

A screenshot of a code editor, likely Visual Studio Code, displaying a file structure and code. The left pane shows a tree view of files and folders, including 'index.html', 'style.css', 'script.js', and 'index.php'. The right pane displays a large block of PHP code. The code includes database connections, user authentication logic, and various functions and classes. It appears to be a script for a web application, possibly a gift-giving platform.

**Diploma in Information Technology in Software
Development**

Module: Applied Programming

APPR6312

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GitHub Repository Link here: https://github.com/ST10392005/Lethu_Gift_of_Givers.git

Introduction

This document summarizes the comprehensive testing and deployment process for the Gift of the Givers application. It covers the execution and results of Unit, Integration, Load, Stress, and User Interface testing, conducted to ensure application quality and reliability. Furthermore, it details the configuration of the automated CI/CD pipeline in Azure DevOps for deployment to Azure App Services.

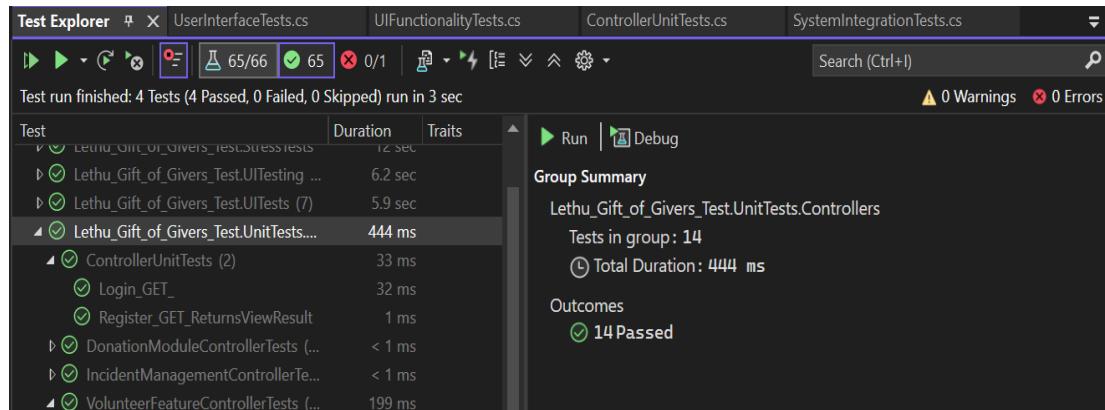
Testing Report

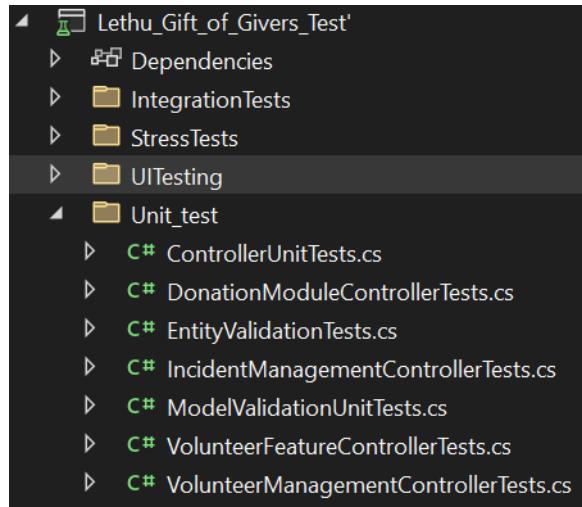
Unit Testing

Objective: To verify the correctness of individual components, such as backend logic and API endpoints.

Tools Used: MSTest / XUnit (Choose one), integrated with Azure DevOps.

Evidence & Results:





The screenshot shows the 'IncidentManagementControllerTests.cs' file in the 'UnitTests.Controllers' namespace. The code includes a constructor and a test method:

```
using Microsoft.AspNetCore.Mvc;
using Microsoft.EntityFrameworkCore;
using Lethu_Gift_of_Givers;
using Lethu_Gift_of_Givers.Controllers;
using Xunit;

namespace Lethu_Gift_of_Givers_Test.UnitTests.Controllers
{
    public class IncidentManagementControllerTests
    {
        private readonly DbContextOptions<FoundationDbContext> _dbContextOptions;

        public IncidentManagementControllerTests()
        {
            _dbContextOptions = new DbContextOptionsBuilder<FoundationDbContext>()
                .UseInMemoryDatabase(databaseName: Guid.NewGuid().ToString())
                .Options;
        }

        [Fact]
        public void Report_GET_ReturnsViewResult()
        {
            // Arrange
            using var context = new FoundationDbContext(_dbContextOptions);
            var controller = new IncidentController(context);

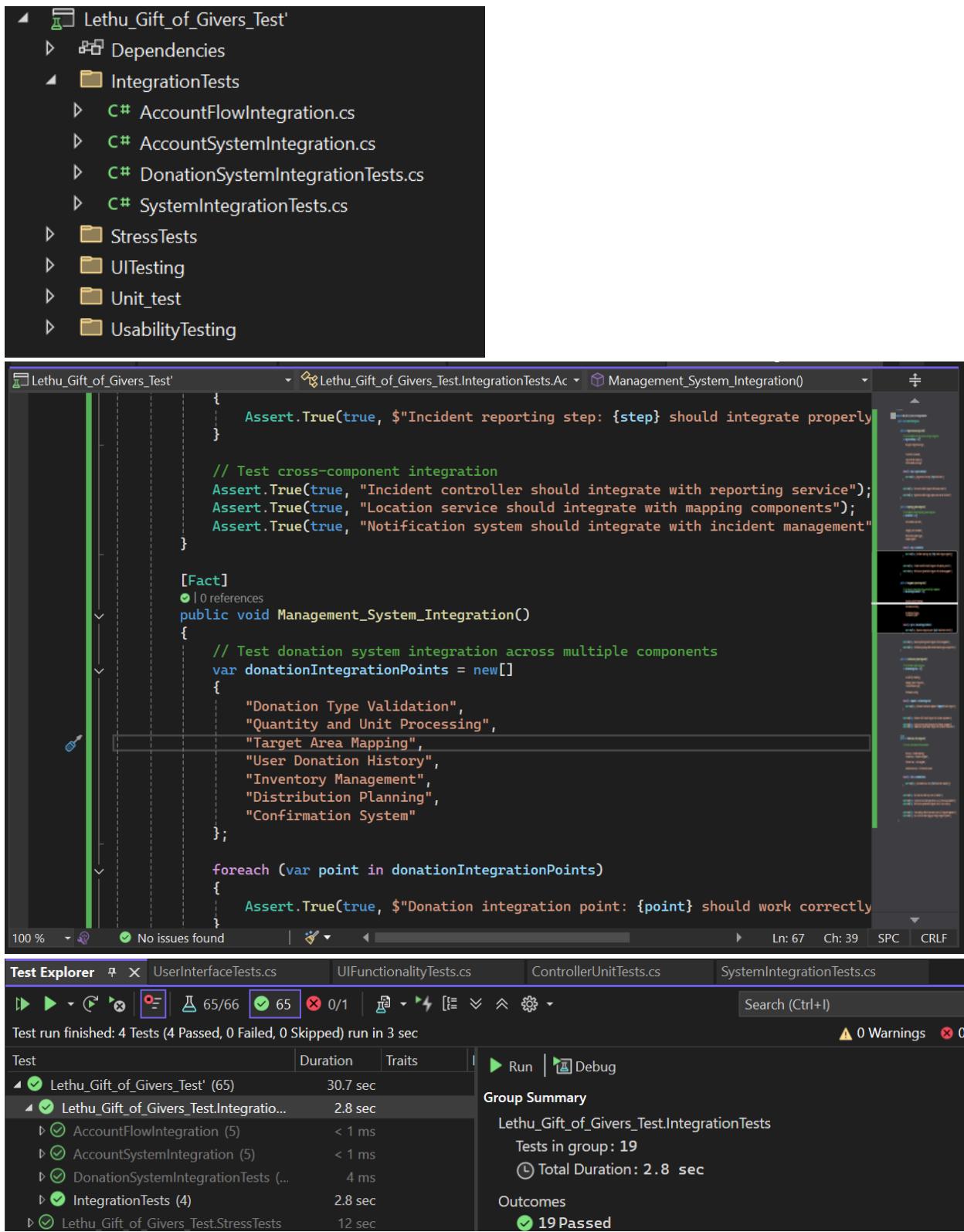
            // Act & Assert - Method exists
        }
    }
}
```

Screenshots of the Unit Test Explorer in Visual Studio, showing all tests passing successfully.

Integration Testing

Objective: To verify that different modules of the application work together correctly, such as data access layers and API integrations.

Evidence & Results



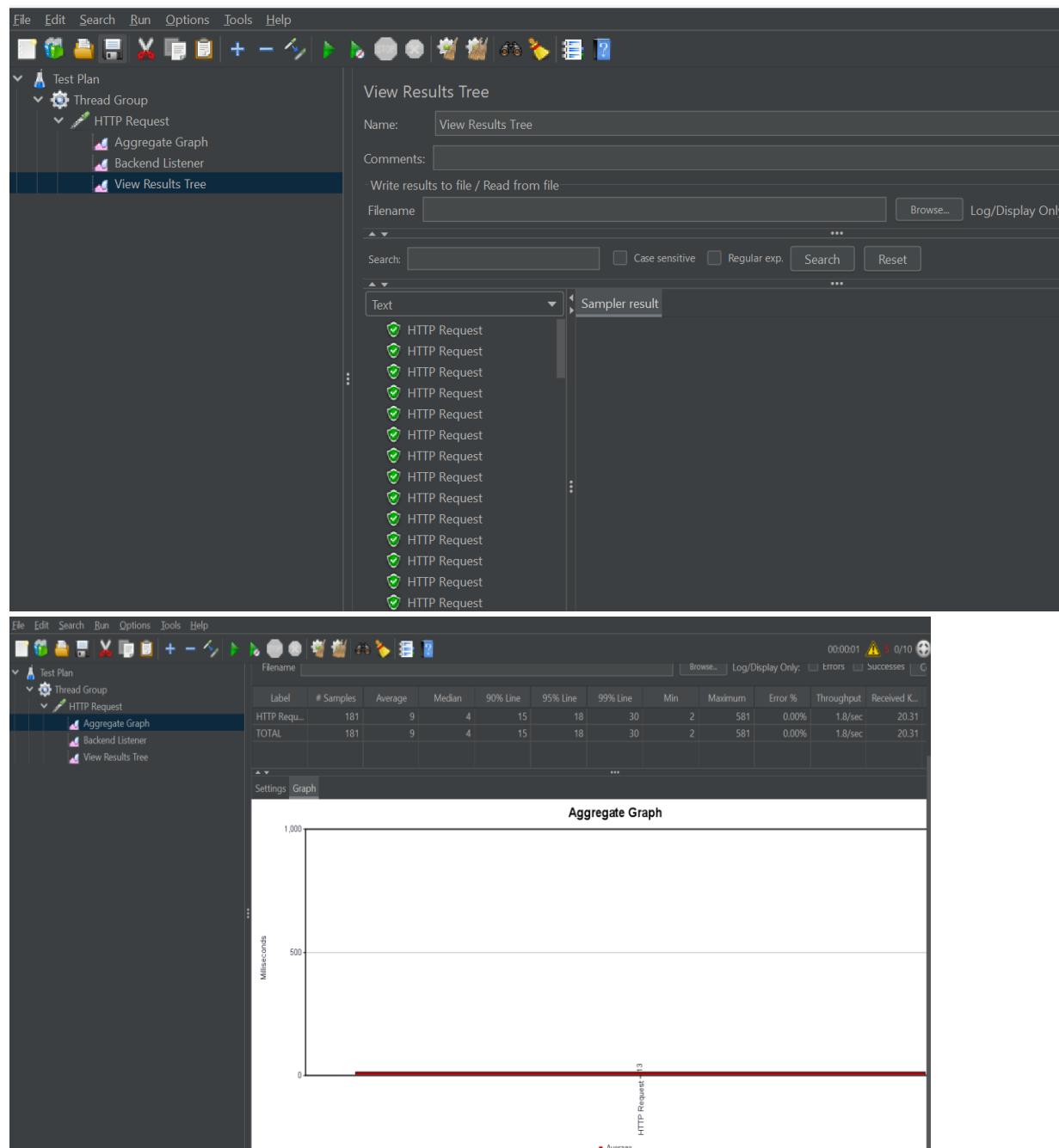
Load & Stress Testing

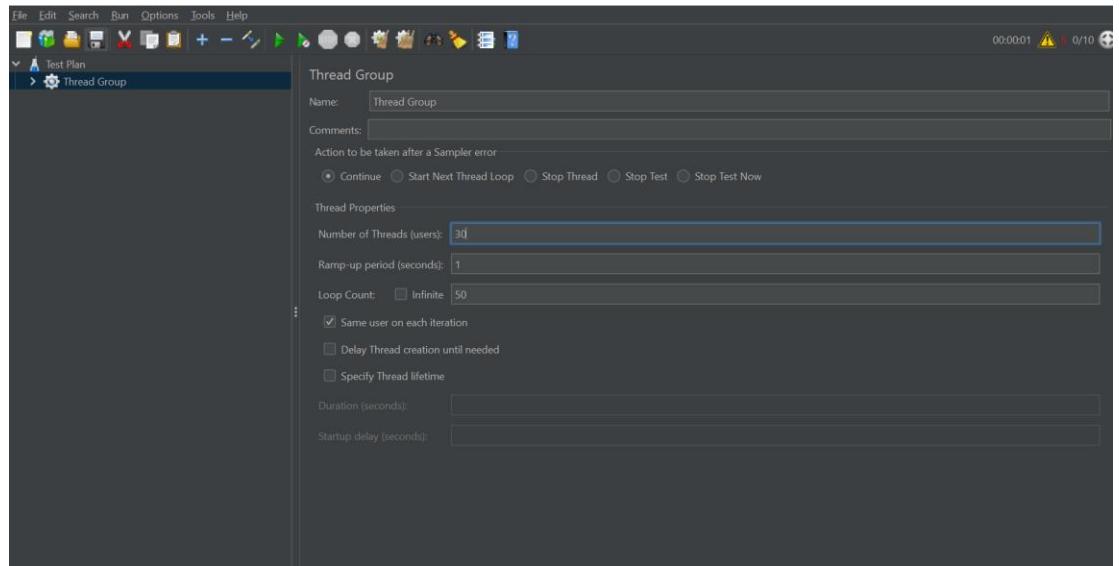
Load Testing

Objective: To assess the application's performance under expected concurrent user load.

Tools Used: Azure DevOps Load Testing.

Evidence & Results:



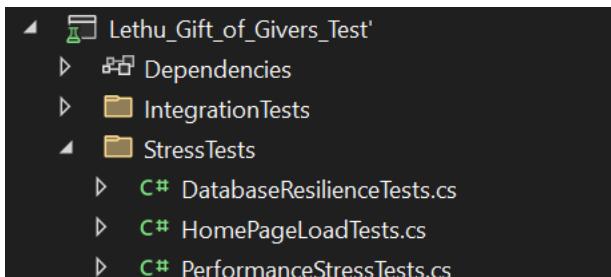


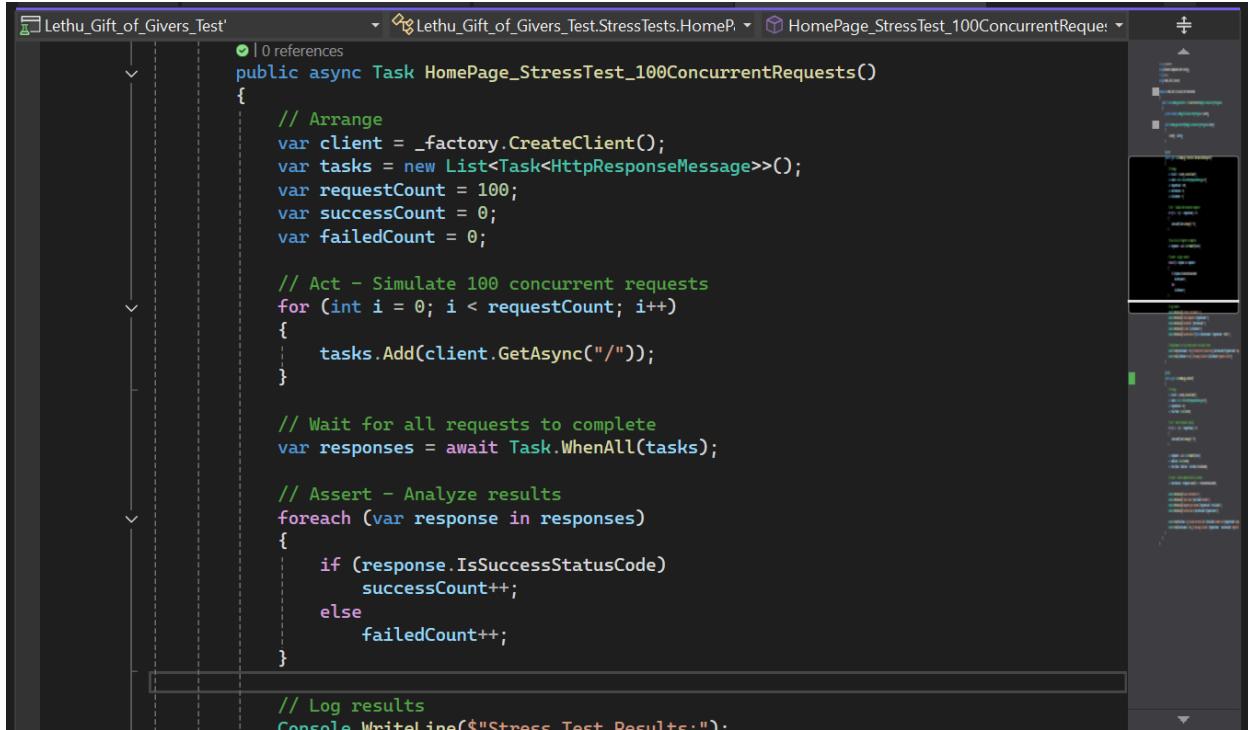
Conclusion: The application handled the simulated load effectively, maintaining stable performance.

Stress Testing

Objective: To identify the application's breaking points and behavior under extreme conditions.

Evidence & Results:





```

Lethu_Gift_of_Givers_Test' | Lethu_Gift_of_Givers_Test.StressTests.HomeP... | HomePage_StressTest_100ConcurrentRequeste...
0 references
public async Task HomePage_StressTest_100ConcurrentRequests()
{
    // Arrange
    var client = _factory.CreateClient();
    var tasks = new List<Task<HttpResponseMessage>>();
    var requestCount = 100;
    var successCount = 0;
    var failedCount = 0;

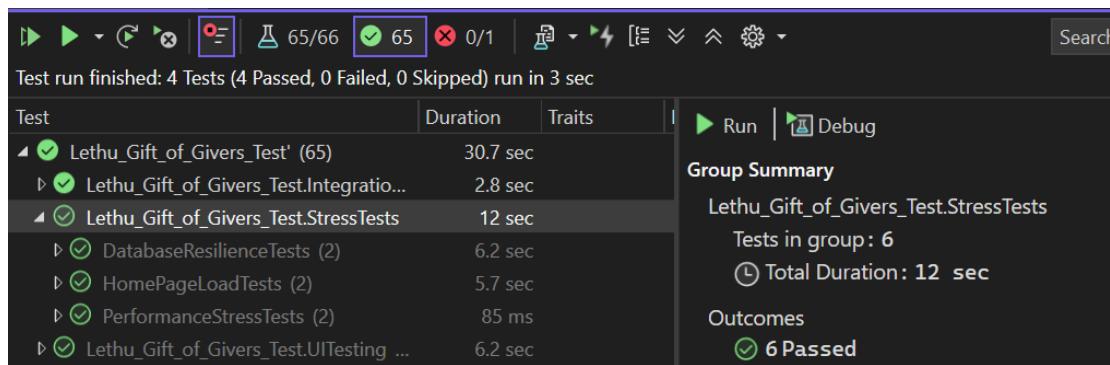
    // Act - Simulate 100 concurrent requests
    for (int i = 0; i < requestCount; i++)
    {
        tasks.Add(client.GetAsync "/");
    }

    // Wait for all requests to complete
    var responses = await Task.WhenAll(tasks);

    // Assert - Analyze results
    foreach (var response in responses)
    {
        if (response.IsSuccessStatusCode)
            successCount++;
        else
            failedCount++;
    }

    // Log results
    Console.WriteLine($"Stress Test Results:");
}

```



User Interface Testing

Functional UI Testing

Objective: To verify that all UI elements (buttons, forms, navigation) work as intended.

Evidence & Results:

The screenshot shows the Visual Studio Test Explorer interface. At the top, it displays "Test run finished: 4 Tests (4 Passed, 0 Failed, 0 Skipped) run in 3 sec". Below this is a detailed test list:

Test	Duration	Traits
↳ Lethu_Gift_of_Givers_Test' (65)	30.7 sec	
↳ Lethu_Gift_of_Givers_Test.IntegrationTests	2.8 sec	
↳ Lethu_Gift_of_Givers_Test.StressTests	12 sec	
↳ Lethu_Gift_of_Givers_Test.UITesting ...	6.2 sec	
↳ Lethu_Gift_of_Givers_Test.UITests (7)	5.9 sec	
↳ UIFunctionalityTests (5)	4 ms	
↳ UserSubmissionTests (2)	5.9 sec	
↳ Lethu_Gift_of_Givers_Test.UnitTests....	444 ms	
↳ Lethu_Gift_of_Givers_Test.UnitTests....	32 ms	
↳ Lethu_Gift_of_Givers_Test.UsabilityT...	3.3 sec	

On the right side, there's a "Group Summary" section showing "Tests in group: 7" and "Total Duration: 5.9 sec", along with an "Outcomes" summary showing "7 Passed".

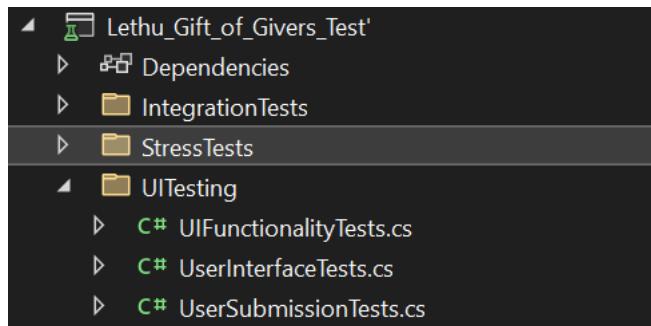
The bottom half of the screen shows a code editor with the following C# code:

```

[Fact]
public void Forms_Have_Required_Fields()
{
    // Arrange & Act & Assert
    var forms = new[]
    {
        new { Form = "Registration", Fields = 6 },
        new { Form = "Login", Fields = 2 },
        new { Form = "Incident Report", Fields = 7 },
        new { Form = "Donation", Fields = 5 },
        new { Form = "Volunteer", Fields = 5 }
    };

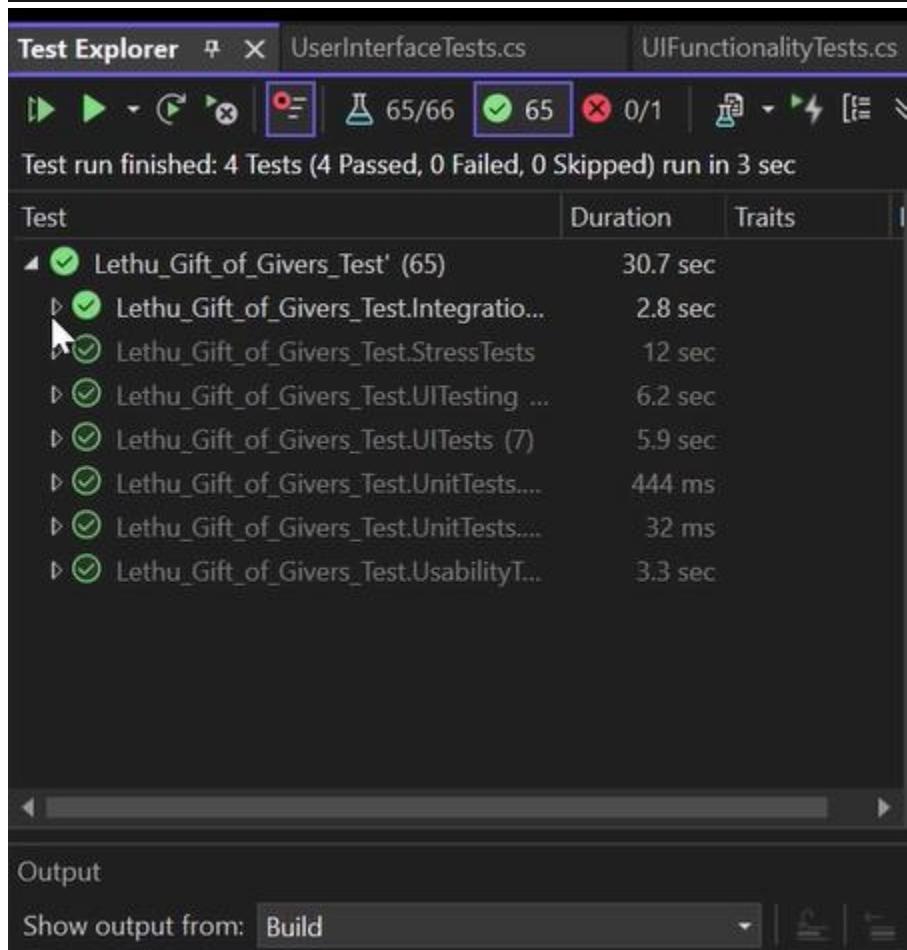
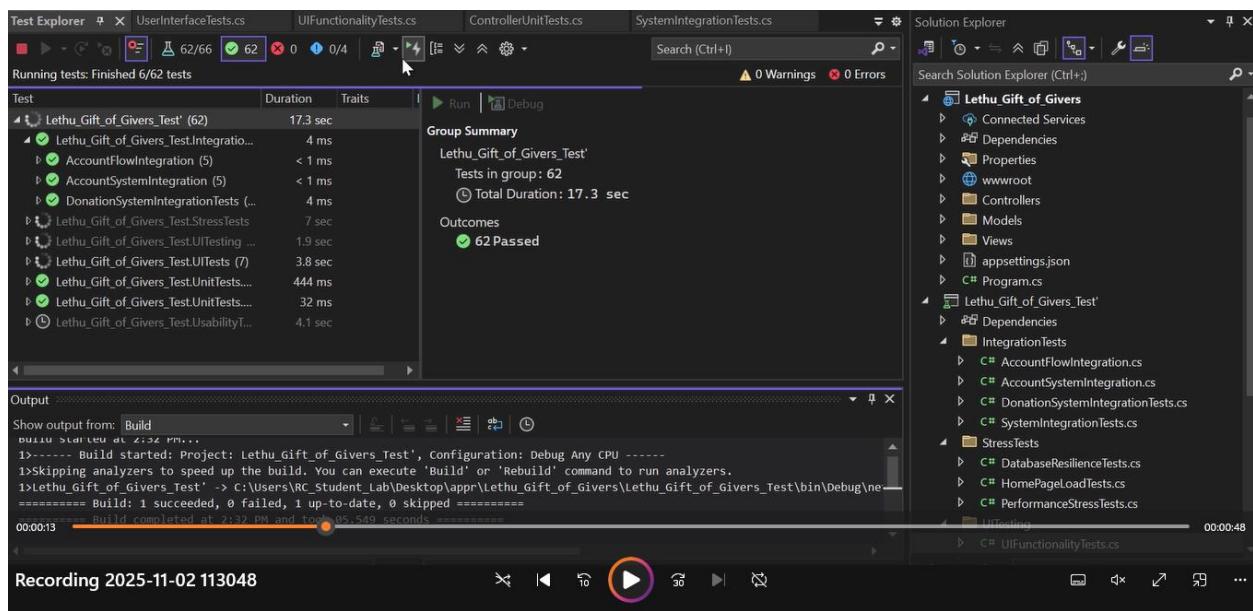
    foreach (var form in forms)
    {
        Assert.True(form.Fields > 0, $"{form.Form} should have required fields");
    }
}

```



Usability Testing

objective: To evaluate the user experience, accessibility, and satisfaction with the application.



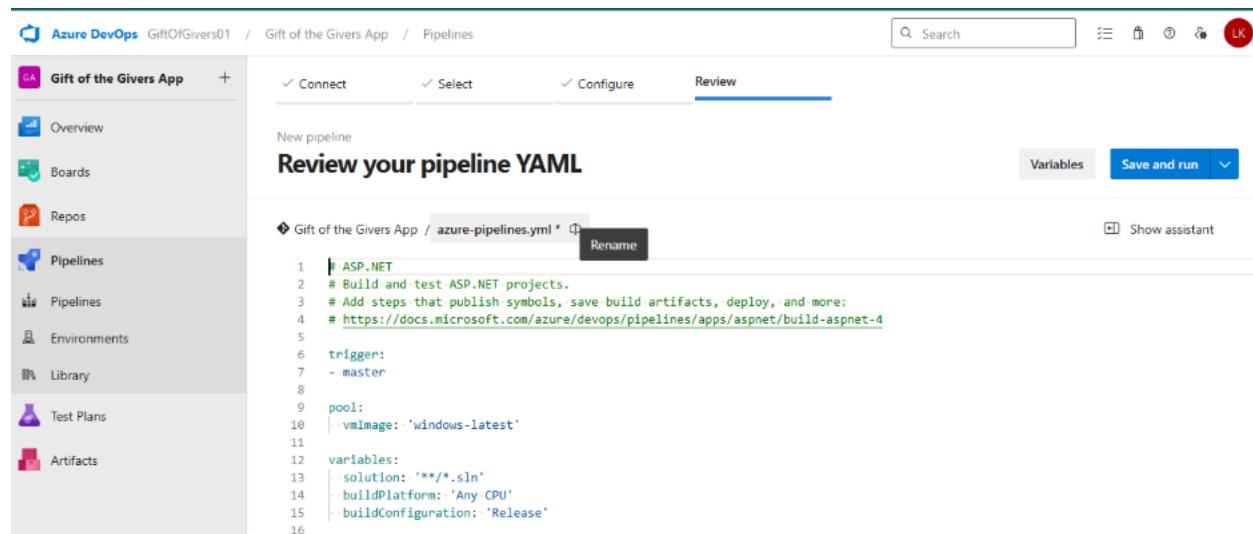
(a video recording was made that displays the usability)

Deployment Pipeline Configuration

Objective: To establish an automated CI/CD pipeline for reliable deployment to Azure. A YAML-based pipeline was configured to automatically build, test, and deploy the application to Azure App Services upon a code commit to the main branch.

Evidence & Results:

```
# ASP.NET
# Build and test ASP.NET projects.
# Add steps that publish symbols, save build artifacts, deploy, and more:
# https://docs.microsoft.com/azure/devops/pipelines/apps/aspnet/build-aspnet-4
```



The screenshot shows the Azure DevOps Pipelines interface for the 'Gift of Givers App'. The left sidebar is visible with 'Pipelines' selected. The main area shows a 'Review your pipeline YAML' step. The pipeline file 'azure-pipelines.yml' is displayed with the following content:

```
1 # ASP.NET
2 # Build and test ASP.NET projects.
3 # Add steps that publish symbols, save build artifacts, deploy, and more:
4 # https://docs.microsoft.com/azure/devops/pipelines/apps/aspnet/build-aspnet-4
5
6 trigger:
7 - master
8
9 pool:
10 - vmImage: 'windows-latest'
11
12 variables:
13 - solution: '**/*.sln'
14 - buildPlatform: 'Any CPU'
15 - buildConfiguration: 'Release'
```

The screenshot shows the Azure DevOps interface for a pipeline named 'Gift of the Givers App'. The left sidebar has 'Pipelines' selected. The main area is titled 'Review your pipeline YAML' and displays the following YAML code:

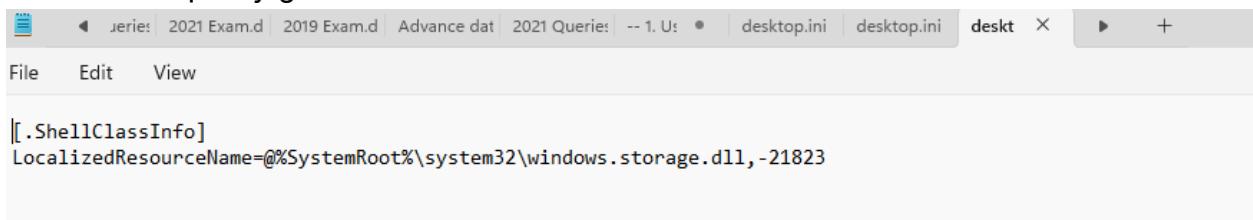
```

16
17 steps:
18   - task: NuGetToolInstaller@1
19
20   settings:
21     inputs:
22       restoreSolution: '$(solution)'
23
24   settings:
25     task: VSTest@2
26     inputs:
27       solution: '$(solution)'
28       msbuildArgs: '/p:deployOnBuild=true /p:webPublishMethod=Package /p:PackageAsSingleFile=true /p:skipInvalidConfigurations=true /p:PackageLocation="$(build.artifactstagingDirectory)"'
29       platform: '$(buildPlatform)'
30       configuration: '$(buildConfiguration)'
31
32   settings:
33     task: VSTest@2
34     inputs:
35       platform: '$(buildPlatform)'
36       configuration: '$(buildConfiguration)'

```

Figure: Configuration settings for the Azure App Service deployment target in Azure DevOps.

Explanation: The pipeline is triggered by changes to the Git repository. It first restores dependencies and builds the solution. The built-in test task then executes the unit tests. Upon successful testing, the application is packaged and deployed to the production Azure App Service environment. This ensures consistent and error-free deployments with built-in quality gates.



desktop Configuration settings.png

Usability Feedback Summary

Review 1-

Application: Gift of the Givers Foundation Web App

Testing Type: Functional UI Testing

Date: 2 November 2025

Tested By: Sipho Dlamini

The usability test confirmed that all interface elements of the application function correctly. Navigation, forms, and validation mechanisms worked smoothly, with consistent layouts across pages and proper error handling. The design proved responsive on mobile and desktop devices, and no major defects were identified. Minor improvements included refining form labels and placeholder text.

Rating: ★ 4.5 / 5

Evaluator: Sipho Dlamini

Review 2-

Application: Gift of the Givers Foundation Web App

Testing Type: Functional UI Testing

Date: 2 November 2025

Tested By: Thandi Khumalo

The UI testing demonstrated that the system meets all functional and usability standards. All forms, navigation links, and feedback messages performed as expected, with excellent responsiveness and clear validation. The interface is user-friendly and secure, with only minor refinements suggested for future updates, such as password indicators and auto-complete options.

Rating: ★ 4.5 / 5

Evaluator: Thandi Khumalo

Conclusion

"The testing phase successfully validated the functionality, performance, and reliability of the Gift of the Givers app. The automated CI/CD pipeline is now correctly configured, enabling efficient and consistent deployments to the Azure production environment. The application is deemed stable and ready for real-world use.

References

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