C-03	DB/ALTER TABLE/FALLBACK CONSTRAINT.sql
	C-04	DB/ALTER TABLE/FALLBACK SEQUENCES.sql
DIR-02	C-05	DB/PRE SPs/F_SEARCH_PO_20200201.sql
	C-06	DB/PRE SPs/F_SEARCH_PSR_20200201.sql
DIR-03	C-07	DB/SP/F_ADD_PO.sql
	C-08	DB/SP/F_ADD_PSR.sql
	C-09	DB/SP/F_ADD_USR.sql
	C-10	DB/SP/F_GET_PERF_PO.sql

	C-11	DB/SP/F_GET_PERF_PSR.sql
	C-12	DB/SP/F_SEARCH_LEAVE.sql
	C-13	DB/SP/F_SEARCH_PO.sql
	C-14	DB/SP/F_SEARCH_PSR.sql
	C-15	DB/SP/F_UPDATEUSR.sql
	C-16	DB/SP/INDEX_DDL.sql
	C-17	DB/SP/INDEX_DDL_FALLBACK.sql
DIR-04	C-18	INITIALIZE_DB.sql
	C-19	PUMP.sql
DIR-05	C-20	config/config.json
DIR-06	C-21	controller/admin.js
	C-22	controller/performance.js
	C-23	controller/psr.js
	C-24	controller/purchase_order.js
	C-25	controller/user.js
DIR-07	C-26	models/branch.js
	C-27	models/department.js
	C-28	models/index.js
	C-29	models/psr.js
	C-30	models/purchase_order.js
	C-31	models/user.js
DIR-08	C-32	routes/ performance.js
	C-33	routes/admin.js
	C-34	routes/index.js
	C-35	routes/psr.js
	C-36	routes/purchase_order.js
-	C-37	app.js
-	C-38	const.js
DIR-09	C-39	Frontend-vue/src/pages/2stepForum.vue
	C-40	Frontend-vue/src/pages/Dashboard.vue
	C-41	Frontend-vue/src/pages/EnterPSR.vue
	C-42	Frontend-vue/src/pages/Icons.vue
	C-43	Frontend-vue/src/pages/Maps.vue
	C-44	Frontend-vue/src/pages/Message.vue
	C-45	Frontend-vue/src/pages/MyApplication.vue
	C-46	Frontend-vue/src/pages/Notification.vue
	C-47	Frontend-vue/src/pages/POListing.vue
	C-48	Frontend-vue/src/pages/POSubmitSucess.vue
	C-49	Frontend-vue/src/pages/PSR.vue
	C-50	Frontend-vue/src/pages/PSRListing.vue
	C-51	Frontend-vue/src/pages/PSR_bak.vue
	C-52	Frontend-vue/src/pages/Register_Bak.vue
	C-53	Frontend-vue/src/pages/Register.vue
	C-54	Frontend-vue/src/pages/ResetPassword.vue
	C-55	Frontend-vue/src/pages/TableList.vue
	C-56	Frontend-vue/src/pages/TableTemplate.vue
	C-57	Frontend-vue/src/pages/Typography.vue
	C-58	Frontend-vue/src/pages/UpgradeToPRO.vue

	C-59	Frontend-vue/src/pages/User.vue
	C-60	Frontend-vue/src/pages/UserProfile.vue
	C-61	Frontend-vue/src/pages/displayLeave.vue
	C-62	Frontend-vue/src/pages/displayPO.vue
	C-63	Frontend-vue/src/pages/displayPSR.vue
	C-64	Frontend-vue/src/pages/displayPSR2.vue
	C-65	Frontend-vue/src/pages/dynamicForm.vue
	C-66	Frontend-vue/src/pages/editPO.vue
	C-67	Frontend-vue/src/pages/index.js
	C-68	Frontend-vue/src/pages/login.vue
	C-69	Frontend-vue/src/pages/notification.vue
	C-70	Frontend-vue/src/pages/passwordRecovery.vue
	C-71	Frontend-vue/src/pages/purchaseOrder.vue
	C-81	Frontend-vue/src/pages/performance.vue
	C-83	Frontend-vue/src/pages/personalPerformance.vue
	C-84	Frontend-vue/src/pages/userPerformance.vue
	C-91	Frontend-vue/src/pages/performanceDashboard.vue
	C-85	Frontend-vue/src/pages/Layout/DashboardLayout.vue
	C-86	Frontend-vue/src/pages/Layout/Content.vue
	C-87	Frontend-vue/src/pages/Layout/ContentFooter.vue
	C-88	Frontend-vue/src/pages/Layout/MobileMenu.vue
	C-89	Frontend-vue/src/pages/Layout/TopNavbar.vue
	C-90	Frontend-vue/src/pages/Layout/loginLayout.vue
DIR-10	C-72	Frontend-vue/src/assets/style/style.css
DIR-11	C-73	Frontend-vue/src/routes/routes.js
DIR-12	C-74	Frontend-vue/src/js/admin.js
	C-75	Frontend-vue/src/js/const.js
	C-76	Frontend-vue/src/js/generatePO.js
	C-77	Frontend-vue/src/js/generatePSR.js
	C-78	Frontend-vue/src/js/po.js
	C-79	Frontend-vue/src/js/psr.js
	C-80	Frontend-vue/src/js/user.js
	C-82	Frontend-vue/src/js/performance.js
DIR-13	C-92	Frontend-vue/src/components/Cards/ChartCard.vue
	C-93	Frontend-vue/src/components/Cards/NavTabsCard.vue
	C-94	Frontend-vue/src/components/Cards/StatsCard.vue
	C-95	Frontend-vue/src/components/NotificationPlugin/Notification.vue
	C-96	Frontend-vue/src/components/NotificationPlugin/Notifications.vue
	C-97	Frontend-vue/src/components/NotificationPlugin/index.js
	C-98	Frontend-vue/src/components/SidebarPlugin/SideBar.vue
	C-99	Frontend-vue/src/components/SidebarPlugin/SidebarLink.vue
	C-100	Frontend-vue/src/components/SidebarPlugin/index.js
	C-101	Frontend-vue/src/components/Tables/NavTabsTable.vue
	C-102	Frontend-vue/src/components/Tables/OrderedTable.vue
	C-103	Frontend-vue/src/components/Tables/PSRSearch.vue
	C-104	Frontend-vue/src/components/Tables/SimpleTable.vue

	C-105	Frontend-vue/src/components/Tables/myPO.vue
	C-106	Frontend-vue/src/components/Tables/myPSR.vue
	C-107	Frontend-vue/src/components/Tables/notifyPO.vue
	C-108	Frontend-vue/src/components/Tables/notifyPSR.vue

6 Tools Set-up

6.1 Repository Set-up

The screenshot shows a GitHub repository page for the organization 'UMFinalYear-BestAssignmentGroup'. The repository name is 'WIF3005_SME'. The page displays a single commit by user 'nivleM-ed' with the message 'Initial commit' and hash '06b5f2a20a', made 2 days ago. There are 14 branches and 0 tags. The 'About' section indicates no description, website, or topics provided. The 'Releases' section shows no releases published, with a link to 'Create a new release'. The 'Packages' section shows no packages published, with a link to 'Publish your first package'. The 'Contributors' section lists 4 contributors, including 'nivleM-ed' (Melvin Edward).

Table 6-1: Github Repository of Application

We create an organization on Github as we require at least two repositories for this project. The first repository is to keep the source code needed for development. There are two folders where one folder is for the back-end side of the application and the other is for the front-end side of the application. The second repository is needed to keep the production files of the application which will be used to deploy to Heroku. Github Pages was not chosen as the medium for deployment as it only serves static files and does not allow usage of database.

Each group members have joined the Github organization and are given write access so they can make changes to the repository branches during maintenance or evolution. Github link https://github.com/UMFinalYear-BestAssignmentGroup/WIF3005_SME. The summary of tasks and person in charge has been listed in the table below.

Task	Status	Person in Charge	Justification

Create organization	✓	Melvin Edward	An organization is created to ease the management of multiple repositories.
Create repository	✓	Melvin Edward	Two repositories are created for the purpose of this assignment. One repository is to keep the source code needed for development, maintenance, and evolution. Another repository is for production and deployment to Heroku.
Add collaborator	✓	Melvin Edward	All members of the group are added to the organization so everyone has write access to the repository.
Create branch	✓	Melvin Edward	Two branches are created for Maintenance and Evolution. The Maintenance branch is to keep the source code for maintenance while the Evolution branch is to keep the source code for evolution.
Make changes to code	✓	Melvin Edward, Syafiq Razak, Tan Ying Shan, Lau Puong Huei	Three people are assigned to do the evolution of the system and one person does the maintenance of the system. More people are assigned to evolve the system because there is a need to discover potential libraries or source code to reuse in the system. Most maintenance tasks are involving perfective maintenance and they are relatively simpler to do hence, a single person would suffice.
Proposed change request	✓	Tan Ying Shan, Andre Tai Wei Xiang, Lau Puong Huei	Three people are assigned to test the system and determine areas of improvement. Each person would test a module and list down potential improvements to the system as there are a quite a number of modules and functions

			in the system. These improvements are made into change requests.
Review change and approve/reject change	✓	Mahirah Mansor, Lee Peh Ting	Two people are assigned to approve or reject the change request. They would determine the validity of the change request by testing the system again. Unfeasible or redundant change requests are rejected. The change requests are also validated by performing the impact analysis.
Impact Analysis	✓	Mahirah Mansor, Lee Peh Ting	The impact analysis is done by two people as they need to determine the SIS, CIS, AIS, DIS and FPIS. They also need to determine the dependencies within the source code for the change requests.
Change Propagation	✓	Andre Tai Wei Xiang	Pulls the final version of the code and do regression testing to ensure the change propagated correctly for every changed done.
Create Workflow (CI file)	✓	Melvin Edward	In the Github action, the workflow is created. The workflow will be triggered to ensure everything work smoothly and correctly after the changes.
Merge file	✓	Melvin Edward	Every committed request will be reviewed by the project manager to avoid conflict and ensure the code changes will not have any impact on other components. After done reviewing the committed code, the final versions will be merged
Baseline	✓	Melvin Edward	The baseline is set for every change request by the previous successful working code.

Update dashboard	✓	Mahirah Mansor, Lee Peh Ting	A basic Kanban used to help to keep track of the progress of the task of the project. Team members can review the To-do card for the tasks that need to be done. The task status will be update automatically.
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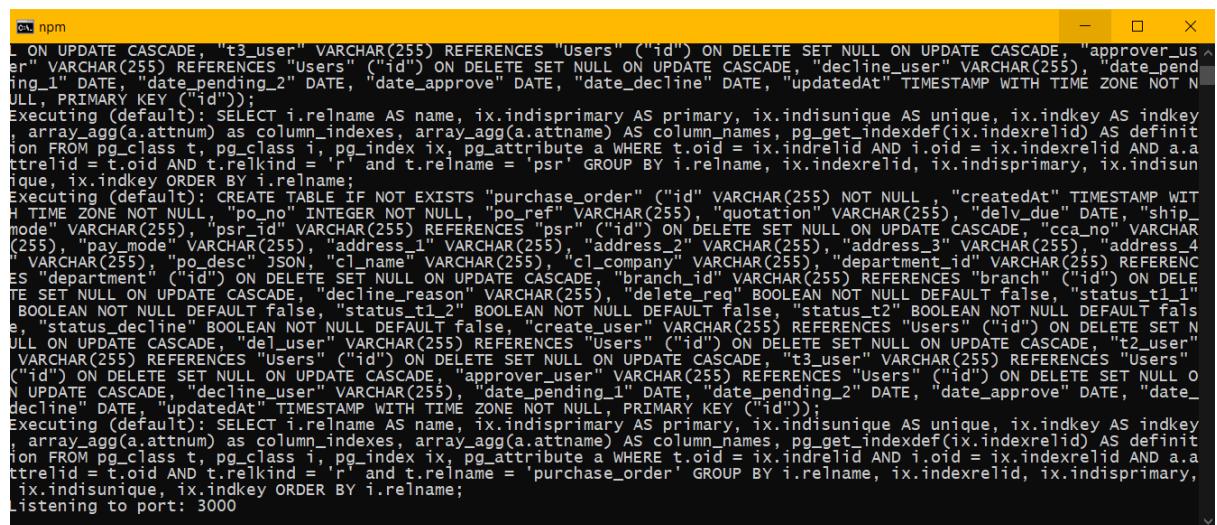
6.2 System Set-up

When setting up the system, we must take into consideration if the purpose is for development or for production as the set-up differ from each other.

6.2.1 Development

Before setting up the development servers for the application, we need to make sure we have set-up our PostgreSQL database. The set-up for the database server is quite straight forward. The only thing to take note is the configurations to connect the back-end code to the database server which can be found in the config folder of the back-end source code.

After the database is working, we can clone the repository and install all necessary files. As this is a NodeJS application we can simply use the *npm install* command within the backend-node and frontend-vue folders. It is important to keep in mind that backend-node folder contains the back-end source code while frontend-vue folder contains the front-end source code and would need to be executed to start their own server. Thus, *npm install* needs to be called within both folders. At this point, we can start the servers using *npm start* for the back-end source code and *npm run serve* for the front-end source code. However, we have not established the database connection and initialize the database tables and stored procedures. To do this, we can run *sequelize db:migrate* within the back-end source code to set-up the tables. Next, we must manually inject the stored procedure by using a script within the DB folder.



```
cmd: npm
    ON UPDATE CASCADE, "t3_user" VARCHAR(255) REFERENCES "Users" ("id") ON DELETE SET NULL ON UPDATE CASCADE, "approver_user" VARCHAR(255) REFERENCES "Users" ("id") ON DELETE SET NULL ON UPDATE CASCADE, "decline_user" VARCHAR(255), "date_pending_1" DATE, "date_pending_2" DATE, "date_approve" DATE, "date_decline" DATE, "updatedAt" TIMESTAMP WITH TIME ZONE NOT NULL, PRIMARY KEY ("id");
Executing (default): SELECT i.relname AS name, ix.indisprimary AS primary, ix.indisunique AS unique, ix.indkey AS indkey, array_agg(a.attnum) AS column_indexes, array_agg(a.attname) AS column_names, pg_get_indexdef(ix.indexrelid) AS definition FROM pg_class t, pg_class i, pg_index ix, pg_attribute a WHERE t.oid = ix.indexrelid AND i.oid = ix.indexrelid AND a.attrelid = t.oid AND t.relkind = 'r' AND t.relname = 'psr' GROUP BY i.relname, ix.indexrelid, ix.indisprimary, ix.indisunique, ix.indkey ORDER BY i.relname;
Executing (default): CREATE TABLE IF NOT EXISTS "purchase_order" ("id" VARCHAR(255) NOT NULL, "createdAt" TIMESTAMP WITH TIME ZONE NOT NULL, "po_no" INTEGER NOT NULL, "po_ref" VARCHAR(255), "quotation" VARCHAR(255), "delv_due" DATE, "ship_mode" VARCHAR(255), "psr_id" VARCHAR(255) REFERENCES "psr" ("id") ON DELETE SET NULL ON UPDATE CASCADE, "cca_no" VARCHAR(255), "pay_mode" VARCHAR(255), "address_1" VARCHAR(255), "address_2" VARCHAR(255), "address_3" VARCHAR(255), "address_4" VARCHAR(255), "po_desc" JSON, "cl_name" VARCHAR(255), "cl_company" VARCHAR(255), "department_id" VARCHAR(255) REFERENCES "department" ("id") ON DELETE SET NULL ON UPDATE CASCADE, "branch_id" VARCHAR(255) REFERENCES "branch" ("id") ON DELETE SET NULL ON UPDATE CASCADE, "decline_reason" VARCHAR(255), "delete_req" BOOLEAN NOT NULL DEFAULT false, "status_t1_1" BOOLEAN NOT NULL DEFAULT false, "status_t1_2" BOOLEAN NOT NULL DEFAULT false, "status_t2" BOOLEAN NOT NULL DEFAULT false, "status_t3" BOOLEAN NOT NULL DEFAULT false, "create_user" VARCHAR(255) REFERENCES "Users" ("id") ON DELETE SET NULL ON UPDATE CASCADE, "t2_user" VARCHAR(255) REFERENCES "Users" ("id") ON DELETE SET NULL ON UPDATE CASCADE, "t3_user" VARCHAR(255) REFERENCES "Users" ("id") ON DELETE SET NULL ON UPDATE CASCADE, "approver_user" VARCHAR(255) REFERENCES "Users" ("id") ON DELETE SET NULL ON UPDATE CASCADE, "decline_user" VARCHAR(255), "date_pending_1" DATE, "date_pending_2" DATE, "date_approve" DATE, "date_decline" DATE, "updatedAt" TIMESTAMP WITH TIME ZONE NOT NULL, PRIMARY KEY ("id");
Executing (default): SELECT i.relname AS name, ix.indisprimary AS primary, ix.indkey AS indkey, array_agg(a.attnum) AS column_indexes, array_agg(a.attname) AS column_names, pg_get_indexdef(ix.indexrelid) AS definition FROM pg_class t, pg_class i, pg_index ix, pg_attribute a WHERE t.oid = ix.indexrelid AND i.oid = ix.indexrelid AND a.attrelid = t.oid AND t.relkind = 'r' AND t.relname = 'purchase_order' GROUP BY i.relname, ix.indexrelid, ix.indisprimary, ix.indisunique, ix.indkey ORDER BY i.relname;
Listening to port: 3000
```

Table 6-2: Executing front-end source code

```
npm
DONE | Compiled successfully in 18186ms

App running at:
- Local: http://localhost:8080/
- Network: http://192.168.193.109:8080/

Note that the development build is not optimized.
To create a production build, run npm run build.
```

Table 6-3: Executing back-end code

During development, it is not difficult to understand the coding style and organization of the code. For the back-end source code, the logic consists to retrieve, save, and process information by calling the stored procedures in the database. The codes are organized based on their specific modules. This is similar with the front-end source code. A live view of the application can be viewed at localhost:8000.

6.2.2 Deployment (Heroku)

Heroku was chosen as the deployment medium as it provides support for NodeJS REST API and its own dedicated PostgreSQL database server. Deploying to Heroku is not difficult when following the steps provided by Heroku. However, first is to build the front-end source code into HTML and JS files which can be served by the back-end source code. Next, is to set up the Heroku server with the correct database. The database needs to be initialized with tables and stored procedure need by the server.

After all configurations are done, we can push the source code into the Heroku repository in which Heroku would automatically detect the type of system and build it. If the build is successful, the system will run.

7 Create branches

The branches are created to handle the changes. Every change is required to commit to a different branch for the easy trace back of the work done. The figure below shows the lists of branches created in the Github.

All branches	
master	Updated 16 hours ago by nivleM-ed
evolution-frontend	Updated 12 hours ago by hueilau
Maintenance-CR5	Updated 16 hours ago by ptlee99
evolution-backend	Updated 21 hours ago by nivleM-ed
Maintenance-CR2	Updated yesterday by mahirahmansor
Maintenance-CR12	Updated yesterday by syafiqrazak
Maintenance-CR13	Updated yesterday by syafiqrazak
Maintenance-CR4	Updated 2 days ago by syafiqrazak
Maintenance-CR11	Updated 2 days ago by syafiqrazak
Maintenance-CR3	Updated 2 days ago by syafiqrazak
Maintenance-CR7	Updated 2 days ago by syafiqrazak
Maintenance-CR9	Updated 2 days ago by syafiqrazak
Maintenance-CR14	Updated 2 days ago by syafiqrazak
Maintenance-CR1	Updated 2 days ago by syafiqrazak

A table is used to link the issues with the created branches.

Issues ID	Issues	Branch	Branch ID	Assigned To
#1	#CR1: Tier 4 user cannot be added	Maintenance-CR1	BM-1	Syafiq Razak
#3	#CR9 An empty list of items can be inserted to the database when adding a PO	Maintenance-CR9	BM-2	Syafiq Razak
#5	#CR11 The color of the filter button is in grey color.	Maintenance-CR11	BM-11	Syafiq Razak

#6	#CR12 There is no hint for the new password field.	Maintenance-CR12	BM-12	Syafiq Razak
#8	#CR13 There is no indication for the required field.	Maintenance-CR13	BM-13	Syafiq Razak
#9	#CR14 The “Back” button does not redirect to the “Enter PSR” page	Maintenance-CR14	BM-14	Syafiq Razak
#10	#CR15 The “Previous” button does not redirect to the previous page			
#11	#CR7 Input field for contact number in the register user form can increase the value inserted.	Maintenance-CR7	BM-7	Syafiq Razak
#12	#CR5 The requests are rejected without a reason.	Maintenance-CR5	BM-5	Lee Peh Ting
#13	#CR4 There is no date validation for filter function.	Maintenance-CR4	BM-4	Syafiq Razak
#14	#CR3 In the table that display list of PSR and PO, the column name for the status of the request is “Is Approved” and the icon for pending request and reject request is the same.	Maintenance-CR3	BM-3	Syafiq Razak
#17	#CR2 The interface for the pop-up modal of request status is not user friendly.	Maintenance-CR2	BM-2	Mahirah Mansor
#4	#CR10 User can only delete the last item added	Maintenance-CR10	BM-10	Andre Tai
#27	-	Evolution-backend	BE-1	Melvin Edward
#31	Evolution #1: Performance Calculator Error	Evolution-frontend	BE-2	Lau Puong Huei
#32	Evolution #2: Decline graph showing wrong information			
#33	Evolution #3:			

8 Commit changes

Every change will be committed into the related branch. Each change is required to provide a proper naming that can explained the changes. It is useful for other member to understand the changes and to do the impact analysis.

8.1 Maintenance

8.1.1 CR1

Change Request	CR1
Commit ID	953f57f56a4394499e5bc28ac6e7c8f2261fd47a
Commit Title	Maintenance CR7
Description	Resolved "Tier 4 user cannot be added" issue.
Branch	Maintenance-CR1
Code Modification	<pre> 54 front-end-vue/src/pages/Register.vue 55 @@ -87,13 +87,15 @@ 56 </td> 57 <td class="clsValue"> 58 select v-model="department" expanded="" style="width:98%;" 59 <option value="Marine">Marine</option> 60 <option value="ccct">Commercial and Contract </option> 61 <option value="acct">Account</option> 62 <option value="adm">Admin</option> 63 <option value="tgd">Trading</option> 64 </select> 65 <div class="error" v-if="\$v.department.required && isPosted">Department is required</div> 66 </td> 67 </tr> 68 <tr> 69 <td>-211,7 +212,6 @@ 70 export default { 71 t4: false, 72 is_admin: false, 73 isPosted: false, 74 dataBackgroundColor: 'blue', 75 validateDepartment: true, 76 isLoading: false 77 }; 78 79 confirmPassword: minLength(8), 80 sameAsPassword: sameAs('password') 81 },department: { 82 required 83 },branch: { 84 required 85 },firstname: { 86 required 87 },tier: { 88 required 89 } 90 @@ -266,26 +267,41 @@ 91 export default { 92 // if(this.register.username && this.register.password) 93 this.isPosted = true; 94 if (!\$v.\$v.\$invalid){ 95 try { 96 this.isLoading = true; 97 const users = await admin.newUser(this.userObj.toJson()); 98 console.log(users); //can be ignored 99 this.posted = true; 100 localStorage.message = "New User Created"; 101 // this.\$router.push({ path: '/message/' + this.id }); 102 this.\$router.push({ path: '/user/' + this.id }); 103 this.isLoading = false; 104 this.register(); 105 //add redirect to other page here 106 } catch (err) { 107 this.isLoading = false; 108 alert(err); 109 this.error = err.message; 110 } 111 } 112 else{ 113 alert("Fill all the required fields"); 114 } 115 } 116 117 else{ 118 alert("Fill all the required fields"); 119 } 120 121 else{ 122 alert("Fill all the required fields"); 123 } 124 125 else{ 126 alert("Fill all the required fields"); 127 } 128 129 else{ 130 alert("Fill all the required fields"); 131 } 132 133 else{ 134 alert("Fill all the required fields"); 135 } 136 137 else{ 138 alert("Fill all the required fields"); 139 } 140 141 else{ 142 alert("Fill all the required fields"); 143 } 144 145 else{ 146 alert("Fill all the required fields"); 147 } 148 149 else{ 150 alert("Fill all the required fields"); 151 } 152 153 else{ 154 alert("Fill all the required fields"); 155 } 156 157 else{ 158 alert("Fill all the required fields"); 159 } 160 161 else{ 162 alert("Fill all the required fields"); 163 } 164 165 else{ 166 alert("Fill all the required fields"); 167 } 168 169 else{ 170 alert("Fill all the required fields"); 171 } 172 173 else{ 174 alert("Fill all the required fields"); 175 } 176 177 else{ 178 alert("Fill all the required fields"); 179 } 180 181 else{ 182 alert("Fill all the required fields"); 183 } 184 185 else{ 186 alert("Fill all the required fields"); 187 } 188 189 else{ 190 mapObj(); 191 if(this.tier == "acct_t") 192 </pre>

Commit by	Syafiq Razak

8.1.2 CR2

Change Request	CR2
Commit ID	28ba9d61cd1f6ea036f12f175d0da2ea4c8ce448
Commit Title	Maintenance CR2
Description	Resolve the issue where the popup modal for status in PO and PSR is difficult to see who reject or accept the request
Branch	Maintenance-CR2
Code Modification	<pre> 8 ████ Frontend-vue/src/assets/style/style.css □ 9 @@ -89,17 +89,15 @@ td.cislabelDetails{ 10 - padding-left: 1em; 11 - font-weight: 700; 12 - text-align: left; 13 - border-style: solid; 14 - border-color: #fb(191, 248, 252); 15 - } 16 - td.cisValueDetails{ 17 - color: black; 18 - height: 20px; 19 - vertical-align: middle; 20 - padding-left: 5px; 21 - font-weight: 400; 22 - border-style: solid; 23 - border-color: #fb(191, 248, 252); 24 - } 25 - .cisFormDetails{ 26 - border-radius: 20px; 27 - }</pre> <pre> 40 padding-left: 1em; 41 font-weight: 700; 42 text-align: left; 43 + background-color: #f3f3f3; 44 - } 45 - td.cisValueDetails{ 46 - color: black; 47 - height: 20px; 48 - vertical-align: middle; 49 - padding-left: 1em; 50 - font-weight: 400; 51 - border-bottom: 1px solid #dddddd; 52 - } 53 - } 54 - td.cisValueDetails{ 55 - color: black; 56 - height: 20px; 57 - vertical-align: middle; 58 - padding-left: 1em; 59 - font-weight: 400; 60 - border-bottom: 1px solid #dddddd; 61 - } 62 - .cisFormDetails{ 63 - border-radius: 20px; 64 - }</pre> <pre> 73 ████ frontend-vue/src/pages/displayPO.vue □ 74 @@ -286,20 +286,21 @@ 75 <td class="cisLabelDetails" colspan="2"> 76 <h3>Name </h3> 77 </td> 78 79 <td class="cisValueDetails" colspan="2"> 80 <h4>{{pos.t2_user_po.firstname}} {{pos.t2_user_po.lastname}}</h4> 81 </td> 82 83 <tr v-if="pos.t2_user_po"> 84 <td class="cisLabelDetails"> 85 <h4>Status </h4> 86 </td> 87 88 <td class="cisValueDetails"> 89 <h4>{{pos.status_t1_1}}</h4> 90 </td> 91 92 <td class="cisLabelDetails"> 93 <h4>Date Approved </h4> 94 </td> 95 96 </tr> 97 98 <tr v-if="pos.t2_user_po"> 99 <td class="cisLabelDetails" colspan="2"> 100 <h4>{{pos.t2_user_po.firstname}} {{pos.t2_user_po.lastname}}</h4> 101 </td> 102 103 <td class="cisValueDetails"> 104 <h4>v-if="pos.t2_user_po"> 105 <h4>{{pos.t2_user_po.firstname}} {{pos.t2_user_po.lastname}}</h4> 106 </td> 107 108 <td class="cisValueDetails"> 109 <h4>v-if="pos.status_t1_1">Approved</h4> 110 <h4>v-else>Declined</h4> 111 </td> 112 113 </tr> 114 115 <tr v-if="pos.date_pending_1 moment('Do MMMM YYYY'))> 116 <td class="cisLabelDetails"> 117 <h4>{{pos.date_pending_1 moment('Do MMMM YYYY'))}</h4> 118 </td> 119 120 </tr> 121 122 </pre>

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@@ -314,20 +315,21 @@
 114      <td class="clsLabelDetails" colspan="2">
 115          <hd>Name </hd>
 116      </td>
 117      <td class="clsValueDetails" colspan="2">
 118          <hd>{{pos.t3_user_po.firstname}} {{pos.t3_user_po.lastname}}</hd>
 119      </td>
 120  </tr>
 121  <tr v-if="pos.t3_user_po">
 122      <td class="clsLabelDetails">
 123          <hd>Status </hd>
 124      </td>
 125      <td class="clsValueDetails">
 126          <hd>{{pos.status_t1_2}}</hd>
 127      </td>
 128      <td class="clsLabelDetails">
 129          <hd>Date Approved </hd>
 130      </td>
 131      <td class="clsValueDetails">
 132          <hd>{{pos.date_pending_2 | moment("Do MMMM YYYY")}}</hd>
 133  </td>
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 135      <td class="clsLabelDetails" colspan="2">
 136          <hd>Name </hd>
 137      </td>
 138  </tr>
 139  <tr v-if="pos.t3_user_po">
 140      <td class="clsLabelDetails">
 141          <hd>Status </hd>
 142      </td>
 143      <td class="clsValueDetails">
 144          <hd>{{pos.t3_user_po.firstname}} {{pos.t3_user_po.lastname}}</hd>
 145      </td>
 146  </tr>
 147  <tr v-if="pos.approver_po">
 148      <td class="clsLabelDetails">
 149          <hd>Status </hd>
 150      </td>
 151  </tr>
 152  <tr v-if="pos.approver_po">
 153      <td class="clsLabelDetails">
 154          <hd>{{pos.status_t2 }}</hd>
 155      </td>
 156      <td class="clsLabelDetails">
 157          <hd>Date Approved </hd>
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 159      <td class="clsValueDetails">
 160          <hd>{{pos.date_approve | moment("Do MMMM YYYY")}}</hd>
 161  </td>
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 166      <!-- Decline Details -->
 167      <tr v-if="pos.date_decline">
 168          <td class="clsLabelDetails" colspan="4">
 169              <hd>Decline Details </hd>
 170          </td>
 171      </tr>
 172      <tr v-if="pos.date_decline">
 173          <td class="clsLabelDetails" colspan="2">
 174              <hd>Date Declined </hd>
 175          </td>
 176          <td class="clsLabelDetails" colspan="2">
 177              <hd>Decline Reason </hd>
 178          </td>
 179      </tr>
 180      <tr v-if="pos.date_decline">
 181          <td class="clsLabelDetails" colspan="2">
 182              <hd>{{pos.date_decline | moment("Do MMMM YYYY")}}</hd>
 183          </td>
 184          <td class="clsLabelDetails" colspan="2">
 185              <hd>{{pos.decline_reason}}</hd>
 186          </td>
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```

	<pre> 255 00 -265,21 +205,21 @@ 256 <td class="clsLabelDetails" colspan="2"> 257 <td>Name </td> 258 <td class="clsValueDetails" colspan="2"> 259 <hd>{{psrs.t3_user_psrs.firstname}}{{psrs.t3_user_psrs.lastname}}</hd> 260 </td> 261 </tr> 262 <tr > 263 <td><psrs.t3_user_psrs> 264 <td class="clsLabelDetails"> 265 <hd>Status </hd> 266 <td class="clsValueDetails" colspan="2"> 267 <hd>{{psrs.t3_user_psrs.firstname}}{{psrs.t3_user_psrs.lastname}}</hd> 268 </td> 269 </td> 270 </tr> 271 <tr > 272 <td><psrs.t3_user_psrs> 273 <td class="clsLabelDetails"> 274 <hd>Status </hd> 275 <td class="clsValueDetails" colspan="2"> 276 <hd>{{psrs.t3_user_psrs.firstname}}{{psrs.t3_user_psrs.lastname}}</hd> 277 </td> 278 <td class="clsLabelDetails"> 279 <hd v-if="psrs.status_t1_2">Approved</hd> 280 <hd v-else>Declined</hd> 281 </td> 282 </tr> 283 <tr > 284 <td class="clsLabelDetails"> 285 <hd>Date Approved </hd> 286 </td> 287 <td class="clsValueDetails" colspan="2"> 288 <hd>{{psrs.date_pending_2 moment("Do MMMM YYYY")}}</hd> 289 </td> 290 </tr> 291 <tr > 292 <td class="clsLabelDetails" colspan="2"> 293 <hd>Name </hd> 294 </td> 295 </tr> 296 <tr > 297 <td class="clsLabelDetails" colspan="2"> 298 <hd>{{psrs.approver_psrs.firstname}}{{psrs.approver_psrs.lastname}}</hd> 299 </td> 300 </tr> 301 <tr > 302 <td class="clsLabelDetails"> 303 <hd>Status </hd> 304 </td> 305 <td class="clsValueDetails" colspan="2"> 306 <hd v-if="psrs.status_t2">Approved</hd> 307 <hd v-else>Declined</hd> 308 </td> 309 </tr> 310 <tr > 311 <td class="clsLabelDetails"> 312 <hd>Date Approved </hd> 313 </td> 314 </tr> 315 </tr> 316 </table> 317

 318 <md-dialog-actions> </pre>
Commit by	Mahirah Mansor

8.1.3 CR3

Change Request	CR3
Commit ID	ac24f5c4ee9706a75527f33fea72a041eae679a8
Commit Title	Maintenance CR3
Description	Resolve issue "In the table that display list of PSR and PO, the column name for the status of the request is "Is Approved" and the icon for pending request and reject request is the same."

Branch	Maintenance-CR3
Code Modification	<pre> v 8 ████ frontend-vue/src/pages/POListing.vue □ 142 <b-table-column> 143 <b-table-column field="is_approved" label="Is Approved" centered=""> 144 <!-- {{ props.row.status }} --> 145 - 146 <i class="far fa-check-circle"></i> 147 148 - 149 <i class="far fa-times-circle"></i> 150 151 </b-table-column> 152 </template> 153 </b-table> 154 + 155 <i class="far fa-check-circle"></i> 156 157 </b-table> *** </pre>
Commit by	Syafiq Razak

8.1.4 CR4

Change Request	CR4
Commit ID	ad7ccfd01eeb18d4d4e02f0dc13ca826f0ba5b9f
Commit Title	Maintenance CR4
Description	Resolve “There is no date validation for filter function.” issue
Branch	Maintenance-CR4
Code Modification	<pre> v 12 ████ frontend-vue/src/pages/POListing.vue □ 205 }, 206 async filter(){ 207 var fulldate = null; 208 try { 209 if(this.poNo == "") { 210 this.poNo = null; 211 } 212 if(this.date) { 213 this.companyName = null; 214 //testing starts 215 if(this.date){ 216 fulldate = new Date(this.year, this.month-1, this.date); 217 fulldate = this.year + "-" + this.month + "-" + this.date; 218 console.log(fulldate); 219 } 220 this.poObj.in_param_3 = fulldate; 221 console.log(this.poObj); 222 this.getPO(); 223 // this.poObj.in_page = 1; 224 // const data = await po.po_search(this.poObj.toJson()); 225 // console.log(data); 226 } 227 } 228 async filter(){ 229 var fulldate = null; 230 var canSearch = true; 231 try { 232 if(this.poNo == "") { 233 this.poNo = null; 234 } 235 this.companyName = null; 236 //testing starts 237 if(this.date){ 238 if(this.month){ 239 alert("Month field must must be filled if search by date") 240 canSearch = false 241 } 242 else if(this.year){ 243 alert("Year field must must be filled if search by date") 244 canSearch = false 245 } 246 fulldate = new Date(this.year, this.month-1, this.date); 247 fulldate = this.year + "-" + this.month + "-" + this.date; 248 console.log(fulldate); 249 } 250 this.poObj.in_param_3 = fulldate; 251 console.log(this.poObj); 252 if(canSearch) 253 this.getPO(); 254 // this.poObj.in_page = 1; 255 // const data = await po.po_search(this.poObj.toJson()); 256 // console.log(data); 257 } 258 } 259 } 260 } 261 </template> 262 </b-table> 263 *** </pre>

	<pre> @@ -303,6 +303,7 @@ export default { 303 }, 304 async filter(){ 305 var fulldate = null; 306 307 try { 308 if(this.psr_no == "") 309 this.psr_no = null; </pre> @@ -317,13 +318,22 @@ export default { 317 if(this.branch == "") 318 this.branch = null; 319 //testing starts 320 - console.log(this.date); 321 if(this.date){ 322 alert(this.month); @@ -337,13 +338,22 @@ export default { 337 fulldate = new Date(this.year, this.month-1, this.date); 338 fulldate = this.year + "-" + this.month + "-" + this.date; 339 console.log(fulldate); 340 } @@ -397,6 +409,8 @@ export default { 397 this.resetParameter(); 398 this.psrObj.in_param_1 = this.psr_no; 399 this.psrObj.in_param_3 = this.isApproved; @@ -439,7 +440,8 @@ export default { 439 console.log(this.psrObj); 440 441 this.psrObj.in_page = 1; 442 this.getPSR(); @@ -453,6 +454,7 @@ export default { 453 console.log(this.psr); 454 } catch (err) { 455 this.error = err.message;
Commit by	Syafiq Razak

8.1.5 CR5

Change Request	CR5
Commit ID	0e6c382c6fc3cf484bdd100ea142061dda8c4518
Commit Title	Maintenance CR5
Description	<p>Resolve issue #12</p> <p>Added a prompt dialog for user to state the decline reason. Display the reason in the status dialog. Applied to PO and PSR module.</p>
Branch	Maintenance-CR5
Code Modification	<pre> @@ -242,7 +242,20 @@ 242 >Generate PDF</button> 243 </md-card-actions> 244 </div> 245 - </pre> @@ -251,13 +251,20 @@ 251 >Generate PDF</button> 252 <md-card-actions> 253 <div> 254 <md-dialog md-active.sync="isComponentModalActive" style="width:30%; overflow:auto;"> 255 <md-dialog-title> 256 Confirm to decline 257 </md-dialog-title> 258 <md-content style="margin-left:50px"> 259 <md-textarea v-model="reason" style="width:90%; placeholder='State the decline reason'></md-textarea> 260 <div class="error" v-if="reason==null isPosted">Reason is required</div> 261 </md-content> 262 <md-dialog-actions> 263 <md-button class="md-success" @click="isPosted=true; decline_poi()>Submit</md-button> 264 <md-button class="md-danger" @click="isComponentModalActive = false">Close</md-button> 265 </md-dialog-actions> 266 </md-dialog> 267 <md-dialog md-active.sync="showDialog" style="width:100%; overflow:auto;"> 268 <md-dialog-title> 269 Purchase Order Details

```

426 @@ -414,8 +427,7 @@ export default {
427   pos: [], //for po in pos {[po,[var name]]}
428   page: 1,
429   error: '',
430   total_page: '',
431   isNext: false,
432   isPrevious: true,
433   isDeclining: false
434   // status_zt: ''
435 },
436 },
437 },
438 // status_zt: ''
439 },
440 },
441 },
442 },
443 },
444 },
445 },
446 },
447 },
448 },
449 },
450 },
451 },
452 },
453 },
454 },
455 },
456 },
457 },
458 },
459 },
460 },
461 }
462 
```

```

427   pos: [], //for po in pos {[po,[var name]]}
428   page: 1,
429   error: '',
430   reason: null,
431   total_page: '',
432   isNext: false,
433   isPrevious: true,
434   po_id: this.$route.params.po_no,
435   status_zt: '',
436   showDialog: false,
437   isDeclining: false,
438   isPosted: false,
439   isComponentModalActive: false,
440   // status_zt: ''
441 },
442 },
443 },
444 },
445 },
446 },
447 },
448 },
449 },
450 },
451 },
452 },
453 },
454 },
455 },
456 },
457 },
458 },
459 },
460 },
461 }
462 
```

```

500   this.$router.push({ path: '/notification/${this.id}' });
501 },
502   async decline_po() {
503     this.poObj.id = this.po_id;
504     try {
505       const data = await po.po_decline(this.poObj);
506       console.log(data); //can be ignored
507     } catch (err) {
508       this.error = err.message;
509     }
510   },
511   async get_pending() {
512     try {
513       this.poObj.id = this.po_id;
514       this.error = '';
515       this.isDeclining = false;
516       this.showDialog = false;
517       this.totalPrice = 0;
518     },
519     catch (err) {
520       this.error = err.message;
521     }
522   }
523 }
```

```

510   this.$router.push({ path: '/notification/${this.id}' });
511 },
512   async decline_po() {
513     if(this.reason==null){
514       this.isComponentModalActive = false;
515       this.poObj.id = this.po_id;
516       this.poObj._decline_reason = this.reason;
517       try {
518         const data = await po.po_decline(this.poObj);
519         console.log(data); //can be ignored
520       } catch (err) {
521         this.error = err.message;
522       }
523     }
524   },
525 }
```

```

515   this.error = '';
516   this.isComponentModalActive = true;
517   this.poObj._decline_reason = this.reason;
518   try {
519     const data = await po.po_decline(this.poObj);
520     console.log(data); //can be ignored
521   } catch (err) {
522     this.error = err.message;
523   }
524 }
```

```

525 }
```

```

515   this.error = '';
516   this.isComponentModalActive = true;
517   this.poObj._decline_reason = this.reason;
518   try {
519     const data = await po.po_decline(this.poObj);
520     console.log(data); //can be ignored
521   } catch (err) {
522     this.error = err.message;
523   }
524 }
```

```

525 }
```

```

192   </div>
193   <!-- ({ psts }) -->
194   <br /><br /><br />
195   <!-- ({ psts }) -->
196   <br /><br /><br />
197   <md-dialog md-active.sync="showDialog" style="width:100%; overflow:auto;">
198     <md-dialog-title>
199       Purchase Order Details
200     </md-dialog-title>
201     <md-content style="margin-left:50px; placeholder='State the decline reason'><md-textarea v-model="reason" style="width:95%; placeholder='State the decline reason'></md-textarea>
202       <div class="error" v-if="reason==null && isPosted">Reason is required</div>
203     </md-content>
204     <md-dialog-actions>
205       <md-button class="md-success" @click="isPosted=true; decline_pst()">Submit</md-button>
206       <md-button class="md-danger" @click="isComponentModalActive = false">Close</md-button>
207     </md-dialog-actions>
208   </md-dialog>
209   <md-dialog md-active.sync="showDialog" style="width:100%; overflow:auto;">
210     <md-dialog-title>
211       Purchase Order Details
212     </md-dialog-title>
213     <md-content style="margin-left:50px; placeholder='State the decline reason'><md-textarea v-model="reason" style="width:95%; placeholder='State the decline reason'></md-textarea>
214       <div class="error" v-if="reason==null && isPosted">Reason is required</div>
215     </md-content>
216     <md-dialog-actions>
217       <md-button class="md-success" @click="isPosted=true; decline_pst()">Submit</md-button>
218       <md-button class="md-danger" @click="isComponentModalActive = false">Close</md-button>
219     </md-dialog-actions>
220   </md-dialog>
221 
```

```

366   psr_id: this.$route.params.psr_id,
367   action: this.$route.params.action,
368   error: '',
369   status_zt: '',
370   isDeclining: false,
371   totalPrice: 0,
372   t3: localStorage.t3,
373   dataBackgroundColor: 'blue',
374   isEmpty: false,
375   isPosted: false,
376   async created() {
377     },
378   },
379   async created() {
380     psr_id: this.$route.params.psr_id,
381     action: this.$route.params.action,
382     error: '',
383     reason: null,
384     status_zt: '',
385     showDialog: false,
386     totalPrice: 0,
387     t3: localStorage.t3,
388     dataBackgroundColor: 'blue',
389     isEmpty: false,
390     isPosted: false,
391     isComponentModalActive: false,
392     },
393   },
394   async created() {
395     psr_id: this.$route.params.psr_id,
396     action: this.$route.params.action,
397     error: '',
398     reason: null,
399     status_zt: '',
400     showDialog: false,
401     totalPrice: 0,
402     t3: localStorage.t3,
403     dataBackgroundColor: 'blue',
404     isEmpty: false,
405     isPosted: false,
406     isComponentModalActive: false,
407     },
408   },
409   async decline_pst() {
410     try {
411       this.pstObj._id = this.psr_id;
412       const data = await psr.ps_rDecline(this.pstObj);
413       console.log(data); //can be ignored
414       this.$notify.snackbar.open({
415         duration: 3000,
416         message: 'Purchase Service and Requisition Declined',
417         type: 'warning',
418         position: 'top',
419         actionText: 'OK',
420       })
421       this.$router.push({ path: '/notification/${this.id}' });
422     } catch (err) {
423       this.error = err.message;
424       alert(err);
425     }
426   }
427 }
```

```

428   const data = await psr.ps_rDecline(this.pstObj);
429   console.log(data); //can be ignored
430   this.$notify.snackbar.open({
431     duration: 3000,
432     message: 'Purchase Service and Requisition Declined',
433     type: 'warning',
434     position: 'top',
435     actionText: 'OK',
436   })
437   this.$router.push({ path: '/notification/${this.id}' });
438   } catch (err) {
439     this.error = err.message;
440     alert(err);
441   }
442 }
```

```

443   async get_pending() {
444     try {
445       this.pstObj._id = this.psr_id;
446       const data = await psr.ps_rDecline(this.pstObj);
447       console.log(data); //can be ignored
448       this.$notify.snackbar.open({
449         duration: 3000,
450         message: 'Purchase Service and Requisition Declined',
451         type: 'warning',
452         position: 'top',
453         actionText: 'OK',
454       })
455       this.$router.push({ path: '/notification/${this.id}' });
456     } catch (err) {
457       this.error = err.message;
458       alert(err);
459     }
460   }
461 }
```

Commit by	Lee Peh Ting
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8.1.6 CR7

8.1.7 CR9

Change Request	CR9
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Commit ID	e80c6e8147271e9f95cf18cda414ba3657f83919
Commit	Maintenance CR9
Title	
Description	Resolve issue "An empty list of items can be inserted to the database when adding a PO"
Branch	Maintenance-CR9
Code Modification	<pre> v 48 ████ █ frontend-vue/src/pages/purchaseOrder.vue □ @@ -551,27 +551,27 @@ export default { 351. // async created() {}, 352. methods: { 353. async po_add(po) { 354. alert(this.poId); 355. this.mapObj(); 356. console.log(this.poObj); 357. alert(this.poObj.pn_r_id); 358. this.isPosted = true; 359. if (!this.\$v.\$invalid) { 360. try { 361. const po = await purchaseOrder.po_add(this.poObj); 362. console.log(po); //can be ignored 363. // localStorage.message = "Purchase Order Application Submitted"; 364. // this.\$router.push({ path: `/message/\${this.id}` }); 365. this.redirectToMyApplication(); 366. this.poCreated(); 367. } catch (err) { 368. alert("Fail!"); 369. this.error = err.message; 370. console.log(this.error); 371. } 372. } 373. else 374. alert("Fill all the required fields"); 375. }, 376. mapObj() { 377. mapObj() { 378. // async created() {}, 379. methods: { 380. async po_add(po) { 381. // async created() {}, 382. methods: { 383. async po_add(po) { 384. var passed = true; 385. for (var i = 0; i < this.desc.length; i++) { 386. var tempt = this.desc[i]; 387. if (tempt.description == null tempt.quantity == null tempt.unitPrice == null) { 388. passed = false; 389. alert("All items must be filled or remove the row in not needed"); 390. } 391. } 392. } 393. } 394. } 395. } 396. } 397. } 398. } 399. </pre>
Commit by	Syafiq Razak

8.1.8 CR10

Change Request	CR10
Commit ID	ac393c804a376ea294c5f487c29ccfa335783ce1
Commit Title	Maintenance CR10
Description	Resolved issue #4

Branch	Maintenance-CR10
Code Modification	<pre> v 33 ████ front-end-vue/src/pages/FSR.vue □ @@ -238,12 +238,12 @@ 238 style="background-color:#ffffff; color: black; overflow:yes;" 238 style="background-color:#ffffff; color: black; overflow:yes;" 239 > 239 > 240 cmd-card-content class="md-scrollbar"> 240 cmd-card-content class="md-scrollbar"> 241 <md-button 241 <md-button 242 class="md-raised md-danger" 242 class="md-raised md-danger" 243 @click="remove()" 243 @click="remove()" 244 style="float:right" 244 style="float:right" 245 >Remove</md-button 245 >Remove</md-button 246 > 246 > 247 cmd-button 247 cmd-button 248 class="md-raised md-success" 248 class="md-raised md-success" 249 @click="clone()" 249 @click="clone()" @@ -261,8 +261,9 @@ 251 <th style="width:250px">Cost (Code)</th> 251 <th style="width:250px">Cost (Code)</th> 252 <th style="width:250px">Remarks</th> 252 <th style="width:250px">Remarks</th> 253 <th>Total(RM)</th> 253 <th>Total(RM)</th> 254 </tr> 255 <tr v-for="items,in desc" :key="items"> 255 <tr v-for="({ items, index },in desc" :key="index"> 256 <td>{{ items.index }}</td> 257 <td> 258 <b-field> 259 {{ items.unitPrice * items.quantity } numeral("0,0.00")} 259 {{ items.unitPrice * items.quantity } numeral("0,0.00")} 260 </b-field> 261 </td> 262 <td><div @click="remove()"> 262 <td><div @click="remove(index)"> 263 <md-icon>cancel</md-icon> 263 <md-icon>cancel</md-icon> 264 </div></td> 265 </tr> 266 </table> 267 </div> 268 </pre> <pre> @@ -311,11 +312,11 @@ 311 {{ items.unitPrice * items.quantity } numeral("0,0.00")} 312 {{ items.unitPrice * items.quantity } numeral("0,0.00")} 312 > 313 </td> 314 </td> @@ -495,13 +496,19 @@ 495 alert("Cannot add row."); 496 }, 497 }, 498 remove() { 499 this.desc.pop(); 500 description: this.index, 501 quantity: 0, 502 unitPrice: 0 503 }); 504 this.index--; 505 }, 506 psrCreated() { 507 this.\$buefy.snackbar.open({ 508 </pre> <pre> v 35 ████ front-end-vue/src/pages/purchaseOrder.vue □ @@ -170,12 +170,12 @@ 170 style="background-color:#ffffff; color: black; overflow:yes;" 170 style="background-color:#ffffff; color: black; overflow:yes;" 171 > 171 > 172 cmd-card-content class="md-scrollbar"> 172 cmd-card-content class="md-scrollbar"> 173 <md-button 173 <md-button 174 class="md-raised md-danger" 174 class="md-raised md-danger" 175 @click="remove()" 175 @click="remove()" 176 style="float:right" 176 style="float:right" 177 >Remove</md-button 177 >Remove</md-button 178 > 178 > 179 cmd-button 179 cmd-button 180 class="md-raised md-success" 180 class="md-raised md-success" 181 @click="clone()" 181 @click="clone()" @@ -187,12 +187,13 @@ 187 <table> 188 <tr> 189 <th style="width:35%>No.</th> 190 <th style="width:20%">Item Description</th> 191 <th style="width:20%">Unit Price(RM)</th> 192 <th style="width:15%">Quantity</th> 193 <th style="width:10%">Total(RM)</th> 194 </tr> 195 </table> 196 <tr v-for="items,in desc" :key="items"> 197 <td>{{ items.index }}</td> 198 <td> 199 <b-field></pre>

	<pre> @@ -228,11 +229,11 @@ 229 > 230 {{ (items.unitPrice * items.quantity) numeral("0.00") }} 229 > 231 </td> 230 {{ (items.unitPrice * items.quantity) numeral("0.00") }}> 232 <td> 231 <td> 233 <div @click="remove()> 232 + <div @click="remove(index)"> 234 <md-icon>cancel</md-icon> 233 + <md-icon>cancel</md-icon> 235 </div> 234 </div> 236 </td> 235 </td> 237
 236 </tr> 238 </table> 237
 239 @@ -440,13 +441,19 @@ export default { 440); 441 this.index++; 442 }, 443 remove() { 444 this.desc.pop({ 445 description: this.index, 446 quantity: 0, 447 unitPrice: 0 448 }); 449 this.index--; 450 }, 451 poCreated() { 452 this.index++; 453 this.desc.push({ 454 description: this.index, 455 quantity: 0, 456 unitPrice: 0 457 }); 458 } </pre>
Commit by	Andre Tai

8.1.9 CR11

Change Request	CR11
Commit ID	fde618cc5e8ca9553e8965fdcd7e5d603234bb6e
Commit Title	Maintenance CR11
Description	Resolve issue “The color of the filter button is in grey color.”
Branch	Maintenance-CR11
Code Modification	<pre> @@ -8,-7 +8,7 @@ 8 <md-card-expand> 9 <md-card-actions md-alignment="space-between"> 10 <md-card-expand-trigger> 11 <md-buttonFilter</md-button> 12 </md-card-expand-trigger> 13 </md-card-actions> 14 @@ -110,7 +110,7 @@ 110 </table> 111 112 <md-card-actions md-alignment="right"> 113 <md-button @click="filter()">Submit</md-button> 114 </md-card-actions> 115 </div> 116 </md-card-content> 117 @@ -11,-11, / +11, / @@ 11 <md-card-expand> 12 <md-card-actions md-alignment="space-between"> 13 <md-card-expand-trigger> 14 <md-buttonFilter</md-button> 15 </md-card-expand-trigger> 16 </md-card-actions> 17 @@ -131,7 +131,7 @@ 131 </table> 132 133 <md-card-actions md-alignment="right"> 134 <md-button @click="filter()">Submit</md-button> 135 </md-card-actions> 136 </div> 137 </md-card-content> 138 </pre>
Commit by	Syafiq Razak

8.1.10 CR12

Change Request	CR12
Commit ID	05df86d321e03a497279355533a378ba635e9a32
Commit Title	Maintenance CR12
Description	Resolve “There is no hint for the new password field” issue
Branch	Maintenance-CR12
Code Modification	<pre> 72 @@ -18,6 +18,7 @@ <b-field> <input type="password" v-model="originalPassword" style="width:70%" password-reveal></b-input> </b-field> 73 </td> 74 </tr> 75 <tr> 76 @@ -28,6 +29,8 @@ <b-field> <input type="password" v-model="password" style="width:70%" password-reveal></b-input> </b-field> 77 </td> 78 </tr> 79 <tr> 80 @@ -38,6 +41,7 @@ <b-field> <input type="password" v-model="confirmPassword" style="width:70%" password-reveal></b-input> </b-field> 81 </td> 82 </tr> 83 <tr> 84 @@ -61,6 +63,7 @@ 85 <script> 86 import user from "@/js/user.js"; //directory to user.js 87 import userClass from "@/js/class/user_class.js"; //directory to psr_class.js 88 // import admin from "@/js/admin.js"; //directory to admin.js 89 export default { 90 data(){ 91 @@ -70,7 +73,8 @@ export default { 92 password: '', 93 confirmPassword: '', 94 posted:false, 95 dateBackgroundColor: "blue" 96); 97 }, 98 async created() { 99 @@ -84,6 +90,10 @@ export default { 100 this.error = err.message; 101 alert(err); 102 } 103 + validations: { 104 + password: { 105 + required, 106 + minlength: minLength(8) 107 },confirmPassword: { 108 + required, 109 + confirmPassword: minLength(8), 110 + sameAsPassword: sameAs('password') 111 }, 112 } 113 </script> 114 import user from "@/js/user.js"; //directory to user.js 115 import userClass from "@/js/class/user_class.js"; //directory to psr_class.js 116 + import { required, minLength, sameAs, numeric } from '@/validate/lib/validators' 117 // import admin from "@/js/admin.js"; //directory to admin.js 118 export default { 119 data(){ 120 @@ -94,7 +100,8 @@ 121 password: '', 122 confirmPassword: '', 123 posted:false, 124 dateBackgroundColor: "blue", 125 isPosted: false 126 }, 127 @@ -104,7 +110,8 @@ 128 this.error = err.message; 129 alert(err); 130 } 131 +], 132 + validations: { 133 + password: { 134 + required, 135 + minlength: minLength(8) 136 },confirmPassword: { 137 + required, 138 + confirmPassword: minLength(8), 139 + sameAsPassword: sameAs('password') 140 }, 141 } 142 } 143 } 144 </div> 145 </div> 146 </pre>

8.1.11 CR13


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00 -43,7 +43,7 00
43      </td>
44      </tr>
45      <tr>
46      <td class="clsLabel">
47          <h3>Username:</h3>
48      </td>
49      <td class="clsValue">
50      </td>
51      </tr>
52      <tr>
53      <td class="clsLabel">
54          <h3>chdDesignation:</h3>
55      </td>
56      <td class="clsValue">
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00 -52,7 +52,7 00
71      </td>
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73      <tr>
74      <td class="clsLabel">
75          <h3>chdBranch:</h3>
76      </td>
77      <td class="clsValue">
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79      </tr>
80      <tr>
81      <td class="clsLabel">
82          <h3>tier</h3>
83      </td>
84      <td><input v-if="tier != 'user4' && tier != 'is_admin' && tier != 'acct_t'" type="checkbox"/>
85      <td class="clsLabel">
86          <h3>chdDepartment:</h3>
87      </td>
00 -62,7 +62,7 00
99      </td>
100     </tr>
101     <tr>
102     <td class="clsLabel">
103         <h3>chdHome Address:</h3>
104     </td>
105     <td class="clsValue">
106         <input v-model="address_1" style="width:98%">
107         <div class="error" v-if="$v.address_1.required && isPosted">Field is required</div>
108     </td>
109     </tr>
110     <tr>
111     <td class="clsLabel">
112         <h3>chdHome Address:</h3> ...
113     </td>
114     <td class="clsValue">
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00 -99,16 +99,18 00
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135     <tr>
136     <td class="clsLabel">
137         <h3>chdContact Number:</h3>
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139     <td class="clsValue">
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00 -133,7 +133,7 00
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148     <td class="clsLabel">
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00 -145,7 +145,7 00
157     </td>
158     </tr>
159     <tr>
160     <td class="clsLabel">
161         <h3>chdConfirm Password:</h3>
162     </td>
163     <td class="clsValue">
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00 -157,7 +157,7 00
169     </td>
170     </tr>
171     </table>
00 -169,6 +169,7 00
172     <br><br>
173     <md-button
174         class="md-raised md-success"
175     <span> ...
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11  @@ -11,7 +11,7 @@
12      <col width="25%">
13      <col width="75%">
14  </tr>
15      <td class="clsLabel">
16          Old Password:
17      <td class="clsValue">
18          </td>
19      </tr>
20      <tr>
21          <td class="clsLabel">
22              New Password:
23          <td class="clsValue">
24          </td>
25      </tr>
26      <tr>
27          <td class="clsLabel">
28              Confirm New Password:
29          <td class="clsValue">
30          </td>
31      </tr>
32      <tr>
33          <td class="clsLabel">
34              Confirm New Password:
35          <td class="clsValue">
36          </td>
37      </tr>
38  </table>
39
40      <div style="text-align: right; margin-top: 10px;">
41          <span style="color: red; margin-right: 10px;">Indicate required field</span>
42          <span style="color: red; font-weight: bold; font-size: 1.2em;">*</span>
43      </div>
44
45      <br><br>
46      <md-button class="md-raised md-success">
47
48  @@ -184,4 +185,8 @@
49      padding: 0.5em 0.75em;
50      vertical-align: top;
51  }
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53  </style>
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	<pre> 61 - <td class="clsLabel"> 62 <h4>Mode of Payment:</h4> 63 </td> 64 <td class="clsValue"> 65 @@ -93,7 +93,7 @@ 66 </td> 67 </tr> 68 <tr> 69 <td class="clsLabel"> 70 <h4>To:</h4> 71 </td> 72 <td class="clsValue"> 73 @@ -102,7 +102,7 @@ 74 </td> 75 </tr> 76 <tr> 77 <td class="clsLabel"> 78 <h4>Company:</h4> 79 </td> 80 <td class="clsValue"> 81 @@ -111,7 +111,7 @@ 82 </td> 83 </tr> 84 <tr> 85 <td class="clsLabel"> 86 <h4>Address:</h4> 87 </td> 88 <td class="clsValue"> 89 @@ -120,7 +120,7 @@ 90 </td> 91 </tr> 92 <tr> 93 <td class="clsLabel" id="required"> 94 <h4>Mode of Payment:</h4> 95 </td> 96 <td class="clsValue"> 97 @@ -130,7 +130,7 @@ 98 </td> 99 </tr> 100 </pre>
Commit by	Syafiq Razak

8.1.12 CR14

Change Request	CR14
Commit ID	0863e09a4f7c9dee4ae35e46fd7205a99c117b5c
Commit Title	Maintenance CR14
Description	Resolve issue "The “Previous” button does not redirect to the previous page"
Branch	Maintenance-CR14
Code Modification	<pre> 347 > 348 <md-button 349 class="md-raised" 350 @click="back()" 351 style="float:right" 352 >Previous</md-button 353 </pre>
Commit by	Syafiq Razak

8.2 Evolution

Due to the limitations of pages, the report only recorded the commit details. The code modifications can refer the history in the Github. (The link of Github is provided in [Section 6.1](#))

8.2.1 Evolution-backend branch

Commit ID	0863e09a4f7c9dee4ae35e46fd7205a99c117b5c
Commit Title	Added logic for performance
Description	<ul style="list-style-type: none">• Added SP for getting po/psr from database• Added routes for performance API• Added controller logic for performance
Commit by	Melvin Edward

Commit ID	5e66a53bc7f4c59fef3727b936f0568982428b6a
Commit Title	Revamp some config files for deployment
Description	-
Commit by	Melvin Edward

Commit ID	9f40354e687b15c3a8fc2d1ac20260c0314729a1
Commit Title	Update API to send extra data
Description	<ul style="list-style-type: none">• Improved calculations for efficiency so it does not return null• response to include PO/PSR submitted by user
Commit by	Melvin Edward

8.2.2 Evolution Front-end branch

Commit ID	98541b8affc863b2e95dd87525d26d5c7a3ebef
Commit Title	Add overall performance page
Description	<ul style="list-style-type: none">• Add statistic for PO and PSR• Add graph for PO and PSR• Add employee list
Commit by	Lau Puong Huei

Commit ID	950e7762157633688a6fc68878263dcd6799a9b9
Commit Title	Fix route bug

Description	-
Commit by	Lau Puong Huei

Commit ID	87ad74d4bb0fe40a20a737cbbba345f4924fa661
Commit Title	Improve statistic and StatsCard UI
Description	-
Commit by	Lau Puong Huei

Commit ID	b12d4657f76b4b262c3308860d25c2e98cf00034
Commit Title	Added user performance
Description	<ul style="list-style-type: none"> • Add userPerformance.vue • Add route for userPerformance • Linked clickable username in performance page to userPerformance
Commit by	Tan Ying Shan

Commit ID	24c019a16652753e7c4492a2eb1cab951fda0745
Commit Title	Fix route bug for overall performance
Description	-
Commit by	Lau Puong Huei

Commit ID	a4d75bdaee807b903d8be5bd95cb67f53d18a8ca
Commit Title	Added personal performance
Description	<ul style="list-style-type: none"> • Add personalPerfomance.vue • Add route for personalPerformance • Add personalPerformance page as dashboard page for usert1, t2 and t3 in DashboardLayout
Commit by	Tan Ying Shan

Commit ID	da4d6cfec96cf843c9c4cd9dd8249a82d6167ecb
Commit Title	Changed path url in routes
Description	-
Commit by	Tan Ying Shan

Commit ID	699846fc70cd4cbeeb320cafacd79e18ab2db307
Commit Title	Added performanceDashboard for usert4
Description	<ul style="list-style-type: none"> • Add performanceDashboard.vue • Add route for performanceDashboard • Set dashboard for usert4 to performanceDashboard • Fixed dashboard link in userPerformance to return to performanceDashboard for usert4
Commit by	Tan Ying Shan

Commit ID	50e21edd3428f70e0f1639f5daf943a6b2387b4c
Commit Title	Add KPI for different tiers
Description	-
Commit by	Lau Puong Huei

Commit ID	b901396b1f4f412bf58611ffc1cd9e7f31aefadd
Commit Title	Add difference btw KPI and current data
Description	-
Commit by	Lau Puong Huei

Commit ID	d70e0c6d0104b31c46cfa468ae6e4bb185b11181
Commit Title	Added KPI for personalPerformance and userPerformance
Description	-
Commit by	Tan Ying Shan

Commit ID	a8f650094b075a0cab0ad7f78c82f997392c56b4
Commit Title	Beutify User Interface for Dashboard
Description	<ul style="list-style-type: none"> • Add color for trending up and trending down icon • Change the display of KPI
Commit by	Tan Ying Shan

Commit ID	709c170ee3d093e7f51fce56ed8f75f68449c5e6
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Commit Title	Resolve "Chart does not load properly" issue
Description	<ul style="list-style-type: none"> • Add color for trending up and trending down icon • Change the display of KPI
Commit by	Syafiq Razak

Commit ID	87e3315911566f9881024000e54829830590c512
Commit Title	Add target KPI for graph
Description	-
Commit by	Lau Puong Huei

9 Create pull requests

When the changes are ready to be viewed by the project manager, the pull request will be created. The changes must be tested before the pull request is created. The project manager will review the request and accept or reject the pull request. If accepted, the changes will be merged into main branch.

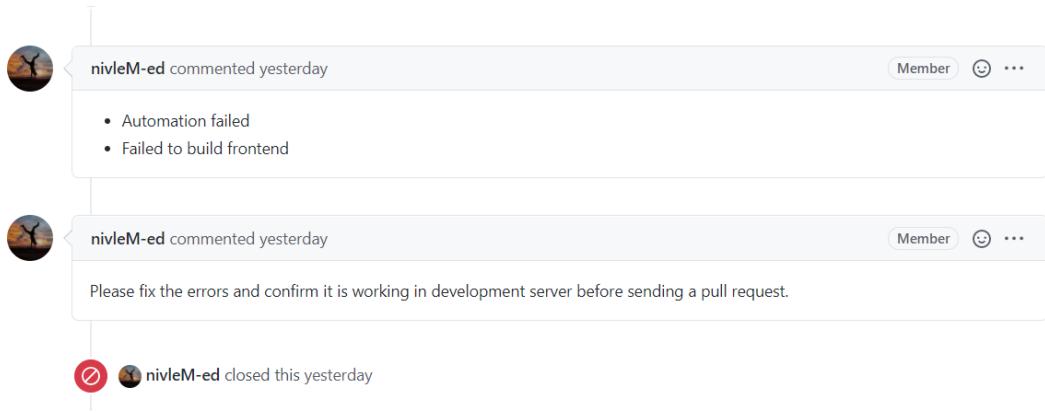
The screenshot shows a list of pull requests in a software interface. At the top, it says "0 Open" and "14 Closed". Below this, there are several entries, each with a checkbox, a title, and a merge status:

- Maintenance CR5 ✓ (merged 3 hours ago)
- Evolution backend ✓ (merged 8 hours ago)
- Maintenance CR2 ✓ (merged 10 hours ago)
- Maintenance CR12 ✓ (merged 22 hours ago)
- Maintenance CR12 (closed 22 hours ago)
- Maintenance CR13 ✓ (merged 22 hours ago)
- Maintenance CR4 ✓ (merged 22 hours ago)

Branch	Pull Request	Requested by	Verified by	Merge ID
BE-1	Added logic for performance	Melvin Edward	Melvin Edward	1cf3ba41e2bb988cc58293 5b55705ebd432f665
BM-1	Maintenance CR1	Syafiq Razak	Melvin Edward	35ba0fca9098e4c52bd6178 930f2dd03ec4629c6
BM-2	Maintenance CR2	Mahirah Mansor	Melvin Edward	471d9c1f333291d461f11ef5 afee582e4d175371
BM-3	Maintenance CR3	Syafiq Razak	Melvin Edward	0ee574b7286f81bd56f996fa 70f17defb6725e8d

BM-4	Maintenance CR4	Syafiq Razak	Melvin Edward	c3189b3998dcc66249f74d1 697519e15dedefcdb
BM-5	Maintenance CR5	Lee Peh Ting	Melvin Edward	2ad31236475f3b706a47ae6 6d5ffc47de0d0ea72
BM-7	Maintenance CR7	Syafiq Razak	Melvin Edward	6e2351cf6addf6f2b5e254a7 48eaf7c984e62b46
BM-9	Maintenance CR9	Syafiq Razak	Melvin Edward	e48df84fb466bbe19c6b5c92 2abcb003991668ac
BM-10	Maintenance CR10	Andre Tai	Melvin Edward	bc8f4c76d8527effca7937db 9376b5091e57d56e
BM-11	Maintenance CR11	Syafiq Razak	Melvin Edward	b5958a6cc70028a0d895dd9 b485fe49e5502f26d
BM-12	Maintenance CR12	Syafiq Razak	Melvin Edward	f653cd63644e1ba91459c7ca 63e195e6b5f3e895
				05df86d321e03a497279355 533a378ba635e9a32
BM-13	Maintenance CR13	Syafiq Razak	Melvin Edward	2b8eec955d6b08d41a76f90 5cfac958b3a3da921
BM-14	Maintenance CR14	Syafiq Razak	Melvin Edward	ec915afccbd44355ea8d6430 70a9e510b2a8f674
BE-1	Evolution Backend	Melvin Edward	Melvin Edward	f6b900ff1cfe6024b49c6bd8 709813e9d4ca6002
BE-2	Evolution by adding staff performance dashboard	Tan Ying Shan	Melvin Edward	3904b10dab8d055f1885ec6 d1ebae7f19d0dce93
	Evolution by adding staff performance dashboard	Tan Ying Shan	Melvin Edward	d5bea616474ece8c99aceef2 91ecf881d0edf8d9
	Resolved issue Evolution #1 and Evolution #2	Tan Ying Shan	Melvin Edward	a4aac4bd8b0b7e53d8f558a0 457aa85c430cbcfa
	Resolved issue Evolution #3	Lau Puong Huei	Melvin Edward	a1eb05131c988b988da3c4e 9d326183281cc19c6
	Change the first page shown once the user login	Tan Ying Shan	Melvin Edward	e2b8eb6095871a3ce69e710 2cc5ea8c948e5d74d

The pull request for BE-2, evolution by adding staff performance dashboard has been rejected due to the errors not fixed.



10 Project board

A project board in the Github is created and as it provides a good monitoring function to the progress of the project. We are using a basic Kanban board to keep track of what is pending, currently doing, and done tasks. The issues and pull requests are set to automatically update in the Kanban board.

The screenshot shows a GitHub project board with four columns: 'To do', 'Pending Approve', 'In progress', and 'Done'. Each column contains several items, which are likely pull requests or issues. The 'To do' column has one item. The 'Pending Approve' column has one item. The 'In progress' column is empty. The 'Done' column has three items, each with a small icon and some text describing the task.

Figure 2: Project Board in Github

11 Workflow and Baseline

Github launched Github Actions that allow developers to run the code on Github. This allows developers to automate their development workflows, whether that is sending notifications or building a full continuous integration and delivery pipeline.

The screenshot shows the GitHub repository page for 'UMFinalYear-BestAssignmentGroup / WIF3005_SME'. The 'Code' tab is selected. Below the tabs, there's a dropdown for the 'master' branch. The main area displays the commit history. It shows two sets of commits: one on 'Commits on Jan 25, 2021' and another on 'Commits on Jan 24, 2021'. Each commit includes the author, date, message, and a copy/paste icon.

<https://techcrunch.com/2018/10/16/github-launches-actions-its-workflow-automation-tool/>

The screenshot shows the GitHub Actions 'All workflows' page. At the top, there's a 'New workflow' button and a feedback section asking for suggestions. Below that, there are two categories: 'Pull Request Check' and 'Heroku Deployment'. The main area displays a table of 45 workflow results. The columns include 'Event', 'Status', 'Branch', and 'Actor'. The results are listed as follows:

Event	Status	Branch	Actor
Pull Request Check #16: by nivleM-ed	master	17 hours ago 2m 14s	...
Heroku Deployment #28: by nivleM-ed	master	17 hours ago 2m 36s	...
Maintenance CR5	Maintenance-CR5	17 hours ago 2m 4s	...
Merge pull request #27 from UMFinalYear-BestAssignm...	master	22 hours ago 2m 2s	...
Merge pull request #27 from UMFinalYear-BestAssignm...	master	22 hours ago 2m 32s	...
Evolution backend	evolution-backend	22 hours ago 1m 58s	...
Merge pull request #26 from UMFinalYear-BestAssignm...	master	yesterday 2m 37s	...

In the Pull Request Check, it will automatically add a PR status check to the current pull request indicating the state of the build. Heroku Deployment will automatically check the changes and continuously build and deploy to the Heroku.

The screenshot shows the GitHub Actions build logs for a 'Heroku Deployment' job. The job was triggered on a pull request and succeeded 4 days ago in 2m 27s. The logs show the following steps:

- Set up job
- Checkout
- Setup up Node.js in frontend-vue
- Install Dependencies
- Build deployment folder
- Run akhileshns/heroku-deploy@v3.8.9
- Post Checkout
- Complete job

12 Test Cases

Test cases have been designed to test the functionality of each module and if any changes of the module is affected by the changes made during the maintenance and evolution.

12.1 Environment

The Purchase Order and Purchase Requisition Management system will be run by using multiple dummy accounts where the test data is sample data. Tests shall be performed on the local computer with the following minimum specification.

Table 12-1 Purchase Order and Purchase Requisition Management Hardware Requirements

Hardware	Processor : 1GHz clock rate Memory RAM: 1GB for 32-bit, 2GB for 64-bit Graphics Card: DirectX9 graphics driver, WDDM 1.0 or higher driver Display: 800*600 pixels Input device: Keyboard and mouse Storage space: 16GB for 32-bit, 20GB for 64-bit
Software	Java virtual machine version 1.5 and above Windows or Linux OS

The following are the dummy accounts needed for testing purposes:

Table 12-2 Required Dummy Accounts

No.	User Level	Username	Password
1.	Administrator	admin	password
2.	Tier 1 User	usert1	password
3.	Tier 2 User	usert2	password
4.	Tier 3 User	usert3	password
5.	Tier 4 User	usert4	password
6.	Accountant	acct	password

12.2 Test Case

This section details all test cases designed separated according to the components applied with the related change requests.

12.2.1 Register User Component

Table 12-3 Verify the Impact of CRs to the Register User component

Test Case ID	TC-01-001			
Related Component	Register User			
Related Change Request	CR1, CR7, CR8, CR12, CR13			
Objective	Verify the impact of CR to the Register User			
Tester	Andre Tai			
Input	Expected Result	Special Procedural Requirements	Intercase Dependency	Pass/Fail
CR1 applied. A filled user registration form.	After applied CR1, the admin should be able to register a Tier 4 user into the system.	N/A	N/A	P
CR7 applied. Test data 1: Testing (TEXT) Test data 2: 774885 (INTEGER)	Test data 1: Not able to insert the TEXT format input Test data 2: Successfully inserted the INTEGER format input	N/A	N/A	P

Test data 3: no number incrementors available	Test data 3: No number incrementors available			
CR8 applied. Test data 1: pas3wor4 (Combination of TEXT and NUMBERS) Test data 2: password+- (Combination of TEXT and SPECIAL CHARACTERS) Test data 3: pas3wor4+- (Combination of TEXT, NUMBER, and SPECIAL CHARACTERS)	The input field of password should be accepting all test data.	N/A	N/A	P

CR12 applied. A hint is given for the new password field.	A hint is given for the new password field.	N/A	N/A	P
CR13 applied. An indication is marked for required field.	An indication is marked for required field.	N/A	N/A	P

12.2.2 Add Purchase Order Component

Table 12-4 Verify the Impact of CRs to the Add Purchase Order Component

Test Case ID	TC-02-001			
Related Component	Purchase Order			
Related Change Request	CR9, CR10			
Objective	Verify the impact of CR to the Purchase Order			
Tester	Mahirah Mansor			
Input	Expected Result	Special Procedural Requirements	Intercase Dependency	Pass/Fail
CR9 applied. Test data 1:	Test data 1 will incur an error message to be displayed and PO will not be inserted in the database.	N/A	N/A	P

<p>An empty list of items.</p> <p>Test data 2:</p> <p>Item description Wooden planks (TEXT)</p> <p>Unit price 120.00 (DOUBLE)</p> <p>Quantity 350 (INTEGER)</p>				
<p>CR10 applied.</p> <p>Test data 1:</p> <p>Create 3 items with randomized data.</p> <p>Click remove to remove item 2.</p>	<p>Item 2 will be removed.</p>	<p>N/A</p>	<p>N/A</p>	<p>P</p>

12.2.3 User Interface Component

Table 12-5 Verify the Impact of CRs to the User Interface Component

Test Case ID	TC-03-001			
Related Component	User Interface			
Related Change Request	CR11, CR2, CR3			
Objective	Verify the impact of CR to the User Interface			
Tester	Lee Peh Ting			
Input	Expected Result	Special Procedural Requirements	Intercase Dependency	Pass/Fail
CR11 applied. Filter button colour changed.	After applying CR11, the filter button colour is no longer grey in colour.	N/A	N/A	P
CR2 applied. The interface for the pop-up modal of request status is changed to be more user friendly.	In the pop-up modal for request status, it is the user can see which user has approved or which user has rejected the request.	N/A	N/A	P
CR3 applied. Column name is changed in	In the table that display list of PSR and PO, the column name for the status of the	N/A	N/A	P

the display list of PSR and PO.	request is “Is Approved” and the icon for pending request and reject request is different.			
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12.2.4 Filter Function Component

Table 12-6 Verify the Impact of CRs to the Filter Function Component

Test Case ID	TC-04-001			
Related Component	Filter Function			
Related Change Request	CR4			
Objective	Verify the impact of CR to the Filter Function			
Tester	Andre Tai			
Input	Expected Result	Special Procedural Requirements	Intercase Dependency	Pass/Fail
CR4 applied. Test data 1: Twelve February (TEXT) Test data 2:	The input field will reject all test data except test data 4.	N/A	N/A	P

Twelve &* (TEXT and SPECIAL CHARACTERS)				
Test data 3: twenty3+- (Combination of TEXT, NUMBER, and SPECIAL CHARACTERS)				
Test data 4: “12/12/2020” (DATE)				

12.2.5 Request Approval Component

Table 12-7 Verify the Impact of CRs to the Request Approval component

Test Case ID	TC-05-001
Related Component	Request Approval
Related Change Request	CR5, CR6

Objective	Verify the impact of CR to the Request Approval			
Tester	Mahirah Mansor			
Input	Expected Result	Special Procedural Requirements	Intercase Dependency	Pass/Fail
CR5 applied.	A field to enter the reason to reject a particular request is available.	A PSR request is created and approved.	N/A	P
A PO request is submitted by Tier 1 user for approval. Tier 2 user rejected the request.	The request has been rejected with a reason. User able to see the reason of rejection when view the PO approval.	A PSR request is created and approved.	N/A	P
A PO request is submitted by Tier 1 user for approval. Tier 2, Tier 3, and Tier 4 users approve the request.	User is not able to approve or decline the PO if no reason is provided.	A PSR request is created and approved.	N/A	P
A PO request is submitted by Tier 1 user for approval. Tier	Tier 1 user can view the reason of rejection in their application list.	A PSR request is created and approved.	N/A	P

2 user rejected the request.				
A PSR request is submitted by Tier 1 user for approval. Tier 2 user rejected the request.	The request has been rejected with a reason. User able to see the reason of rejection when view the PSR approval.	N/A	N/A	P
A PSR request is submitted by Tier 1 user for approval. Tier 2, Tier 3, and Tier 4 users approve the request.	User is not able to approve or decline the PSR if no reason is provided.	N/A	N/A	P
A PSR request is submitted by Tier 1 user for approval. Tier 2 user rejected the request.	Tier 1 user can view the reason of rejection in their application list.	N/A	N/A	P
A PO request is submitted by Tier 1 user for approval. Tier	The user is notified with the rejection.	A PSR request is created and approved.	N/A	P

2 user rejected the request.				
A PSR request is submitted by Tier 1 user for approval. Tier 2 user rejected the request.	The user is notified with the rejection.	N/A	N/A	P

12.2.6 Form Component

Table 12-8 Verify the Impact of CRs to the Form Component

Test Case ID	TC-06-001			
Related Component	Form			
Related Change Request	CR13			
Objective	Verify the impact of CR to the Form Component			
Tester	Lee Peh Ting			
Input	Expected Result	Special Procedural Requirements	Intercase Dependency	Pass/Fail
CR13 applied. No input required.	An indication for required field will appear.	N/A	N/A	P

13 References

JSHint, A Static Code Analysis Tool for JavaScript. (n.d.). Retrieved from JSHint:
<https://jshint.com/about/>

Tripathy, P., & Naik, K. (2015). *Software Evolution And Maintenance*. John Wiley & Sons, Inc.