Software Requirements Specification

For

Aircraft Maintenance System Version

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Course: COMP2171 – Object Oriented Design and Implementation

Problem Statement

We want our software product to provide efficiency for the local aviation industry where aircraft maintenance engineers can spend more time fixing planes than doing tedious paperwork. Currently, the system used to log and calculate hours is tedious to use and consumes too much time.

If aircraft maintenance engineers are spending more time behind a computer than in the hangar ensuring aircraft are fit and safe to fly, they could be exhausted from the time it takes to use the system and the backed-up maintenance work to be done. This exhaustion could potentially cause the engineer to overlook any defects which may have catastrophic consequences. We will use an object-oriented program to automate most of the calculations that need to be done.

Functional Requirements

Requirement #1: Update Aircraft Component Maintenance status

Use Case:

Rationale: Each aircraft component has its own maintenance countdown and is required to be maintained after a specific set of hours. This system is necessary for keeping track of all the separate components and their individual countdowns..

User Requirement: The system shall allow the user to create a new entry in the plane’s status report

System Requirements: 1. The system shall accept date, time, aircraft name and flight time

2. The user shall be allowed to validate input and edit inputs before submission

3. The system shall allow the displaying of the plane’s new status report

Acceptance Criteria: 1. The system is able to save new maintenance rates after an update and display new status report entry 100% of the time

Relates to/Dependencies: This requirement relates to requirement numbers 2 and 3

Priority: High

Requirement #2: Organise list to prioritise aircrafts parts in need of maintenance

Use Case:

Rationale: Aircrafts with more parts in need of maintenance have a higher probability to experience failure of some nature. This can be avoided by doing maintenance check-ups on such aircrafts.

User Requirement: N/A

System Requirements:1. System shall assign each plane with a maintenance number based on how many parts need to be inspected.

2. System shall display a sorted list of planes from high maintenance number to low.

3. System shall display a sorted list of parts based on maintenance needs.

Acceptance Criteria: 1. The system is able to display a sorted list of planes from highest to lowest maintenance number.

Relates to/Dependencies: This requirement relates to requirement number 1.

Priority: High

Requirement #3: Calculate remaining hours until maintenance.-

Use Case:

Rationale: Each airplane part has a specified number of flight hours until they need to be serviced. Keeping track of this can be tedious due to the amount of parts and can lead to miscalculations.

User Requirement: The system shall accept values inputting in requirement 1.

System Requirements:1. System shall accept maintenance hours and flight hours and calculate the difference.

Acceptance Criteria: 1. The system is able to calculate the difference between the specified maintenance hours and the flight hours of each part.

Priority: High

Requirement #4: Display reports to the user

Use Case:

Rationale: Each aircraft has their own maintenance rate, and it is crucial to keep track of this. In addition, it is costly to maintain and replace parts/components. Therefore, reports need to be generated to keep track of the aircraft components status and the cost to maintain these components

User Requirement: The system shall display a specific report to the user based on what they selected

System Requirements:1. The system shall accept and store data such as maintenance cost, date, time and name of components in specific files which are your reports

2. The system shall give the users an update option which allows them to add more data in the report and their own comments

3. The system shall allow the displaying of the plane’s new status report or the monthly expense

4. the system shall save reports made so the user can check reports from previous months

Acceptance Criteria: 1. The system is able to display and save specific reports to the user

Relates to/Dependencies: this relates to requirement 1,2 and 3.

Priority: High

Requirement #5: . Alert user of upcoming maintenance.

Use Case: View Alerts, View Operations Report, View Components Report

Rationale: Due to the amount of parts that each plane has and the amount of planes that could possibly be in the aerodrome at any given point, it can be hard to keep track of which part needs to be serviced when.

User Requirement: The system will ask the user if they wish to view alerts

System Requirements:1. The system shall display a visible message informing the user upon login, of upcoming maintenance checks.

2. The system will calculate the time since the last update on a component

Acceptance Criteria: 1. The system is able to inform the user of upcoming maintenance checks.

Relates to/Dependencies: this relates to requirement 1,2

Priority: High

Requirement #6: Maintenance Documentation

Use Case:

Rationale: Proper documentation of each serviced part is needed. Inclusive of maintenance expenses and airworthy certification.

User Requirement: The system will prompt the user for maintenance documentation.

System Requirements:1. The system shall be able to accept the documentation associated with a serviced part.

Acceptance Criteria: 1. The system is able to accept the documentation.

Relates to/Dependencies: this relates to requirements 1,4,

Priority: High

Non-Functional Requirements

Performance Requirements

1. Any calculation will not take more than 10 seconds.
2. The displaying of any report will not take more than 15 seconds.
3. The generating of a monthly report will not take more than 15 seconds.

Safety and Security Requirements

- This software will ask the user to validate the data they enter as the data entered is extremely sensitive and if the user were to make a mistake it could lead to damage or possible loss.
- This software will create backups of data in order to prevent the loss of data due to file corruption or failure due to any third party interferences such as a power outage.
- There will be a simple login protocol where engineers have sole access to the system in which they will be able to input and retrieve the data generated. This will safeguard the data from being manipulated by persons who may want to change the data which may cause loss of property due product (plane) extending service life.

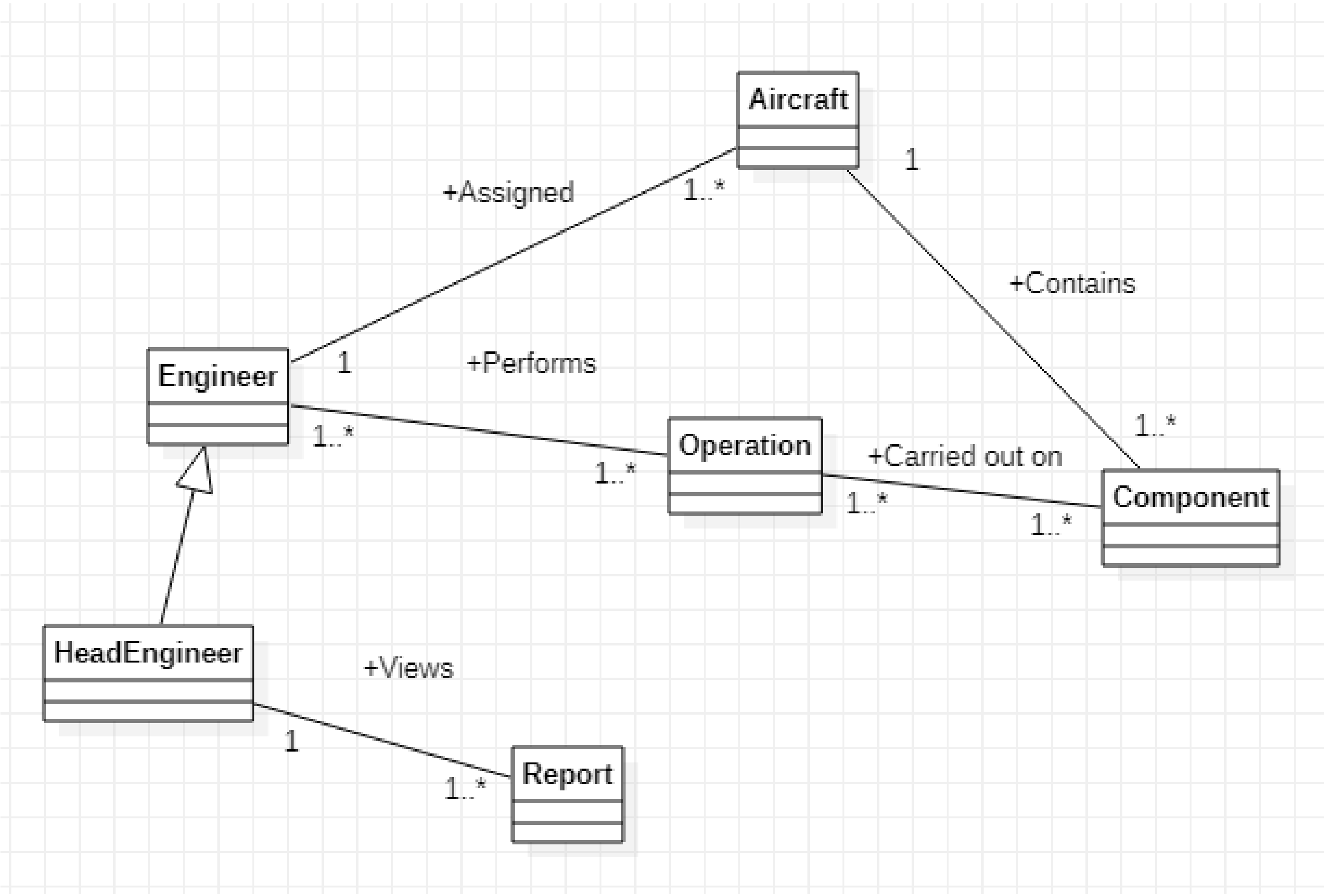
Software Quality Attributes

Correctness: This software will be correct in its calculations and reports through information given by the user.

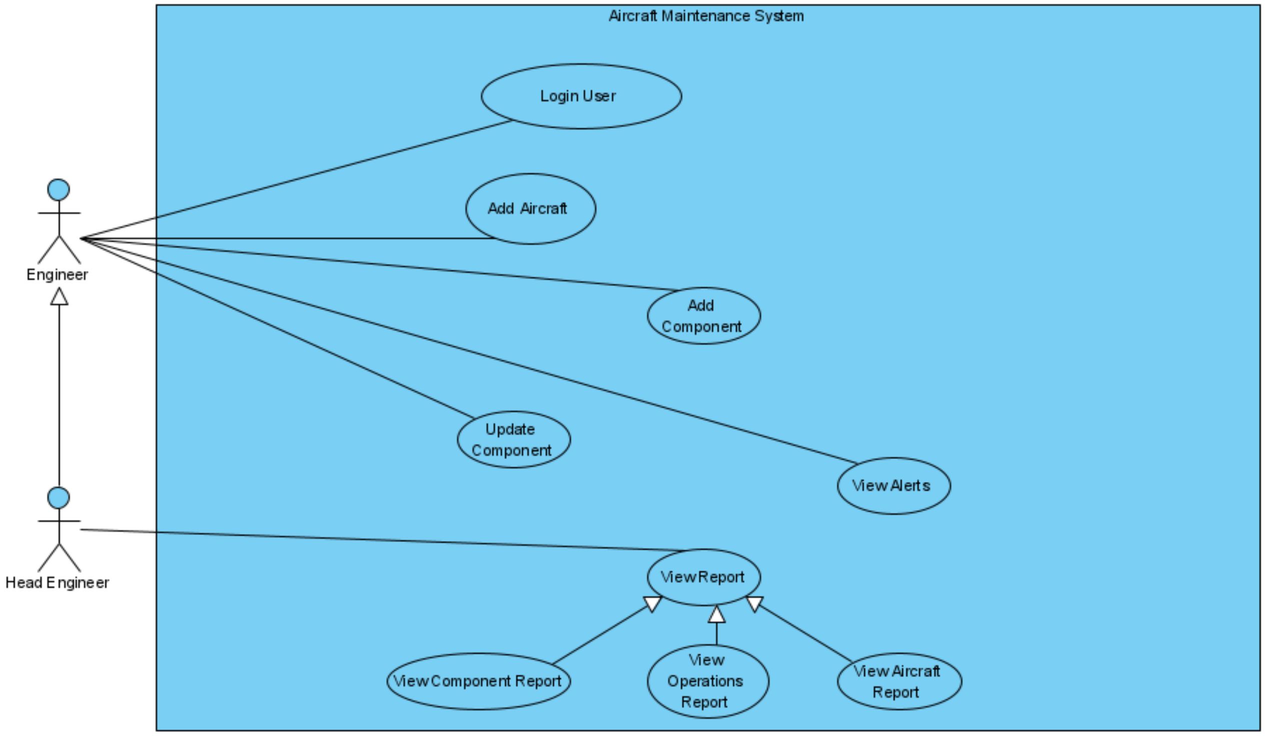
Usability: This software will satisfy a number of needs specified by the engineer.

Portability: This software will be portable as the platform the software will be using is Java which is executable on all major platforms.

Domain Model



Use Case Diagram



Use Case Description

Name	Login User
Related Requirements	
Goal in Context	An engineer can log in to the system so they can perform various actions such as viewing and updating information for aircrafts
Pre Condition	System must be available and running
Successful End Condition	Engineer logs in
Fail End Condition	System rejects user based on inaccurate login credentials
Primary Actors	Engineer, Engineer Credential Database
Trigger	User clicks the login button
Main Flow	1. User opens system and is met with a login screen on startup 2. User enter credentials and is either accepted or rejected

Name	Add Aircraft
Related Requirements	1
Goal in Context	To add a new aircraft to keep track of in the system
Pre Condition	System is functioning properly and engineer has logged in
Successful End Condition	A new aircraft has been added to the list of aircrafts
Fail End Condition	System fails to add a new aircraft
Primary Actors	Engineer
Trigger	Engineer select “Add Aircraft” option
Main Flow	1. Engineer clicks on “Add Aircraft” option and is shown a form to fill out the aircraft information 2. Engineer fills out form and attempts to add aircraft 3. System notifies user on whether the aircraft was accepted or not

Name	Add Component
Related Requirements	1
Goal in Context	To add a new component for a specific aircraft in the system
Pre Condition	System is functioning properly and engineer has logged in
Successful End Condition	New component added
Fail End Condition	Component fails to be added
Primary Actors	Engineer
Trigger	Engineer select “Add component” option
Main Flow	1. Engineer clicks on “Add Component” option and is shown a form to fill out details about the component 2. Engineer fills out details and the system confirms that the component is added

Name	Update Component
Related Requirements	1
Goal in Context	To update information about a component or several components on an aircraft
Pre-Condition	System is functioning properly and engineer has logged in with the proper credentials (has to be a head engineer)
Successful End Condition	Component/components have been updated
Fail End Condition	Information failed to be updated, User was prevented from attempting to update anything because they did not have permission to edit this information
Primary Actors	Engineer
Trigger	Head engineer clicks on the “Update Component” button
Main Flow	1. Head engineer clicks on the “Update Component” button 2. Engineer then has the option to choose whether they want to update a specific component or the flight time for the aircraft

Name	View Alerts
Related Requirements	5
Goal in Context	To alert and allow the engineer to view important information
Pre Condition	System is functioning properly and engineer has logged in
Successful End Condition	Engineer is alerted and can click “Okay” to dispel alert
Fail End Condition	Alert doesn't disappear
Primary Actors	Engineer
Trigger	Engineer logs in or clicks on “View alerts button”
Main Flow	1. Engineer logs in 2. Engineer is greeted with an alert or clicks on “View Alert” button 3. Engineer click “Okay” to dispel alert

Name	View Component Report
Related Requirements	5
Goal in Context	To show the engineer a generated report on a certain component or components
Pre Condition	System is functioning properly and engineer has logged in
Successful End Condition	Engineer is shown a report on the specific component/components requested
Fail End Condition	There is no report shown to the engineer
Primary Actors	Engineer
Trigger	Engineer clicks on “View Component Report” button
Main Flow	1. After clicking on “View Component Report” the engineer is then taken to a new screen so they can select what report they would like to see 2. Engineer selects and is shown a report.

Name	View Operations Report
Related Requirements	5
Goal in Context	To show the engineer a generated report on the recent operations that took place
Pre Condition	System is functioning properly and engineer has logged in
Successful End Condition	Engineer is shown a report on the recent operations that took place
Fail End Condition	There is no report shown to the engineer
Primary Actors	Engineer
Trigger	Engineer clicks on “View Operations Report”
Main Flow	1. After clicking on “View operations Report” the engineer is then taken to a new screen where it shows the title and dates of the different operations that have taken place on the aircraft components 2. Engineer selects a report and is shown the details of that report

Name	View Aircraft Report
Related Requirements	
Goal in Context	To show the engineer a generated report on the recent operations that took place and all components for a select aircraft.
Pre Condition	System is functioning properly and engineer has logged in
Successful End Condition	Engineer is shown a report on the aircraft selected
Fail End Condition	System fails to show report to the engineer
Primary Actors	Engineer
Trigger	Engineer selects “View Aircraft Report” button
Main Flow	1. After clicking on “View Aircraft Report” the engineer is then taken to a new screen where it shows the names and ID of the different aircrafts 2. Engineer selects a aircraft and is shown a report on the aircrafts