**Testing report**

**Acme Ans D04**

**Dibujo animado de un personaje animado

El contenido generado por IA puede ser incorrecto.**

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**C2.023**

**https://github.com/ManunGar/Acme-ANS-C2  
Seville May 26, 2025**

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# 1. Executive Summary

This report details the evaluation of the functionalities implemented by student 5 for the technician role within the Acme ANS system. The functional testing aimed to assess how the system responds under various conditions, including proper usage, incorrect inputs, and attempts at unauthorized access. The objective was to ensure that validation rules functioned as intended and that no major issues were encountered.

Furthermore, system performance was tested on two separate devices. Response times were collected and subjected to statistical analysis, which included calculating 95% confidence intervals and performing a Z-test to compare average performance across environments.

Based on the findings, it can be concluded that the evaluated features are reliable, functionally sound, and perform well under different conditions, fulfilling the expected requirements.

# 2. Revision table

| **Version** | **Date** | **Description** |
| --- | --- | --- |
| 1.0 | 26/05/2025 | Initial and final versión |
| 2.0 | 02/07/2025 | Remake of almost all the tests due errors |

# 3. Introduction

The purpose of this report is to present and examine the results of the functional and performance testing conducted on the system developed as part of the Acme ANS project, focusing specifically on the features assigned to the technician role. These tests, implemented by Student 5, address essential operations involving the entities MaintenanceRecord, Task, and MaintenanceRecordTask.

Functional testing was carried out using structured validation methods to verify the system's proper behaviour under various usage scenarios. In parallel, performance assessments were executed on multiple devices, with the collected data subjected to statistical analysis to draw meaningful insights regarding the application's responsiveness in different technical environments.

Overall, this document offers a thorough overview of the quality assurance process, delivering valuable input for system assessment and future enhancements.

# 4. Functional Testing

In this section, the different test cases carried out by Student 5, corresponding to requirements 8 and 9, will be presented. The description of the test case, the result of the test case, and the effectiveness of finding bugs will be displayed.

## 4.1 Test cases for list features

|  |  |  |
| --- | --- | --- |
| Description | Result | Bugs detected |
| List Maintenance Records | All records belonging to a customer were shown | None |
| List Maintenance Records that don't belong to the authenticated technician | An error appeared access not authorise | None |
| List Maintenance Records with another user who is not a technician | An error appeared access not authorise | None |
| List Published Maintenance Records | All published records were shown | None |
| List Tasks | All Tasks belonging to a technician were shown | None |
| List Tasks related to a Maintenance Record | All Tasks belonging to a Maintenance Record were shown | None |
| List Published Tasks | All published tasks were shown | None |
| List Tasks with another user who is not a technician | An error appeared access not authorise | None |

## 4.2 Test cases for show features

|  |  |  |
| --- | --- | --- |
| Description | Result | Bugs detected |
| Show a Maintenance Record | The data related to that Maintenance Record was shown | None |
| Show a Maintenance Record that doesn't belong to the authenticated technician | An error appeared access not authorise | None |
| Show a Maintenance Record with another user who is not a technician | An error appeared access not authorise | None |
| Show a Maintenance Record with a non-existent id or non-numeric id | An error appeared access not authorise | None |
| Show a Task | The data related to that Task was shown | None |
| Show a Task that does not belong to the authenticated technician and it’s not published | An error appeared access not authorise | None |
| Show a Task with another user who is not a technician | An error appeared access not authorise | None |
| Show a Task with a non-existent id or non-numeric id | An error appeared access not authorise | None |

## 4.3 Test cases for create features

|  |  |  |
| --- | --- | --- |
| Description | Result | Bugs detected |
| Create a Record with all fields empty | The system prevented the creation of the Record with non-blocking errors | None |
| Create a Record with an invalid Maintenance Date | The system prevented the creation of the record with a non-blocking error | None |
| Create a Record with an invalid Next Inspection | The system prevented the creation of the record with a non-blocking error | None |
| Create a Record with an invalid Notes (+255 characters) | The system prevented the creation of the record with a non-blocking error | None |
| Create a Record with an invalid Estimated Cost | The system prevented the creation of the record with a non-blocking error | None |
| Create a Record without choosing an aircraft | The system prevented the creation of the record with a non-blocking error | None |
| Create a Record without choosing a status | The system prevented the creation of the record with a non-blocking error | None |
| Create a Record with a valid Maintenance Date | The system allowed the creation of the record | None |
| Create a Record with a valid Next Inspection | The system allowed the creation of the record | None |
| Create a Record with a valid Notes (between 0 and 255 characters) | The system allowed the creation of the record | None |
| Create a Record choosing an aircraft | The system allowed the creation of the record | None |
| Create a Record choosing a status | The system allowed the creation of the record | None |
| Create a Task with all fields empty | The system prevented the creation of the Task with non-blocking errors | None |
| Create a Task with an invalid Descrpition | The system prevented the creation of the task with a non-blocking error | None |
| Create a Task with an Invalid Priority | The system prevented the creation of the task with a non-blocking error | None |
| Create a Task with an invalid Estimated Duration | The system prevented the creation of the task with a non-blocking error | None |
| Create a Task without choosing a Type | The system prevented the creation of the task with a non-blocking error | It was detected that this hacking casuistry was not correctly controlled in the authorise method |
| Create a Task with a valid Descrpition | The system allowed the creation of the task | None |
| Create a Task with a valid Priority | The system allowed the creation of the task | None |
| Create a Task with a valid Estimated Duration | The system allowed the creation of the task | None |
| Create a Task choosing a Type | The system allowed the creation of the task | None |
| Create a Maintenance Record Task with all fields empty | The system prevented the creation of the relation with non-blocking errors | It was detected that this hacking casuistry was not correctly controlled in the authorise method |
| Create a Maintenance Record Task without choosing a record | The system prevented the creation of the relation with a non-blocking error | None |
| Create a Maintenance Record Task without choosing a task | The system prevented the creation of the relation with a non-blocking error | None |
| Create a Maintenance Record Task choosing a record | The system allowed the creation of the relation | None |
| Create a Maintenance Record Task choosing a task | The system allowed the creation of the relation | None |

4.4 Test cases for update features

|  |  |  |
| --- | --- | --- |
| Description | Result | Bugs detected |
| Update a Record with all fields empty | The system prevented the update of the Record with non-blocking errors | None |
| Update a Record with an invalid Maintenance Date | The system prevented the update of the record with a non-blocking error | None |
| Update a Record with an invalid Next Inspection | The system prevented the update of the record with a non-blocking error | None |
| Update a Record with an invalid Notes (+255 characters) | The system prevented the update of the record with a non-blocking error | None |
| Update a Record with an invalid Estimated Cost | The system prevented the update of the record with a non-blocking error | None |
| Update a Record without choosing an aircraft | The system prevented the update of the record with a non-blocking error | None |
| Update a Record without choosing a status | The system prevented the update of the record with a non-blocking error | None |
| Update a Record with a valid Maintenance Date | The system allowed the update of the record | None |
| Update a Record with a valid Next Inspection | The system allowed the update of the record | None |
| Update a Record with a valid Notes (between 0 and 255 characters) | The system allowed the update of the record | None |
| Update a Record choosing an aircraft | The system allowed the update of the record | None |
| Update a Record choosing a status | The system allowed the update of the record | None |
| Update a Task with all fields empty | The system prevented the update of the Task with non-blocking errors | None |
| Update a Task with an invalid Descrpition | The system prevented the update of the task with a non-blocking error | None |
| Update a Task with an Invalid Priority | The system prevented the update of the task with a non-blocking error | None |
| Update a Task with an invalid Estimated Duration | The system prevented the update of the task with a non-blocking error | None |
| Update a Task without choosing a Type | The system prevented the update of the task with a non-blocking error | It was detected that this hacking casuistry was not correctly controlled in the authorise method |
| Update a Task with a valid Descrpition | The system allowed the update of the task | None |
| Update a Task with a valid Priority | The system allowed the update of the task | None |
| Update a Task with a valid Estimated Duration | The system allowed the update of the task | None |
| Update a Task choosing a Type | The system allowed the update of the task | None |

## 4.5 Test cases for publish features

|  |  |  |
| --- | --- | --- |
| Description | Result | Bugs detected |
| Publish a Record with all fields empty | The system prevented the publish of the Record with non-blocking errors | None |
| Publish a Record with an invalid Maintenance Date | The system prevented the publish of the record with a non-blocking error | None |
| Publish a Record with an invalid Next Inspection | The system prevented the publish of the record with a non-blocking error | None |
| Publish a Record with an invalid Notes (+255 characters) | The system prevented the publish of the record with a non-blocking error | None |
| Publish a Record with an invalid Estimated Cost | The system prevented the publish of the record with a non-blocking error | None |
| Publish a Record without choosing an aircraft | The system prevented the publish of the record with a non-blocking error | None |
| Publish a Record without choosing a status | The system prevented the publish of the record with a non-blocking error | None |
| Publish a Record with a valid Maintenance Date | The system allowed the publish of the record | None |
| Publish a Record with a valid Next Inspection | The system allowed the publish of the record | None |
| Publish a Record with a valid Notes (between 0 and 255 characters) | The system allowed the publish of the record | None |
| Publish a Record choosing an aircraft | The system allowed the publish of the record | None |
| Publis a Record with status = completed | The system allowed the publish of the record | None |
| Publish a Record with status != completed | The system prevented the publish of the record with a non-blocking error | None |
| Publish a Record without any related Task | The system prevented the publish of the record with a non-blocking error | None |
| Publish a Record without all related Task published | The system prevented the publish of the record with a non-blocking error | None |
| Publish a Record with all related tasks published | The system allowed the publish of the record |  |
| Publish a Task with all fields empty | The system prevented the publish of the Task with non-blocking errors | None |
| Publish a Task with an invalid Descrpition | The system prevented the publish of the task with a non-blocking error | None |
| Publish a Task with an Invalid Priority | The system prevented the publish of the task with a non-blocking error | None |
| Publish a Task with an invalid Estimated Duration | The system prevented the publish of the task with a non-blocking error | None |
| Publish a Task without choosing a Type | The system prevented the publish of the task with a non-blocking error | None |
| Publish a Task with a valid Descrpition | The system allowed the publish of the task | None |
| Publish a Task with a valid Priority | The system allowed the publish of the task | None |
| Publish a Task with a valid Estimated Duration | The system allowed the publish of the task | None |
| Publish a Task choosing a Type | The system allowed the publish of the task | None |

# 5. Performance Testing

Performance tests have been conducted on two different devices. The results on both devices will then be displayed, as well as the final comparison between the two.

Interfaz de usuario gráfica

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The image above shows the percentage of tests that passed (almost 100% of them).

## 5.1 First device performance tests

Regarding the first device, the following results were obtained:

|  |  |  |
| --- | --- | --- |
| **Promedio /** |  | 2,78803786 |
| **Promedio /anonymous/system/sign-in** |  | 4,64472866 |
| **Promedio /anonymous/user-account/create** | | 22,5928 |
| **Promedio /any/system/panic** |  | 1,76696923 |
| **Promedio /any/system/welcome** |  | 1,7067971 |
| **Promedio /authenticated/system/sign-out** | | 3,816025 |
| **Promedio /technician/maintenance-record/create** | | 92,449487 |
| **Promedio /technician/maintenance-record/delete** | | 31,2867 |
| **Promedio /technician/maintenance-record/list** | | 16,905891 |
| **Promedio /technician/maintenance-record/publish** | | 70,6093667 |
| **Promedio /technician/maintenance-record/show** | | 16,186841 |
| **Promedio /technician/maintenance-record/update** | | 45,6155208 |
| **Promedio /technician/maintenance-record-task/create** | | 23,405725 |
| **Promedio /technician/maintenance-record-task/delete** | | 28,0364125 |
| **Promedio /technician/task/create** |  | 15,6664433 |
| **Promedio /technician/task/delete** |  | 18,637375 |
| **Promedio /technician/task/list** |  | 7,43640959 |
| **Promedio /technician/task/publish** |  | 15,13784 |
| **Promedio /technician/task/show** |  | 5,58654 |
| **Promedio /technician/task/update** |  | 16,63366 |
| **Promedio general** |  | 12,8925194 |

Descriptive statistics below:

|  |  |
| --- | --- |
| *First device* | |
|  |  |
| Media | 14,51562386 |
| Error típico | 0,863231309 |
| Mediana | 6,3116 |
| Moda | 1,527 |
| Desviación estándar | 23,70352068 |
| Varianza de la muestra | 561,8568925 |
| Curtosis | 27,11194751 |
| Coeficiente de asimetría | 4,237564261 |
| Rango | 272,7162 |
| Mínimo | 0,7216 |
| Máximo | 273,4378 |
| Suma | 10944,78039 |
| Cuenta | 754 |
| Nivel de confianza(95,0%) | 1,694626125 |

Confidence interval:

|  |  |  |
| --- | --- | --- |
| interval(ms) | 12,82099773 | 16,21025 |
| interval(s) | 0,012820998 | 0,01621025 |

## 5.2 Second device performance tests

Regarding the second device, the following results were obtained:

|  |  |  |
| --- | --- | --- |
| **Promedio /** |  | 1,85333107 |
| **Promedio /anonymous/system/sign-in** |  | 2,76895541 |
| **Promedio /anonymous/user-account/create** |  | 8,1034 |
| **Promedio /any/system/panic** |  | 1,02312308 |
| **Promedio /any/system/welcome** |  | 0,97411667 |
| **Promedio /authenticated/system/sign-out** |  | 1,69926563 |
| **Promedio /technician/maintenance-record/create** |  | 40,4942522 |
| **Promedio /technician/maintenance-record/delete** |  | 15,05224 |
| **Promedio /technician/maintenance-record/list** |  | 8,73084925 |
| **Promedio /technician/maintenance-record/publish** |  | 25,2040333 |
| **Promedio /technician/maintenance-record/show** |  | 8,46948525 |
| **Promedio /technician/maintenance-record/update** |  | 16,1753333 |
| **Promedio /technician/maintenance-record-task/create** |  | 13,6200375 |
| **Promedio /technician/maintenance-record-task/delete** |  | 15,5495125 |
| **Promedio /technician/task/create** |  | 7,17820333 |
| **Promedio /technician/task/delete** |  | 8,85785 |
| **Promedio /technician/task/list** |  | 4,57232055 |
| **Promedio /technician/task/publish** |  | 8,30661 |
| **Promedio /technician/task/show** |  | 3,576072 |
| **Promedio /technician/task/update** |  | 8,82069333 |
| **Promedio general** |  | 6,191714 |

Descrpitive statistics below:

|  |  |
| --- | --- |
| *Second device* | |
|  |  |
| Media | 6,88673899 |
| Error típico | 0,34917761 |
| Mediana | 4,0149 |
| Moda | 1,1119 |
| Desviación estándar | 9,5880891 |
| Varianza de la muestra | 91,9314526 |
| Curtosis | 24,8776379 |
| Coeficiente de asimetría | 4,03791948 |
| Rango | 105,2812 |
| Mínimo | 0,5277 |
| Máximo | 105,8089 |
| Suma | 5192,6012 |
| Cuenta | 754 |
| Nivel de confianza(95,0%) | 0,68547734 |

Confidence interval:

|  |  |  |  |
| --- | --- | --- | --- |
| interval(ms) |  | 6,20126165 | 7,57221633 |
| interval(s) |  | 0,00620126 | 0,00757222 |

## 5.3 Comparison between the two devices

Using the z-test to compare the results obtained on both devices, the following is obtained:

|  |  |  |
| --- | --- | --- |
|  | *First device* | *Second device* |
| Media | 12,87498399 | 6,189453855 |
| Varianza (conocida) | 561856893 | 91,9314526 |
| Observaciones | 843 | 843 |
| Diferencia hipotética de las medias | 0 |  |
| z | 0,008189111 |  |
| P(Z<=z) una cola | 0,496733054 |  |
| Valor crítico de z (una cola) | 1,644853627 |  |
| Valor crítico de z (dos colas) | 0,993466108 |  |
| Valor crítico de z (dos colas) | 1,959963985 |  |

As can be seen, a value of 0.49673305 has been obtained. Being greater than 0.05, it indicates that there is no statistically significant difference in performance between the two devices. Therefore, even though the first device has a higher average than the second, this difference cannot be considered meaningful according to the data collected during the tests.

# 6. Conclusion

Throughout this report, the functionalities assigned to the technician role in the system have been exhaustively evaluated through functional and performance tests. Functional tests have made it possible to verify that the system responds correctly to valid, erroneous, and unauthorized scenarios, without detecting critical errors. All the planned validations have worked as expected, thus ensuring the integrity of the system's behaviour.

Performance tests have shown no significant differences between the devices used. Through statistical analysis and Z-testing, it has been confirmed that, despite differences in the average values obtained, these differences are not statistically significant. This indicates that both devices offer comparable performance, which is relevant for future compatibility and optimization analyses.

Overall, the results obtained demonstrate a high degree of reliability and stability in the functionalities tested. This validation process makes a decisive contribution to ensuring the quality of the software before its final deployment.

# 7. Bibliography

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