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| Acme AirNav Solutions, Inc. |
| **Testing Report** |
| https://github.com/Emilio-115/DP2-Acme-ANS |



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# Executive Summary

This document is the test report for student 1, focusing on airline manager features testing, an extensive suite of tests was produced, catching some bugs in the process, and covering most of the code base.

After a performance analysis comparing database indexing and not, we concluded that we could not see any improvement in the performance when using indexing probably due to small database size.

# Revision Table

|  |  |  |
| --- | --- | --- |
| Revision number | Date | Description |
| 1 | 26/05/2025 | Initial version |

# Introduction

This document is the testing report for Student 1 it will cover what tests cases were developed for the project specifically for airline manager features, how good is the test coverage and what are the execution branches that were not achieved by testing and an analysis of performance comparing using and not indexing in the database

# Content

Following the guidelines provided, safe and hack test cases were recorded for airline manager features including everything related to flights and legs management aiming for a high coverage, there is a performance test and a comparison between using or not indices.

## Tests Cases

The following is a list of the test cases implemented, grouped by feature:

### Flight

* **List-show.safe**:  
  These test checks that an airline manager can list only their flights, can show a single flight in detail it was tested for published and draft flights. Because of the simple nature of list where we don’t expose anything user related and the list of flights shown is based on the current logged in user there are no hack cases for list. No bugs were found.
* **show.hack**:  
  These tests were made to ensure safety on the show feature, making sure a airline manager can only see information about their own flights, there are tests like trying to access to others manager fight or non-existing flights. No bugs were found.
* **create.safe**, **update.safe**, **delete.safe**, **publish.safe**:  
  These tests ensure you can properly use all the airline manager legal features, this includes all validation related to flights and their respective legs, like publishing without legs or with not published legs, leaving all fields empty to ensure the backend did not fail, also tested all these features with big set of permutations ensuring expected behavior on every one of them. Some bugs were found like the system allowing flights with no legs or the system allowing the deletion of flights with published legs.
* **create.hack**:  
  This tests that, only airline managers can create flights, and that changing the id of the request to an existing flight does not modify it. This last test case was found during testing and solved effectively.
* **update.hack**, **delete.hack**, **publish.hack**:  
  This are test cases for updating , deleting and publishing flights under non legal situation, they are grouped because of their similarities. All of them check that an airline manager can’t perform these actions for others manager flights, non-existing flights, and their own flights already published. No bugs where found.

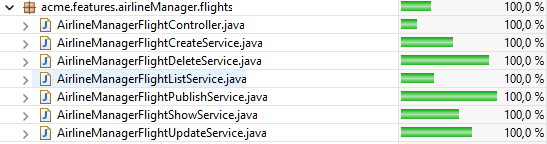
## Test Coverage

The following is a summary of the coverage achieved for all relevant files

### Flight

* **Validator** **(88,2%):**All the missing coverage comes from safety null checks that are never actually executed due to being an impossible branch of execution, all domain logic is 100% covered.
* **Services of features (100%)**

100% of coverage was successfully achieved in the all the services of the flight features





## Performance Analysis

The performance analysis was produced following the instructions, for 2 different computers running the project, the objective of this section is to analyze both and compare them. This data was extracted from the execution of airport tests.

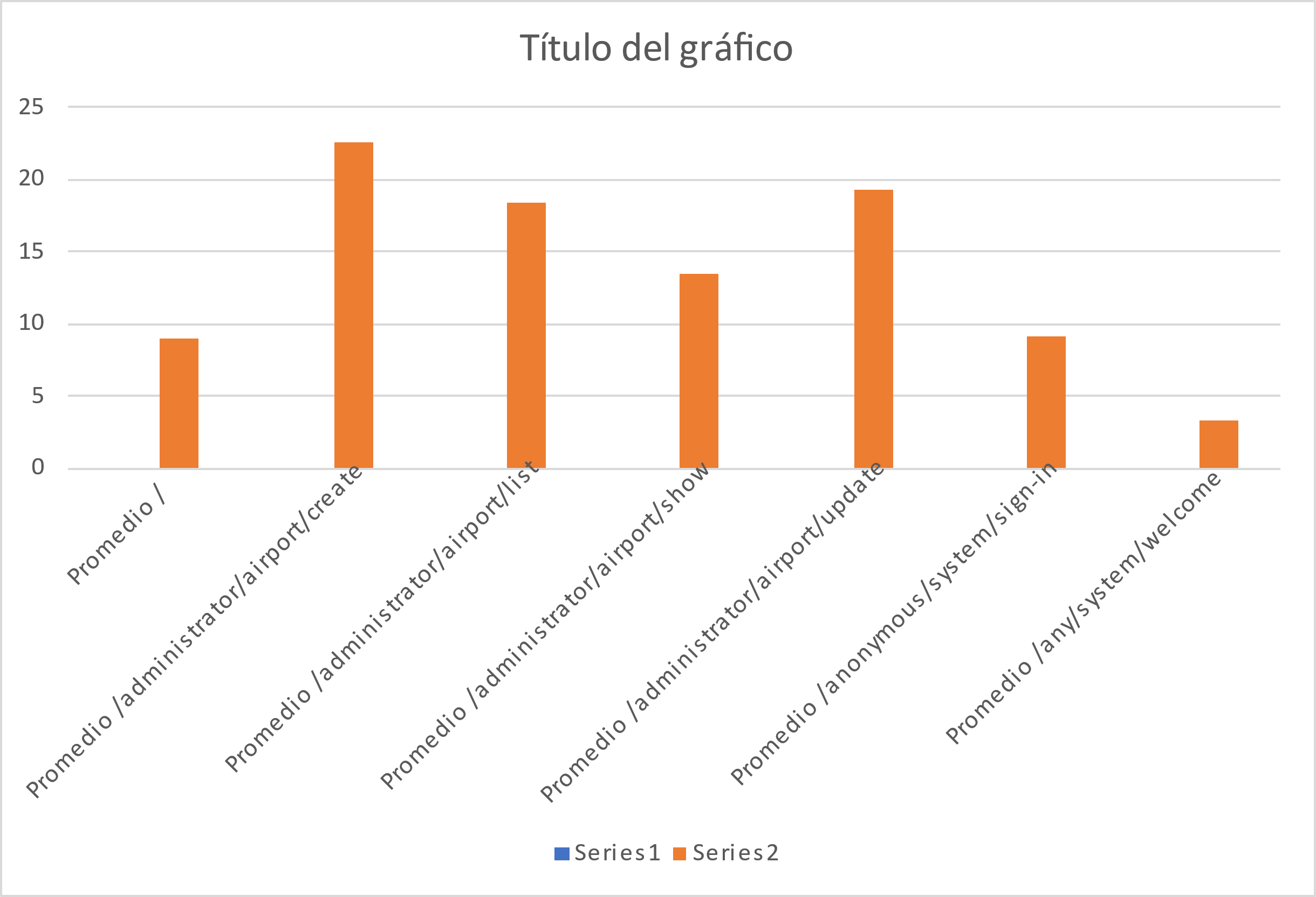
### Computer 1

For computer 1, the testing resulted in a 95% confidence interval from 15.09ms to 17.80ms and a mean of 16.44ms. The request with the highest response time was /administrator/airport/create with 85.21ms.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Response Time* | |  |  |  |  |
|  |  |  | Interval(ms) | 15.0917452 | 17.8057642 |
| Media | 16.4487547 |  | Interval(s) | 0.01509175 | 0.01780576 |
| Error típico | 0.68817491 |  |  |  |  |
| Mediana | 16.2265 |  |  |  |  |
| Moda | #N/D |  |  |  |  |
| Desviación estándar | 9.75656322 |  |  |  |  |
| Varianza de la muestra | 95.1905258 |  |  |  |  |
| Curtosis | 13.3862365 |  |  |  |  |
| Coeficiente de asimetría | 2.28138825 |  |  |  |  |
| Rango | 82.8921 |  |  |  |  |
| Mínimo | 2.3187 |  |  |  |  |
| Máximo | 85.2108 |  |  |  |  |
| Suma | 3306.1997 |  |  |  |  |
| Cuenta | 201 |  |  |  |  |
| Nivel de confianza(95,0%) | 1.3570095 |  |  |  |  |

### Computer 2

For computer 2, the interval was from 16.10ms to 19.21ms, with a mean of 17.66ms. The request with the highest response time was /administrator/airport/create with 76.53ms



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Response Time* | |  |  |  |  |
|  |  |  | Interval(ms) | 16.1082632 | 19.2161697 |
| Media | 17.6622164 |  | Interval(s) | 0.01610826 | 0.01921617 |
| Error típico | 0.78805022 |  |  |  |  |
| Mediana | 17.1031 |  |  |  |  |
| Moda | #N/D |  |  |  |  |
| Desviación estándar | 11.1725402 |  |  |  |  |
| Varianza de la muestra | 124.825655 |  |  |  |  |
| Curtosis | 7.78052111 |  |  |  |  |
| Coeficiente de asimetría | 1.96779195 |  |  |  |  |
| Rango | 74.705 |  |  |  |  |
| Mínimo | 1.8302 |  |  |  |  |
| Máximo | 76.5352 |  |  |  |  |
| Suma | 3550.1055 |  |  |  |  |
| Cuenta | 201 |  |  |  |  |
| Nivel de confianza(95,0%) | 1.55395326 |  |  |  |  |

### Comparison

The two-sample z-test for means resulted in a P(Z<=z) two-tail value of 0.24, which is over the alpha value for the 95% confidence level (0.05). With this in mind there is not enough evidence to ensure there is a significative change. Even with this we can see how the mean is higher in the PC2

|  |  |  |
| --- | --- | --- |
|  | *PC1* | *PC2* |
| Media | 16.4487547 | 17.6622164 |
| Varianza (conocida) | 95.1905258 | 124.825655 |
| Observaciones | 201 | 201 |
| Diferencia hipotética de las medias | 0 |  |
| z | -1.15983654 |  |
| P(Z<=z) una cola | 0.12305768 |  |
| Valor crítico de z (una cola) | 1.64485363 |  |
| P(Z<=z) dos colas | 0.24611537 |  |
| Valor crítico de z (dos colas) | 1.95996398 |  |

# Conclusions

We deeply tested all airline manager features to ensure maximum quality, having 100% tests passing, a really high percentage of test coverage and uncovered branches are not coverable.

After the performance analysis we can see a minor rise in execution time when using indices due to the cost of the indices being bigger than the advantage, they bring us because of the small database size.

# Bibliography

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