

CAPSTONE PROJECT REPORT

Report 5 – Software Test Documentation

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I. Record of Changes

Date	A* M, D	In charge	Change Description

*A - Added M - Modified D - Deleted

II. Testing Documentation

1. Scope of Testing

The testing scope for the Gop Le Project Management (GPM) includes defining the objectives and steps of the testing process. Here is a general overview of the testing scope:

- Functional testing is conducted to ensure accuracy and compliance with feature requirements, including user authentication verification processes and the management of roles and permissions.

- Integration testing focuses on ensuring smooth interaction between different modules and efficient data exchange. System testing aims to identify logical flow and user interaction.

- Compatibility testing is performed across multiple browsers and mobile devices, confirming adaptability to accessibility standards.

- Documentation testing for users confirms the accuracy and integrity of user manuals and software requirements documentation. Performance testing ensures that updates or new features do not introduce regressions.

- User acceptance testing helps confirm the accuracy and effectiveness of the system in real world scenarios.

This testing scope encompasses various aspects of GPM to ensure that the system provides an optimal and reliable software product for use.

2. Test Strategy

2.1 Testing Types

No	Type of Tests	Description
1	Unit testing	Unit testing is executed during iterations 1, 2, 3 and 4 to assess the functionality of the smallest units within the source code.
2	Integration testing	Integration testing is executed during iterations 1, 2, 3 and 4. This testing phase involves integrating and testing software features in a logical group.

3	System testing	System testing is executed in iteration 3. This testing method involves monitoring and evaluating the behavior of an entire fully integrated product or software system.
4	Performance testing	Performance testing is executed in iteration 4. This testing method evaluates how a system performs in terms of responsiveness and stability under a specific workload, performance testing is typically performed to test speed, robustness, reliability, and application size.
5	Acceptance testing	Acceptance testing is performed in the final iteration. This phase evaluates the system's performance using real-world data to determine if it meets the software requirements.

Table 5.1 Testing types

2.2 Test Levels

Type of Tests	Test Level				
	Unit	Integration	Performance	System	Acceptance
Function Testing	X	X		X	X
UI Testing		X		X	X
Load Testing			X		
API Testing		X			

Table 5.2 Test levels

2.3 Supporting Tools

Purpose	Tool	Vendor/In-house	Version
Test APIs	Postman	Postman.Inc	Lastest
Test function	IntelliJ	JetBrain	Lastest
Test Report	Microsoft Excel	Microsoft Excel	Office 16
Test Case	Microsoft Excel	Microsoft Excel	Office 16
Test Result	Microsoft Excel	Microsoft Excel	Office 16
Front-end test	Chrome	Google	1.75.1
Manage Bug	GitLab	GitLab.Inc	Lastest
Database Management	My SQL	Oracle Corporation	Lastest

Table 5.3 Supporting tools

3. Test Plan

3.1 Human Resources

Worker/Doer	Role	Specific Responsibilities/Comments
TuanLD	Team Leader, BE Developer	✓ Fix bugs ✓ Unit Test
HieuNH	API Developer, FE Developer	✓ Fix bugs ✓ Unit Test
TruongVX	FE Developer, Tester	✓ Fix bugs ✓ Unit Test ✓ Performance Test
AnhTQ	API Developer, BE Developer	✓ Fix bugs ✓ Unit Test
AnhHT	Tester and Developer	✓ Fix bugs ✓ Unit Test ✓ System Test
CuongLV	Tester	✓ Fix bugs ✓ Unit Test ✓ Integration Test ✓ System Test

Table 5.4 Human resources

3.2 Test Environment

Purpose	Tool	Provider	Version
Manage Test Cases	Google sheets	Google	Lastest
Write Unit Test Documents	Google sheets	Google	Lastest
Write Test Report Documents	Google sheets, Google docs	Google	Lastest
Test API	Postman	Postdot Technologies	Lastest
Perform Unit Testing	IntelliJ	JetBrains	Lastest

Tracking any database transaction (evaluate the performance of the SQL queries)	MySQL Workbench	Oracle	Lastest
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Table 5.5 Test environment

3.3 Test Milestones

Milestone Task		Effort (md)	Start Date	End Date
Iteration 1	Create test case	2	10/6/2024	12/06/2024
	Execution Unit Case	2	13/06/2024	15/06/2024
	Execute Integration Test	4	13/06/2024	17/06/2024
	Create Test Report	1	18/06/2024	19/06/2024
Iteration 2	Create test case	2	21/06/2024	23/06/2024
	Execution Unit Case	2	24/06/2024	26/06/2024
	Execute Integration Test	4	24/06/2024	28/06/2024
	Create Test Report	1	29/06/2024	30/06/2024
Iteration 3	Create test case	2	01/07/2024	03/07/2024
	Execution Unit Case	2	04/07/2024	06/07/2024
	Execute Integration Test	4	04/07/2024	08/07/2024
	Create Test Report	1	09/07/2024	10/07/2024

Iteration 4	Create test case	2	11/07/2024	13/07/2024
	Execution Unit Case	2	14/07/2024	16/07/2024
	Execute Integration Test	4	14/07/2024	18/07/2024
	Create Test Report	1	19/07/2024	20/07/2024
	System Testing	6	14/07/2024	20/07/2024
	User Acceptance Testing	4	02/08/2024	06/08/2024
	Performance Testing	4	20/07/2024	24/07/2024
	Security Testing	4	20/07/2024	24/07/2024
	Usability Testing	4	24/07/2024	28/07/2024
	Compatibility Testing	4	28/07/2024	31/07/2024

Table 5.6 Test milestones

4. Test Cases

In this section, we provide details on the test case in test report

4.1. Unit Testing

- The methods that will be tested through the unit testing phases are the main methods of the above. Each UT is designed in the following order:
 - Design Test Script: Set up necessary conditions include initialise objects, determine the input domain, boundary value analysis,...
 - Write Test Case on IDE: Call methods to be tested according to design. Runs each test case in an isolated manner, with “mocks” used to simulate external dependencies. Does not test every line of code, focusing on critical features of the unit under test
 - Check the correct operation of the methods: Verifies each test case using criteria determined in code, known as “assertions”. The testing

framework uses these to run the test and report failed tests. Then record the test results into the test script.

Example:

Please click on the following link to see details: [G28 GPM UnitTest](#)

	A	B	C	D	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Code Module		DefaultAccountService		Method				register									
2	Created By		AnhHT		Executed By				AnhHT									
3	Test requirement		<Brief description about requirements which are tested in this function>															
4	Passed		Failed		Untested				N/A/B			Total Test Cases						
5	7		0		0				3	4	0	7						
6																		
7																		
8	Condition	Precondition			UTCID01	UTCID02	UTCID03	UTCID04	UTCID05	UTCID06	UTCID07							
9		Can connect with server	0	0	0	0	0	0	0	0								
10		OTP is valid	0	0	0	0	0	0	0									
11																		
12		Fullname																
13		"Hoàng Thế Anh"	0	0	0	0			0									
14		null							0									
15		Email																
16		"newuser@gmail.com"	0	0	0			0	0									
17		null						0										
18																		
19		password																
20		"password"	0		0	0	0											
21		"123456"		0														
22		null								0								
23																		
24		confirmPassword																
25		"password"	0			0	0											
26		"123456"		0	0				0									

Image 5.1 Example of unit testing

```
@Test @admin
void register_Success() {
    AccountRegisterDTO registerDTO = AccountRegisterDTO.builder()
        .email("newuser@example.com")
        .password("password")
        .confirmPassword("password")
        .otp("123456")
        .build();

    when(otpUtils.get(anyString())).thenReturn( t "123456");
    when(passwordEncoder.encode(anyString())).thenReturn( t "encodedPassword");
    when(roleRepository.findRoleByRoleName(anyString())).thenReturn(Optional.of(role));
    when(accountRepository.save(any(Account.class))).thenReturn(account);
    when(codeUtils.genCode(anyString(), any())).thenReturn( t "ACC123");

    ApiResponse<?> response = accountService.register(registerDTO);

    assertNotNull(response);
    assertEquals( expected: "200", response.getStatusCode());
    verify(accountRepository, times( wantedNumberOfInvocations: 2)).save(any(Account.class));
    verify(otpUtils, times( wantedNumberOfInvocations: 1)).delete(anyString());
}
```

Image 5.2 Example of code for unit testing

4.2. Integration Testing

- Integration testing of a build indicates separate testing units of a system as one. Integration Test is done by testers to ensure that combined units work correctly and that the system functions as intended.

Example:

Please click on the following link to see details: [G28 GPM IntegrationTest](#)

Manage campaign						
Feature						
Test requirement						
Number of TCs						
Testing Round		19				
		Passed	Failed	Pending	N/A	
Round 1		14	0	5		
Round 2		15	4	0		
Round 3		19	0	0	0	

Test Case ID	Test Case Description	Test Case Procedure	Expected Results	Pre-conditions	Round 1	Test date	Tester	Round 2	Test date	Tester	Round 3	Test date	Tester	Note
<ViewCampaign_2>	View list all campaign without data	1. User sign in to the system 2. Click "Quản lí chiến dịch" in sidebar 3. Click "Chiến dịch"	1. Display Dashboard screen 3. Notify "no rows"	1. User signed in with Admin role 2. API is loaded 3. Internet connection is available	Passed	- 19/06/2024	CuongLV	Passed	- 19/07/2024	CuongLV	Passed	- 11/08/2024	CuongLV	
<ViewCampaign_3>	View details campaign	1. User sign in to the system 2. Click "Quản lí chiến dịch" in sidebar 3. Click "Chiến dịch" 4. Click "chi tiết" button in campaign	1. Display Dashboard screen 3. Display campaign list with pagination 4. Display campaign details screen	1. User signed in with Admin role 2. API is loaded 3. Internet connection is available	Passed	- 19/06/2024	CuongLV	Passed	- 19/07/2024	CuongLV	Passed	- 11/08/2024	CuongLV	
<ViewCampaign_4>	Fiter campaign with "Tên chiến dịch"	1. User sign in to the system 2. Click "Quản lí chiến dịch" in sidebar 3. Click "Chiến dịch" 4. Click "Tìm kiếm tên chiến dịch" 5. Enter "Tên chiến dịch"; "nhà"	2. Display list campaign 5. Campaign with the word "nhà" in the title are displayed.	1. User signed in with Admin role 2. API is loaded 3. Internet connection is available	Passed	- 19/06/2024	CuongLV	Passed	- 19/07/2024	CuongLV	Passed	- 11/08/2024	CuongLV	
<ViewCampaign_5>	Fiter campaign with wrong "Tên d/án"	1. User sign in to the system 2. Click "Quản lí chiến dịch" in sidebar 3. Click "Chiến dịch" 4. Click "Tìm kiếm tên chiến dịch" 5. Enter "Tên chiến dịch"; "qwer"	2. Display list campaign 5. Display "No row"	1. User signed in with Admin role 2. API is loaded 3. Internet connection is available	Passed	- 19/06/2024	CuongLV	Passed	- 19/07/2024	CuongLV	Passed	- 11/08/2024	CuongLV	
<ViewCampaign_6>	Paging campaign successfully	1. User is signed in as admin, manage 2. Scroll down to the bottom of page 3. Click the next page button. 4. Click the previous page button.	3.The next set of campaign is displayed. 4.The previous set of campaign is displayed.	1. User signed in with Admin role 2. API is loaded 3. Internet connection is available	Passed	- 19/06/2024	CuongLV	Passed	- 19/07/2024	CuongLV	Passed	- 11/08/2024	CuongLV	
<ViewCampaign_7>	Paging campaign unsuccessfully		Pop up error "Đã có lỗi xảy ra, xin vui lòng thử lại sau."	1. User signed in with Admin role 2. API is loaded	Passed	- 19/06/2024	CuongLV	Passed	- 19/07/2024	CuongLV	Passed	- 11/08/2024	CuongLV	

Home
 Users
 Groups
 Roles
 Permissions
 Reports
 Settings
 Logout

Dashboard
 Campaigns
 Analytics
 Marketing
 Sales
 Support
 Finance
 HR
 Legal
 Compliance
 Security
 IT
 Operations
 Logistics
 Manufacturing
 Retail
 Healthcare
 Education
 Government
 Non-profit
 Other

New
 Edit
 Delete
 Duplicate
 Share
 Print
 Download
 Upload
 Refresh
 Undo
 Redo
 Zoom In
 Zoom Out
 Reset
 Fullscreen
 Exit

Account
 Profile
 Settings
 Notifications
 Help
 Feedback
 Privacy
 Terms
 Contact
 About
 FAQ
 Blog
 News
 Events
 Partners
 Sponsors
 Advisors
 Investors
 Media
 Press
 Public
 Private
 Protected
 Unprotected

Figure 5.3 Example for integration testing

4.3. System Testing

- This testing method involves monitoring and evaluating the performance of an entire system. This testing method combines multiple management flows to deliver the user's desired results.
- Test cases define what must be done to test a system, including the steps executed in the system, the input data values that are entered into the system and the results that are expected throughout test case execution.

Example:

Please click on the following link to see details: [G28 GPM SystemTest](#)

Test Case ID	Test Case Description	Test Case Procedure	Expected Results	Pre-conditions	Round 1	Test date	Tester	Round 2	Test date	Test
TC01	Donated project in campaign successfully	User a guest 1. User go to website https://fpt.sucmanh2000.com 2. Click "Góp lễ" in header. Ex: Choose "Góp lễ xây nhà" 3. Scroll down the page and select the project you want to donate to, enter your information and the amount want to donate. Ex: Our aim "04022" 4. Scan qr by app bank 5. Confirm and agree User a donation 6. User go to website website "Góp Lễ" 7. Click "Đăng nhập" in the header of homepage 8. Enter account valid 9. Click "Góp lễ" in header. Ex: Choose "Góp lễ xây nhà" 10. Scroll down the page and select the project you want to donate to, enter your information and the amount want to donate. 11. Scan qr by app bank 12. Confirm and agree User a manager	1. Show homepage screen 2. Show project in campaign with status "Cần góp lễ" screen 3. Show screen project selected donate 4. Display qr code(include information and amount you want to donate) 5. Donate successfully, after 30s successful transaction display in table's transaction 6. Show homepage screen 7. Show login page 8. Show homepage screen with role donation 9. Show project in campaign with status "Cần góp lễ" screen 10. Show screen project information selected donate 11. Display qr code(include information and amount you want to donate) 12. Donate successfully, after 30s successful transaction display in table's transaction 13. Show login page 14. Show dashboard with role admin 15. Show list project 16. After 30s successful transaction display in table's transaction admin screen	1. Device must be connected internet. 2. Have an account of GPM.	Passed	4 - August	TruongVX	Passed	9 - August	TruongV

Image 5.4 Example for System testing

4.4. Acceptance Testing

- Acceptance Testing in the system is a crucial phase where the system is evaluated for its adherence to business requirements and readiness for delivery.

Example:

Please click on the following link to see details: [G28 GPM AcceptanceTest](#)

ACCEPTANCE CRITERIA TEST MATRIX				
#	Acceptance criteria description	Test Result		Comment
		Accept	Reject	
1	Test functions flow: Guest: View Homepage - View Public Campaign - View Detail Campaign - Donate For Project In CamPaigh - View Donation History	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2	Test functions flow: Guest: View Homepage - View Public Project - View Detail Project - Donate For Project - View Donation History	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3	Test functions flow: Guest: View Homepage - View Challenger And Ambassador - View List Ranking - View All Ambassador	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4	Test functions flow: Guest: View Homepage - View Public News - View Detail News	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5	Test functions flow: System User: View Homepage - View Public Campaign - View Detail Campaign - Donate For Project in CamPaigh - View Donation History	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6	Test functions flow: System User: View Homepage - View Public Project - View Detail Project - Donate For Project - View Donation History	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7	Test functions flow: System User: View Homepage - View Challenger And Ambassador - View List Ranking - View All Ambassador	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8	Test functions flow: System User: View Homepage - View Public News - View Detail News	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Figure 5.5 Example for Acceptance testing

5. Test Reports

5.1. Unit testing report

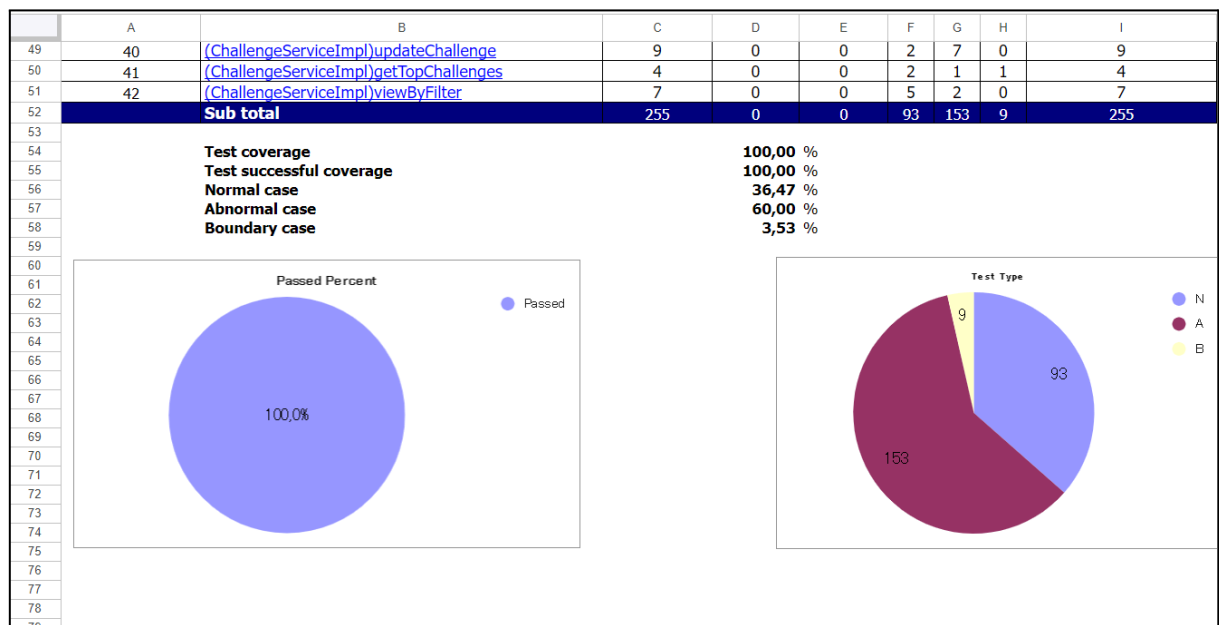


Image 5.6 Report of unit testing

5.2. Integration testing report

TEST STATISTICS

Project Name	Gop Le Project Management	Creator	CuongLV	
Project Code	GPM	Reviewer/ Approver	TuanLD	
Document Code	GPM Test Report v0.5	Issue Date		
Notes				

No	Module code	Passed	Failed	Pending	N/A	Number of test cases
1	User Authentication	22	0	1	0	23
2	Manage campaign	19	0	0	0	19
3	Manage project	28	0	0	0	28
4	Manage account	18	0	0	0	18
5	Manage news	29	0	0	0	29
6	Manage budget	17	0	0	0	17
7	Manage sponsor	22	0	0	0	22
8	Manage tracking	18	0	0	0	18
9	Manage expense	15	0	0	0	15
10	Manage member	8	0	0	0	8
11	Manage profile	22	0	0	0	22
12	Manage user	9	0	0	0	9
13	Manage challenge	9	0	0	0	9
14	Donation history	2	0	0	0	2
15	Client campaign	9	0	0	0	9
16	Client news	11	0	0	0	11
17	Client project	9	0	0	0	9
18	User profile	27	1	0	0	28
Sub total		294	1	1	0	296

Test coverage

Test successful coverage

99,66 %

99,32 %

Image 5.7 Report of integration testing

5.3. System testing report

a. Functional testing

TEST STATISTICS

Project Name	Gop Le Project Management	Creator		TruongVX
Project Code	GPM	Reviewer/Approver		KienNT
Document Code	GPM_Test Report_v1.0	Issue Date		4/8/2024
Notes	Workflow: - User Account - Donation Management - Project Management - New Management - Challenge Management - Campaign Management - Account Management			

No	Module code	Passed	Failed	Pending	N/A	Number of test cases
1	User Account	2	0	0	0	2
2	Donation Management	5	0	0	0	5
3	Project Management	9	0	0	0	9
4	News Management	4	0	0	0	4
5	Challenge Management	7	0	0	0	7
6	Campaign Management	2	0	0	0	2
7	Account Management	2	0	0	0	2
Sub total		33	0	0	0	33

Test coverage	100.00 %
Test successful coverage	100.00 %

Image 5.8 Report of system testing

b. Load Testing

- Load testing assesses the GPM's ability to handle a specific volume of users and interactions without compromising performance. It ensures that the app remains responsive and stable even during peak usage periods, preventing crashes or slowdowns.

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received K...	Sent KB/sec	Avg. Bytes
Login list c...	4112	822	672	1270	80.08	0.00%	7.6/sec	14.06	1.87	1895.2
Get Campa...	4112	7	1	313	14.25	0.00%	7.6/sec	10.62	1.19	1431.0
List project...	4112	65	20	419	34.06	0.00%	7.6/sec	132.20	1.28	17819.0
Get Campa...	4110	5	1	378	11.71	0.00%	7.6/sec	6.45	1.21	870.8
Statistics ...	4110	20	3	299	23.34	0.00%	7.6/sec	6.41	1.27	865.0
View card ...	4107	180	50	7203	133.29	0.02%	7.6/sec	978.15	1.23	132240.1
View detail ...	4104	8	1	376	13.20	0.00%	7.6/sec	75.63	1.22	10126.0
View list d...	4102	19	3	311	19.56	0.00%	7.6/sec	47.79	1.29	6403.9
View image...	4102	5	0	206	10.02	0.00%	7.6/sec	7.94	1.33	1064.0
View spon...	4102	6	1	154	11.26	0.00%	7.6/sec	5.51	1.27	740.0
List news	4102	12	3	346	15.21	0.00%	7.6/sec	41.31	1.16	5547.0
view detail...	4102	6	1	160	10.38	0.00%	7.6/sec	154.96	1.18	20814.9
Top rankin...	4102	8	2	190	8.76	0.00%	7.6/sec	85.63	1.26	11507.0
List challe...	4102	12	4	266	12.07	0.00%	7.6/sec	47.68	1.21	6410.0
List ambas...	4102	20	7	240	15.25	0.00%	7.6/sec	14.77	1.21	1987.0
Logout	4102	1	0	221	5.65	0.00%	7.6/sec	2.95	1.36	396.9
TOTAL	65685	75	0	7203	202.11	0.00%	121.0/sec	1625.35	20.39	13760.1

Image 5.9 Report of load testing

5.4. Acceptance testing report

82	Test functions flow: Admin: Sign In - View List Account - Create Account - View Detail Account - Search Account	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
83	Test functions flow: Admin: Sign In - Create Manager Account	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
84	Test functions flow: Admin: Sign In - View Personal Page - Edit Profile - ChangePassword - Sign Out	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
85	Total	84	0	
	Test coverage	100,00	%	
	Test successful coverage	100,00	%	

Image 5.10 Report of Acceptance Testing