**Hydra Data Protection Tool**

Project Documentation Submitted

To the Faculty of School of

Computer Science and Information Technology

Of

Asia Pacific College

In Partial Fulfillment of the Requirements for the subject

Applied Projects 2 or Software Development

By

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# **Project Proponents**

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# **Abstract**

This project aims to create a forensic tool capable of preventing data corruption. The existence of data corruption began since the beginning of the automated technologies, and in the world manipulated by virtual information it is necessary for us to secure the information that we have. Information stored virtually are so fragile that in fact a single error or point of failure could cause your information to be corrupted. Data corruptions are something you’ll definitely hated if you’re one of those people who doesn’t do backup or does backup occasionally. The efforts that you’ve inserted and the time allotted for the file or document would gone to waste, and how devastating could the event if it we’re to happen to you? The researches of this paper would want to create a solution on this. And they figure out that the data corruption itself are inevitable since there are external factors that aren’t preventable. As the researchers continue the study, they’ve realized that data corruption prevention aren’t just limited on how could you avoid the event of corruption, but you could minimize or neglect the impact by considering the fact that it’s unavoidable and be always prepared of it.

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# **Introduction**

## Background of the Problem

Nowadays, technology is inevitable. From personal matter all the way to school works to professional works, researchers are inputting information to computers and other gadgets, thus, safeguarding is vital and crucial. They need to protect it not just from the hackers, who wanted to steal information for their own benefit, but also from being corrupted that will steal all the hard works and left you nothing but despair. These scenarios wherein the data itself becomes corrupted are due to hardware and software failures. Computers don’t have the ability to prevent nor retrieve because to them, it appears as the same data.

There are applications such as File Repair which identifies the corrupted data in your hard drive and creates a new usable file where it extracts much of the recovered data as possible. There is also an application called BadCopy pro where it recovers deleted files, formatted drive, or data loss due to damage, media errors, bad sectors and other reasons for flash drives and save the recovered files into a directory you specify. Another is application that offers safeguard is Microsoft Document, the approach that the Microsoft document does is deferent from file repair & other recovery applications such as BadCopy pro, since the Microsoft Document provides backup for your document in case it might be corrupted if the computer suddenly turns off, and it is a good practice since prevention is greater than cure. (BadCopy Pro - Flash Drive Data Recovery Software, n.d.) , (File Repair, n.d.)

As we have read the information, we can conclude that there’re a lot of application which fix and recover corrupted data, there are also application where they provide prevention mechanism to avoid having corrupted data. But the researches still think that all of this application is not enough.

## Statement of the Problem

Corrupted data had always been a problem in the computing industry, since most of the information are now stored in a mechanical device. A lot of factors can result to data corruption, such as software and hardware failures. There are identified tools or applications that can be used for in case of having corrupted data such as specified above. The researchers would like to know, how could they enhance the existing applications and how could they provide a better way in safeguarding your file from corruption.

## Project Context

Data corruption has always been a problem in computing. With the imminent implementation of internet of things, solutions on data corruption must be address to avoid future complications regarding data loss.

## Purpose and Description

People are expose to different security issues that revolves around the Security, Integrity and accessibility. The main essence of this research is to address availability issues that concerns data corruption. And to produce a tool capable of preventing the occurrence of corrupted data that can be easily used by non-IT people.

## Objectives

### General Objectives

* This Project aims to create a security algorithm that could save critical information from data loss.

### Specific Objectives

* To be able to provide an algorithm that could save someone’s information.
* To be able to give confidentiality control on the user’s information.
* To be able to innovate a low-learning curve security algorithm that is applicable to most people.

## Significance

A lot of applications that were made related to this project are mostly for corrupted data fixation and retrieval. The essence of this research is to provide a way on how to prevent having corrupted data by means of having an application that is capable of detecting and fixing corrupted data, preventing having corrupted data by providing a way to backup, and minimizing the existence of corrupted information in real-time. The issue of corrupted data already exists along with the advancements of mechanical technology. As said by Microsoft “No computer is failure proof, but preventive measurements and strategic planning can make a computer more failure resistant”. And this innovation offers more than that.

## Scope and Limitations

This Project aims to help students and/or office-workers to secure their information or data on availability issues, whom are using windows OS- 7 and higher. The project primarily focuses on data corruption and prevention. It also assumes that the interaction is just between the players of the system such as the admin, system, and user. The prevention of data corruption is only focus on text documents, and it is beyond the systems capability if the flash drive itself became corrupted since it should be the users’ responsibility to protect the hardware itself.

The flash drive that will be used should have a NTFS file structure with a memory space not below 4 gigabytes. The optimal performance of the application could be achieved if the memory space of the flash drive is less than 90%.

# **Related Literature**

## Data Corruption

The data corruption is commonly problem of people that uses computer in such of programmers, office worker and even students. The data corruption can identify when files and folders are relocated or missing, open file error such a file invalid error in which you cannot open a file, file name renamed by a gibberish file name, file permission and attribute are modified, computer frequently crashing without any reason, slow disk operation and disk activities appear to be very busy even there is not much going on in the computer. (Data Corruption Info, 2009)

## Causes of data corruption

The data corruptions have causes which these causes have bad effect in the computer. These are the causes of the data corruption: First, the data is corrupted due to of bad programming, this happen when your computer is shutdown or restart improperly like intentionally or unintentionally. For example, switching off the computer in a hurry or sometimes the computer occurs to the power shortage it may cause the system to freeze in which the user going to restart the computer manually and because of this event, the file in the computer can be lose or be corrupt due incomplete bit. Second, the Malware, this may have different approach to the corruption of the file, this may occur a loss bot on the data or can’t be open or it might be lost in the computer, when this thing happens to the computer it might became prone to viruses.

These kind of malware can enter to the computer in which cause the many hardware failures. Lastly, the poor software and hardware, these issue can also affect to data because even into these modern age technologies it is still rapidly changing so fast that some file that we try to save into our computer cannot compatible in which also lead to hardware and software failure. (Rita, 2004)

## Back Up

Many people of this modern technology may prone to lost their data and for some, it is hard to make their work do it all over again. Maybe it can change its work to better or worse and one thing it can solve its problem when it is the file is backed-up, now other people may wonder what is a back-up. Back-up is an operation or procedure of copies data to an alternative location, so it can be recovered if deleted or it becomes corrupted.

There are many ways on how to back up files, there are two types on how to back up file. First, by using an external drive it can be used to store another copy of the file. Second, it can be back-up files using the internet it has many potentials such as cloud storage device that can store the file in Google Drive, Dropbox and Microsoft OneDrive these services can help to back up the file just in case the file is deleted or even worse got corrupted. These kinds of back up may help to recover the file. (Stepanovska, 2015)

Checksum

The checksum is used for ensure of the integrity of the file on which it can transmitted into one device to another. This can happen through the internet or simply through two different computers that are connected into a single network simply to ensure the transmitted file to be exact as the source file. Checksum is the best option to use also not only to secure the transmission of the file between two or more devices but also it is responsible for calculating on hash function on which normally posted when downloading.

This is also responsible to verify and calculate the downloaded file for making sure that there the same. The most common checksum that can see in your computer are MD5 and SHA-1, there are both have a weak point, this means that any malicious tampering can be lead to two different files having same computed hash. Due to these issue the newer SHA-1 is the best cryptographic hash function so far due to no issue that has been attacked. (Kishore, 2015)

## File System

File system is a method of an operating system which it uses to track the file inside the disk of the computer also the way on how the disk organize the file in it. It is created to initialize or format the hard disk. There are different types of file system and the commonly used are FAT, FAT32, NTFS. The newest one is the NTFS or New Technology File System it supports by Microsoft Windows Server 2003, this allows the user to gain the maximum benefits of need to the today’s enterprise business environment. By using this file system, the larger the hard drive, the larger the default cluster size. Since, would be increase the performance at the expense of the amount of space efficiency. (NT file system; sometimes New Technology File System, 2008)

## Hash value

A hash value is a numeric value of a fixed length that uniquely identifies data. Hash value represents a bigger amount of data as much a smaller numeric values, so they are used with a digital signature. It can put a hash value more efficient than signing a large amount of its value, also the this is more useful for the verifying the integrity of the data that send through the insecure channels. The hash value of received data can be compared to the hash value of the sender to determined that what data is altered. (Ensuring Data Integrity with Hash Codes)

## An Analysis of Data Corruption in the Storage Stack

The difficult part of creating and designing a storage system is that is providing the reliability and the availability that the user expects and it is use to be persistent forever and perpetually available but the machine has not of flaws, there will always be a problem that appears. There are lot of number of problem that, if not dealt with can cause data loss in storage system, unfortunately one of the primarily cause of the data loss in the storage system is disk drive unreliability it is well known that hard drive are mechanical, moving device that can suffer a mechanical problem leading to a drive failure and data loss. (Bairavasundaram, 2008)

# **Technical Background**

Nowadays, due to the fast evolving modern technology, things are easier to access and control. As the people continue to make life easy, convenient, and comfortable different Security issues occur in the global community, that can risk someone’s life or even threaten the national security. When we talk about security everyone is involve and everyone are at risks of losing their future. Improving security from different aspects could help us reduce our exposure on threats that might end up taking all our assets or even our lives.

The most powerful tool in today’s society are computers, they are multi-purpose gadgets that are capable of manipulating binary’s, which are used to communicated all types of gadgets. But even though it’s powerful it is still vulnerable to data loss or corruption.

The researchers conducted a survey on how many college students have experience data corruption, and the results shows that 88% of the students have experience data loss due to factors such as hardware failures, software failures, malwares, and Unintentional deletion of file. 29% of the corrupted files was caused by a malware, 27% are due to software failures and 44% was caused by hardware failures.

# **Design and Methodology**

# **Results and Discussion**

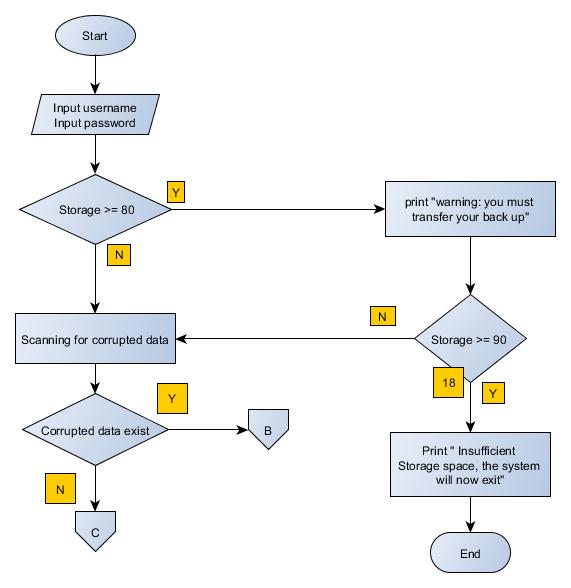
# **Conclusion and Recommendations**

# **Appendices**

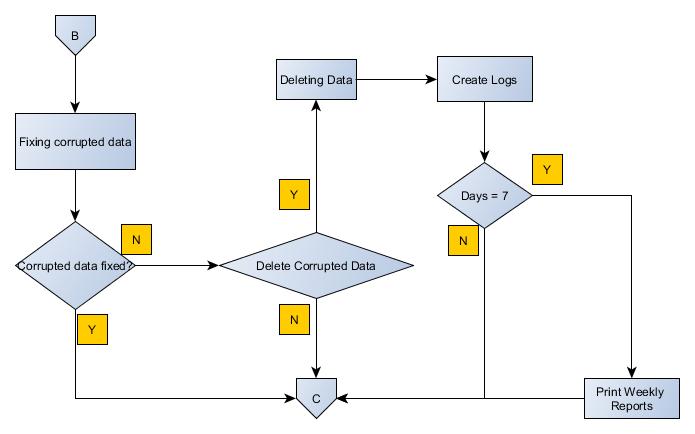
## Diagrams

### Flowchart

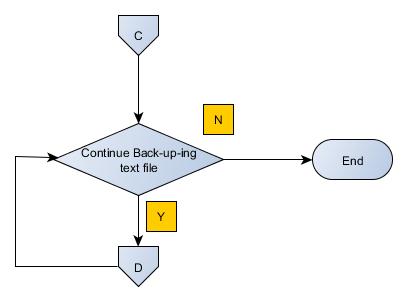
Main Program of Hydra Data Protection Tool



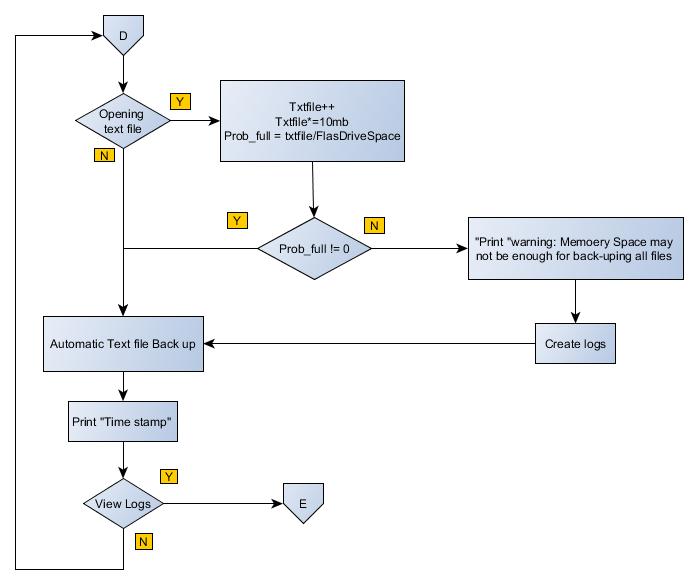
Fixation of Corrupted Text file



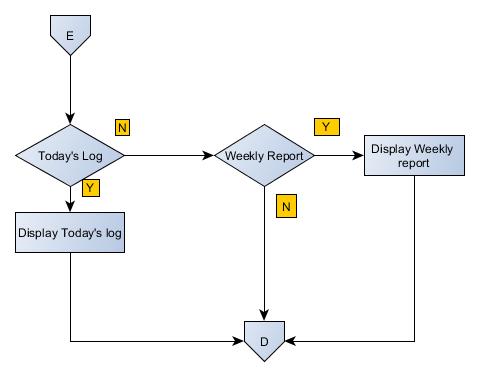
Continuation of Back-up



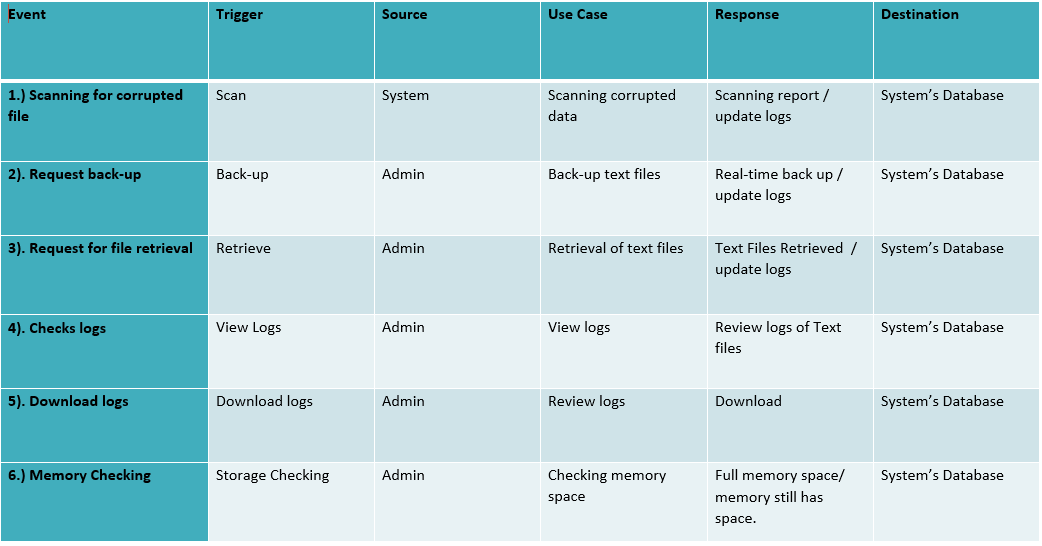
Flash Drive Space



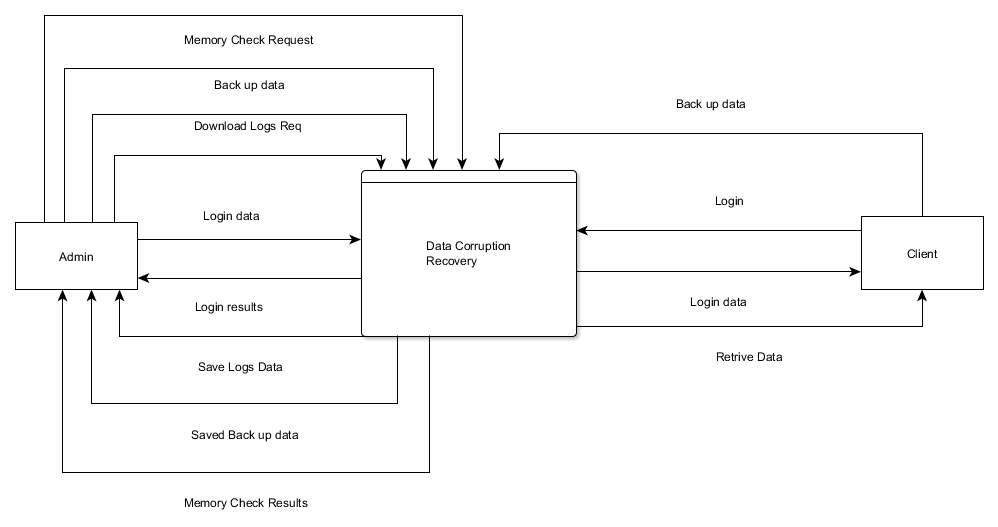
View Logs



### Event Table

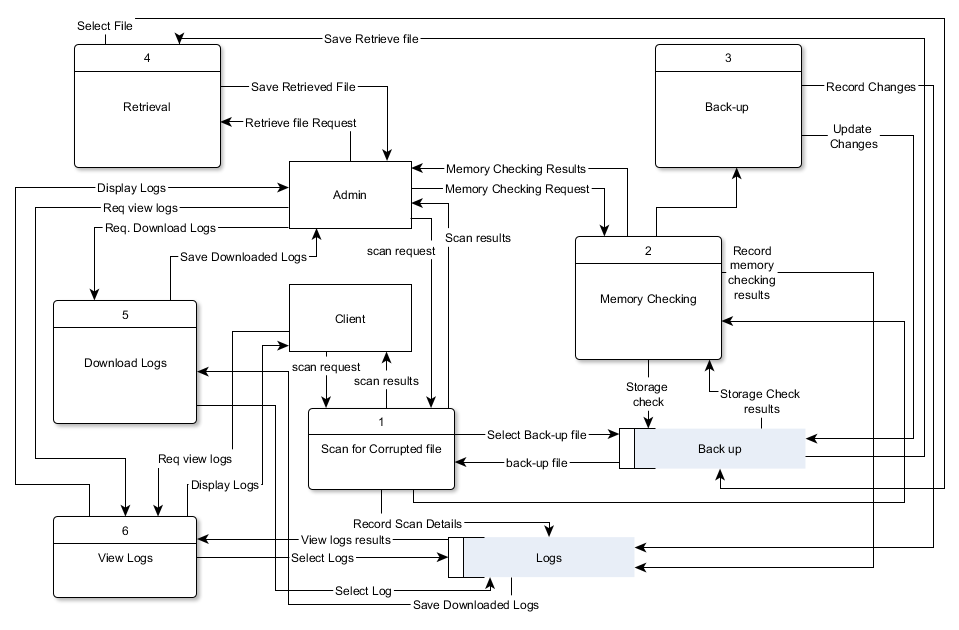


### Context Diagram

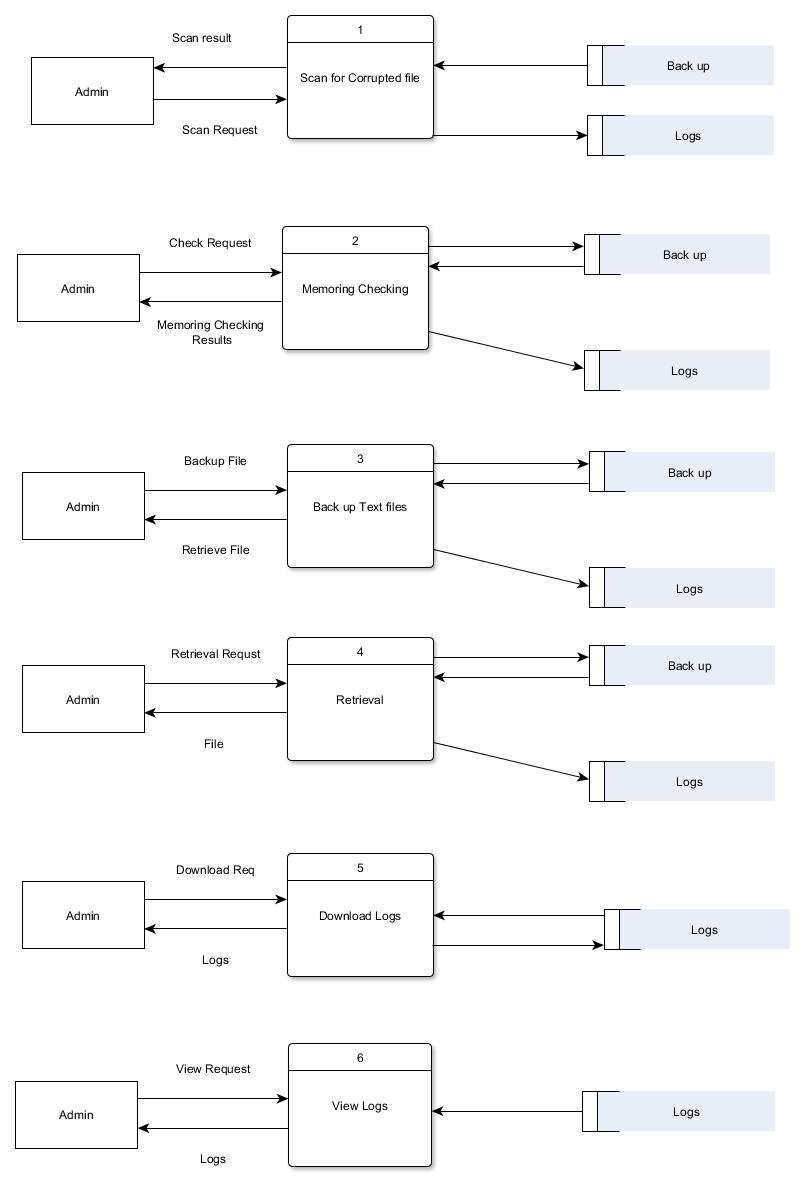


### Data Flow Diagram

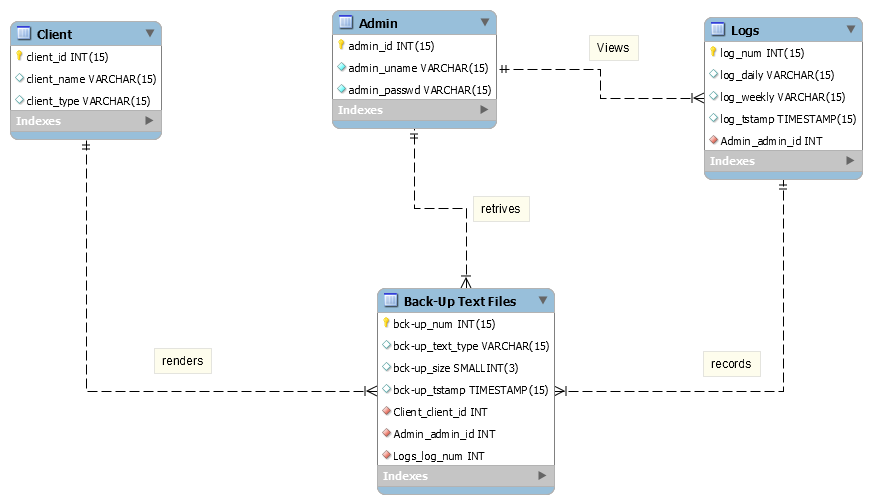
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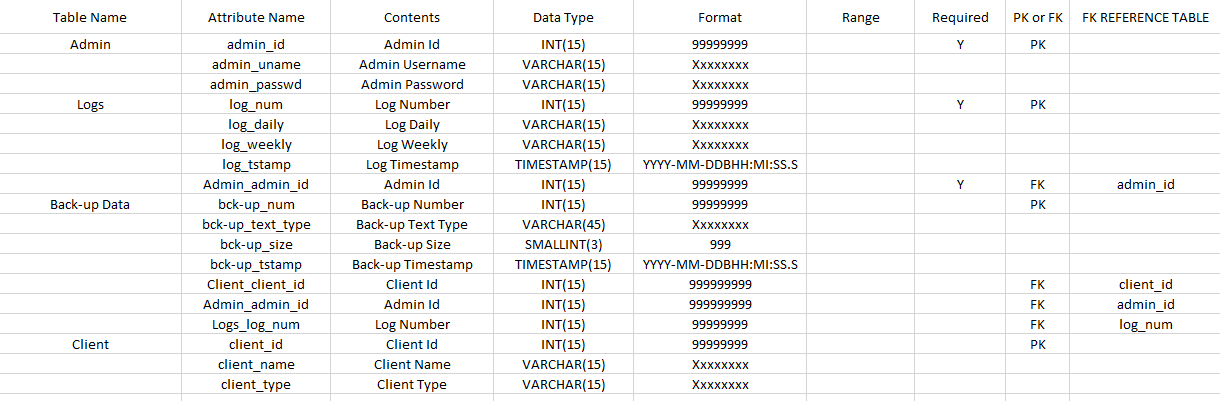
#### DFD Fragments



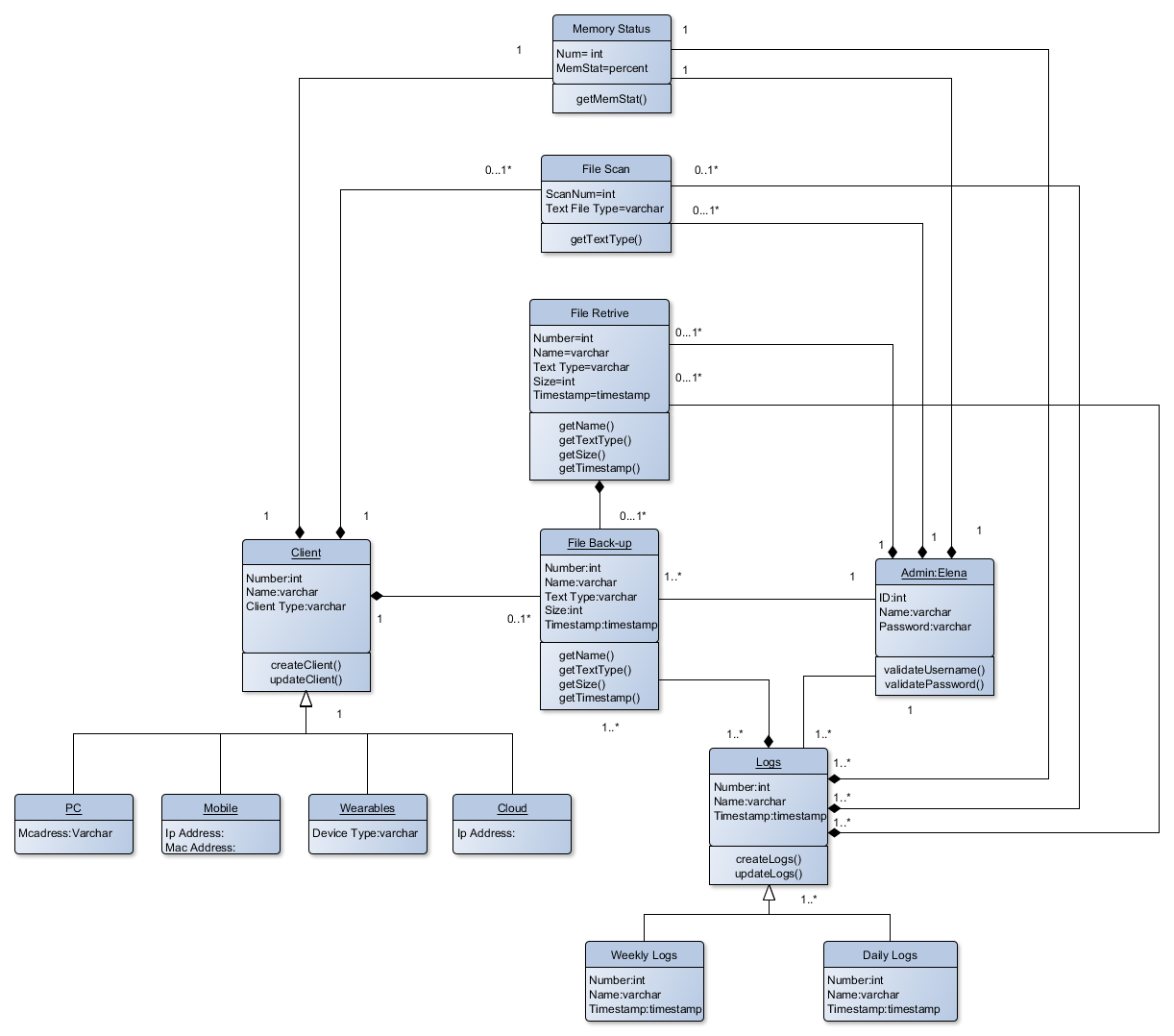
### Entity- Relationship Diagram



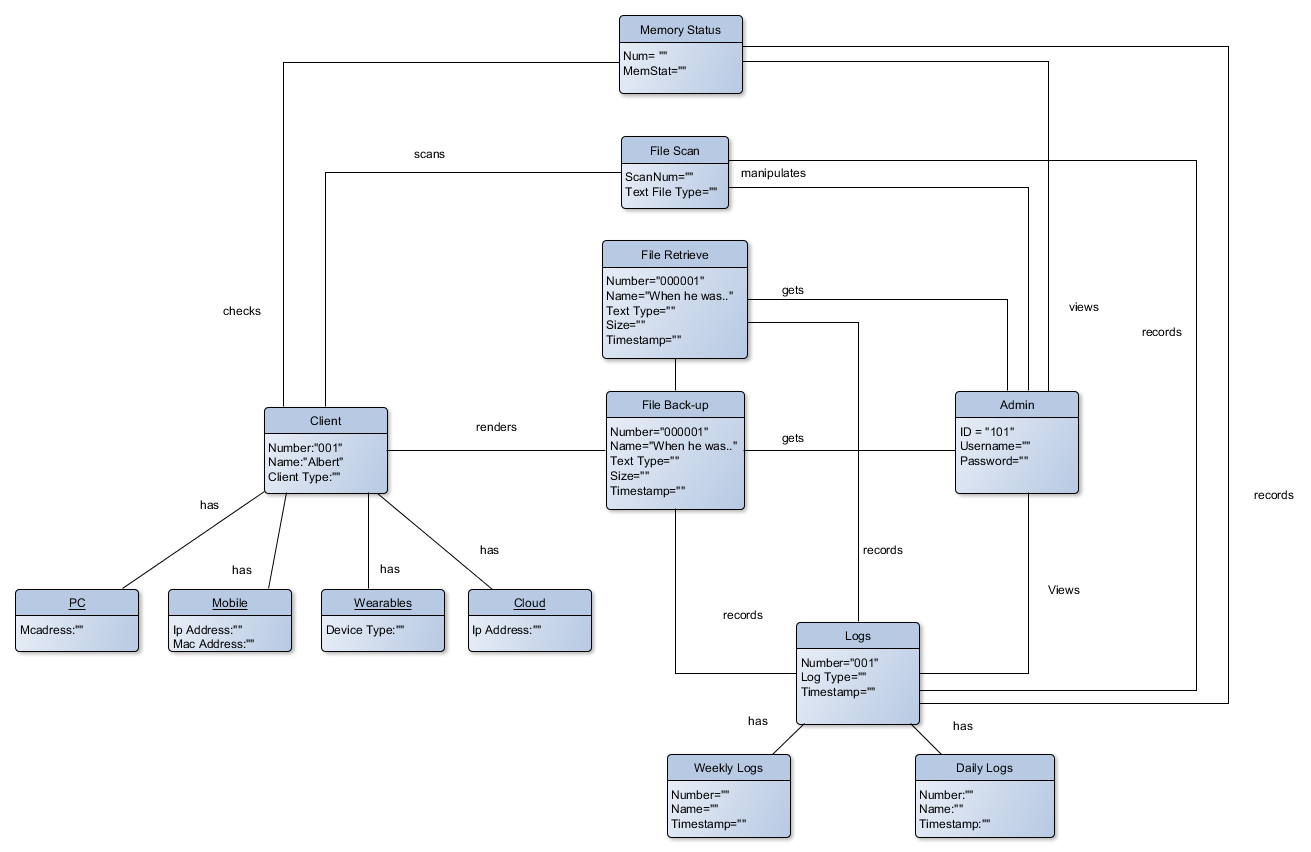
### Data Dictionary



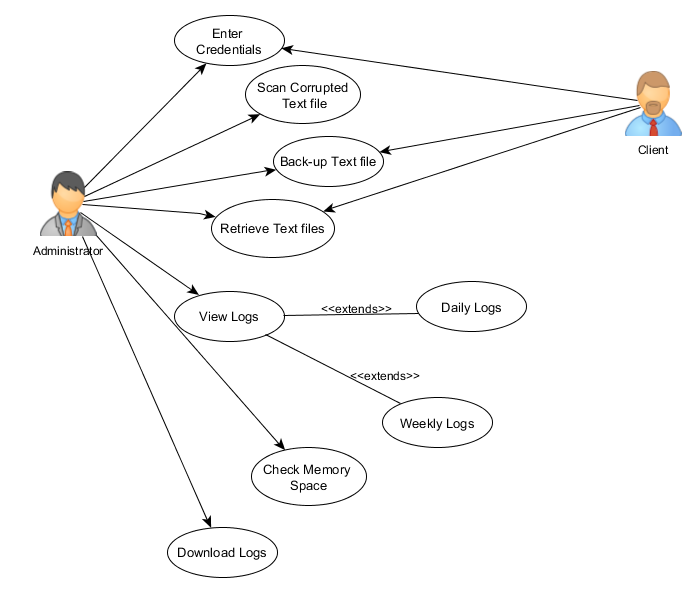
### Class Diagram



### Object Diagram



### Use Case Diagram



### Use Case Full Description

|  |  |  |
| --- | --- | --- |
| Number | PICDS-UC01 | |
| Use Case Name | User Authentication | |
| Scenario | User wants to Log in to the system | |
| Triggering Event | Log In | |
| Brief Description | When the admin access his files authentication is required. | |
| Actor(s) | Administrator | |
| Related Use Cases | ---- | |
| Stakeholders | Administrator, Client | |
| Precondition | User must plugin the Flash drive to the PC | |
| Post Condition | Administrator must able to access the system | |
| Basic Flow: | Actor’s Action | System’s Response |
|  | 1: Opens the application | 1.1: System displays the login page of the application |
| 2: User types its username/password |  |
| 3: User clicks login button | 3.1: System checks the database if the username and password is correct |
|  | 3.2: username and password matched System will message (SM01) |
|  | 3.3: System appears the main page of the application |
|  | 3.4: System scans for corrupted text file |
|  |  |  |
| Alternative Flow: |  | 3.2: If username and password of Administrator didn’t match |
|  |  | 3.3: System displays message (SM02) |

|  |  |  |
| --- | --- | --- |
| Number | PICDS-UC02 | |
| Use Case Name | User back-ups text files | |
| Scenario | User request for back-up | |
| Triggering Event | Back-up Text files | |
| Brief Description | As a prevention mechanism on data corruption, an automatic real-time backup is running on background. | |
| Actor(s): | Administrator | |
| Related Use Cases | User Authentication | |
| Stakeholders | Administrator, Client | |
| Precondition | User opens an text application | |
| Post condition | User was able to back-up the text file automatically while working on text application | |
| Basic Flow: | Actor Action | System Response |
|  | Step 1: User Plug’s in the Flash Drive | 1.1: System checks if the flash drive is less than 80% of the storage |
|  | 1.2: System scans for corrupted text file |
|  | 1.3: System will identify If the corrupted data can be fixed or not. |
|  | 1.4 Fix corrupted data |
| 2: User opens text file application | 2.1: System will start executing automatic real-time back up |
|  | 2.2: System will calculate if the storage can accumulate the back-up file. |
|  | 2.3: System backed-up text file |
|  |  |
|  |  |  |
| Alternative Flow: |  | 1.3: System will identify If the corrupted data can be fixed or not. |
|  | 2. User Agrees to delete corrupted data | * 1. Delete Corrupted data. |

|  |  |  |
| --- | --- | --- |
| Number | PICDS-UC03 | |
| Use Case Name | User views log | |
| Scenario | Admin views logs | |
| Triggering Event | View Logs | |
| Description | The changes made in the Flash drive are recorded in the logs. | |
| Actor(s) | Administrator | |
| Related Use Case | Use Authentication | |
| Stakeholders | Administrator | |
| Precondition | User is logged in as Admin | |
| Post Condition | User is able to view the in/out of text file | |
| Basic Flow: | Actor Action | System Response |
|  | 1: User view logs. | 1.1: System displays “Daily logs” and “Weekly logs” |
| 2. User select “Daily logs” | 2.1: System displays “Daily logs” page |
| 3. User select “Weekly logs” | 3.1: System displays “Weekly logs” page |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| Number | PICDS-UC04 | |
| Use Case Name | User retrieve text file | |
| Scenario | User wants to get the back-up text file | |
| Triggering Event | Retrieve Text File | |
| Brief Description | Admin retrieves files that were backed up. | |
| Actor(s) | Administrator | |
| Related Use Case | User Authentication, User Back-Up | |
| Stakeholders | Administrator, Client | |
| Precondition | User has a back-up text files | |
| Post condition | Admin was able retrieve the back-up files | |
| Basic Flow: | Actor Action | System Response |
|  | 1. Admin will Select & Copy the file to retrieve |  |
| 1. Admin will Paste the retrieved file. |  |

|  |  |  |
| --- | --- | --- |
| Number | PICDS-UC05 | |
| Use Case Name | Scan Corrupted Text file | |
| Scenario | User wants to know if there’s any corrupted text file | |
| Triggering Event | Scan | |
| Brief Description | System scans for the corrupted text file | |
| Actor(s) | Administrator | |
| Related Use Case | User Authentication | |
| Stakeholders | Administrator, Client | |
| Precondition | Admin is logged in | |
| Post condition | Admin was able to log out the system | |
| Basic Flow: | Actor Action | System Response |
|  | 1. Log In’s the application |  |
|  | 1. Automatically scans for the corrupted text file |

|  |  |  |
| --- | --- | --- |
| Number | PICDS-UC06 | |
| Use Case Name | Download Log | |
| Scenario | User wants to review logs | |
| Triggering Event | Logs | |
| Brief Description | To review the systems activity | |
| Actor(s) | Administrator | |
| Related Use Case | User Authentication, View logs | |
| Stakeholders | Administrator, Client | |
| Precondition | User must have logged in as Administrator | |
| Post condition | Admin was able to download the logs | |
| Basic Flow: | Actor Action | System Response |
|  | 1. Admin clicks “View Logs” | 1.1 Displays the View Logs page |
| 1. Admin clicks “Download Logs” | * 1. System download logs |

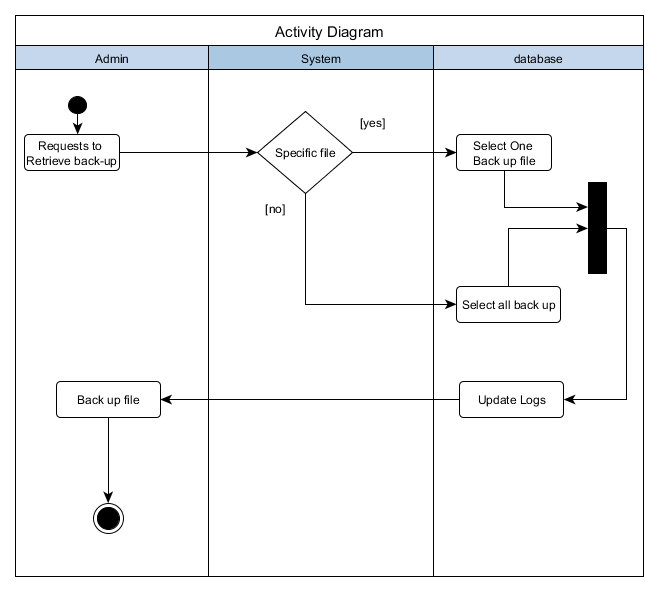
|  |  |  |
| --- | --- | --- |
| Number | PICDS-UC07 | |
| Use Case Name | Memory Check | |
| Scenario | User wants to know the memory space of the flash drive | |
| Triggering Event | Memory Checking | |
| Brief Description | Able to identify the available memory space of the flash drive | |
| Actor(s) | Administrator, client | |
| Related Use Case | User Authentication | |
| Stakeholders | Administrator, Client | |
| Precondition | User must have logged in | |
| Post condition | User was able to know the memory space of the flash drive | |
| Basic Flow: | Actor Action | System Response |
|  | 1. Enter credentials | 1.1 Automatically Scans for the corrupted text file |
|  | 1. Scanned Complete |
|  |  | 1. Checks the memory space |

|  |  |  |
| --- | --- | --- |
| Number | PICDS-UC08 | |
| Use Case Name | Log out | |
| Scenario | User wants to log out from the system | |
| Triggering Event | Log out | |
| Brief Description | Log out from the system | |
| Actor(s) | Administrator | |
| Related Use Case | User Authentication | |
| Stakeholders | Administrator, Client | |
| Precondition | Admin is logged in | |
| Post condition | Admin was able to log out the system | |
| Basic Flow: | Actor Action | System Response |
|  | 1. Clicks the Logout button |  |
|  | 1. Destroys the session and logs out from the system 2. Displays the Log In page |

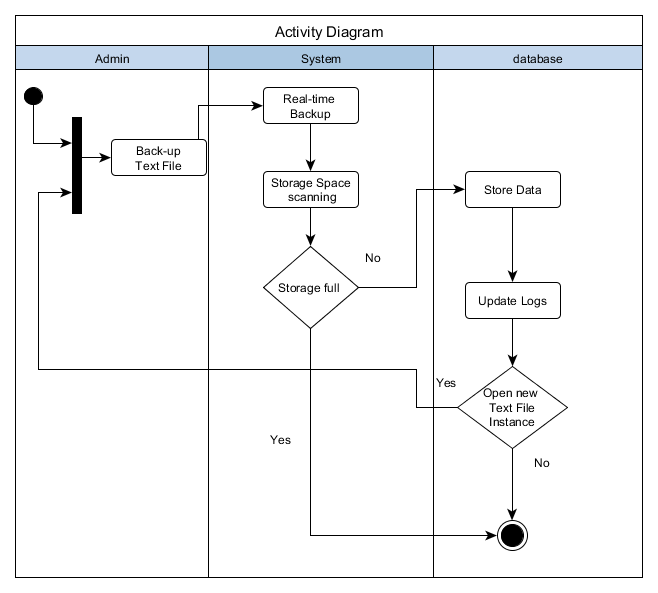
|  |  |
| --- | --- |
| System Message | |
| SM01 | You logged in successfully! |
| SM02 | Username or password is incorrect! |

### Activity Diagram

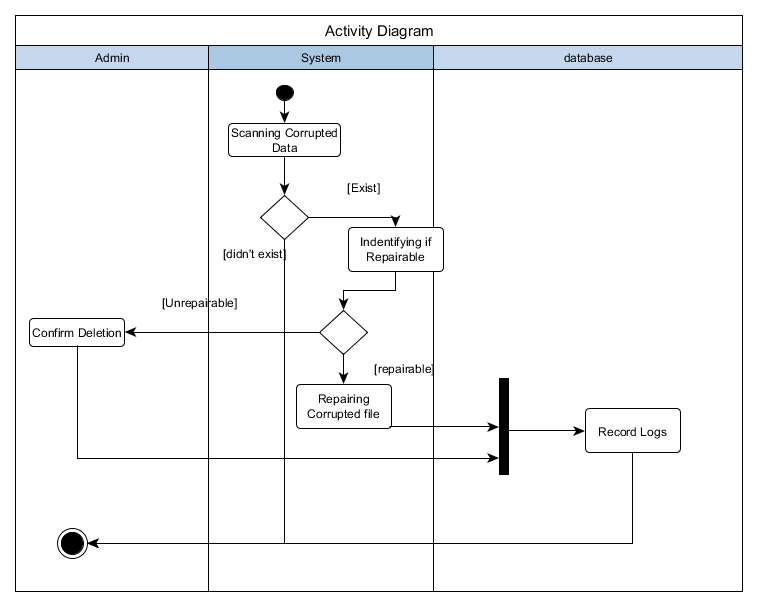
Back- up



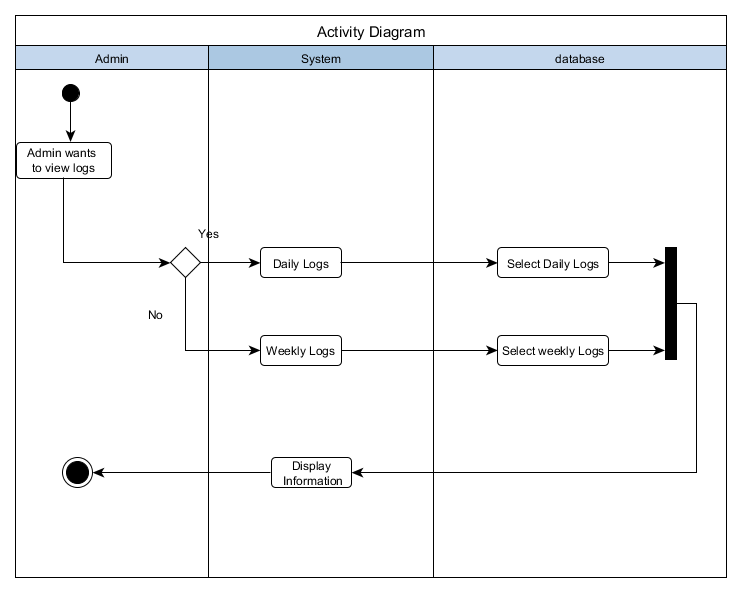
Memory Check and Scanning



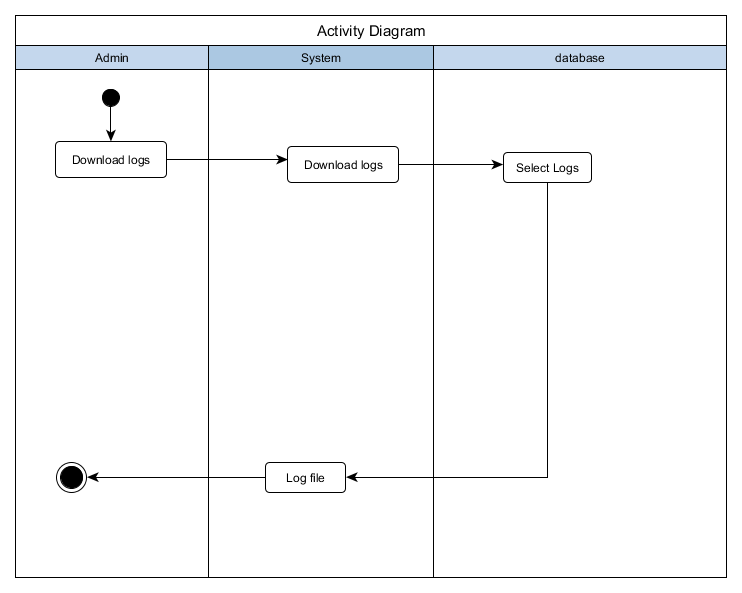
File Scanning



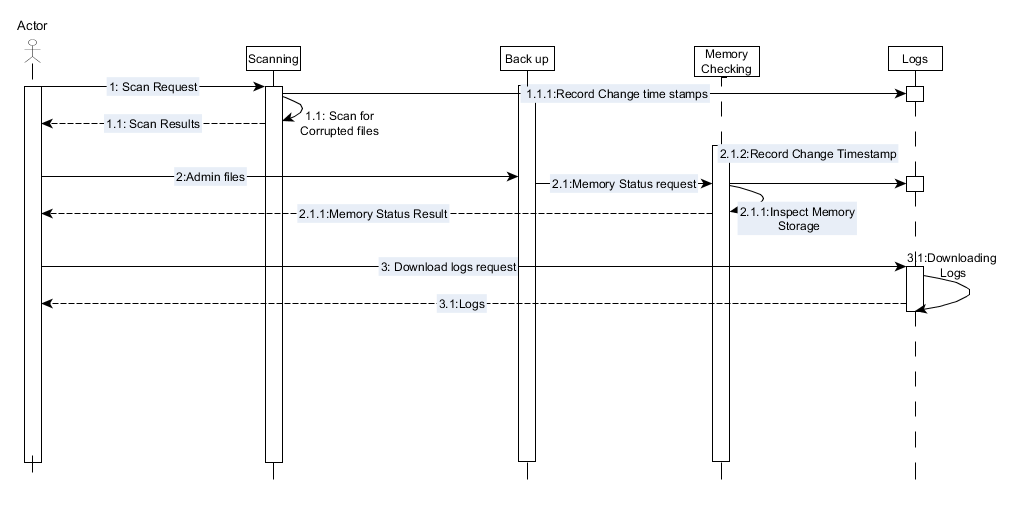
View Logs



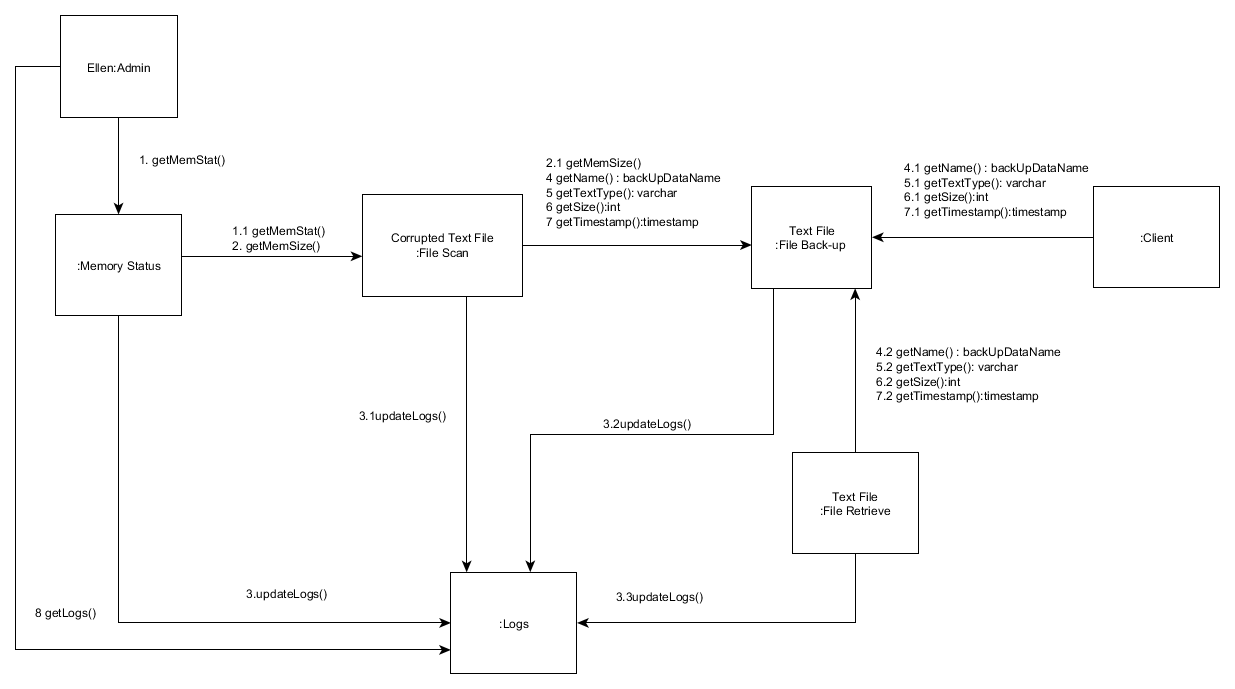
Download Logs



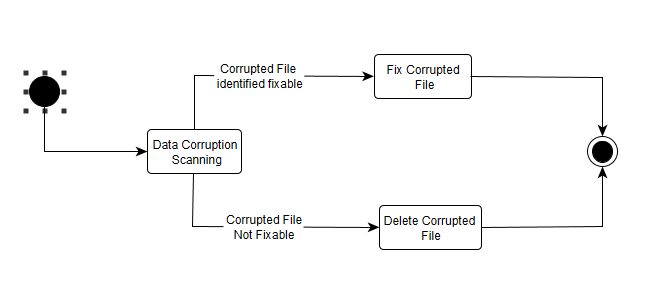
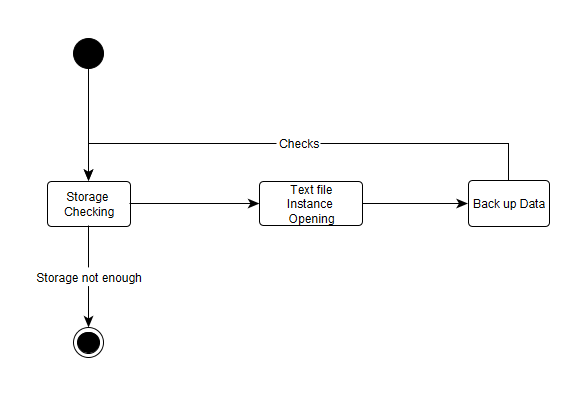
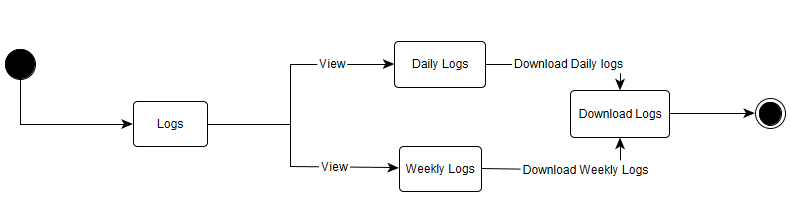
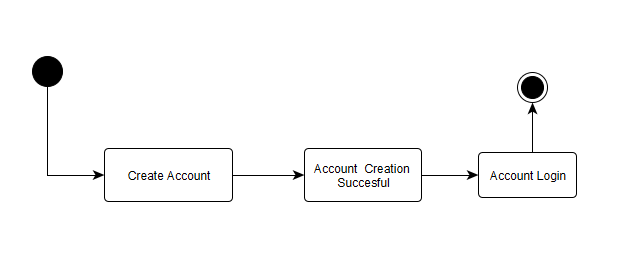
### Sequence Diagram



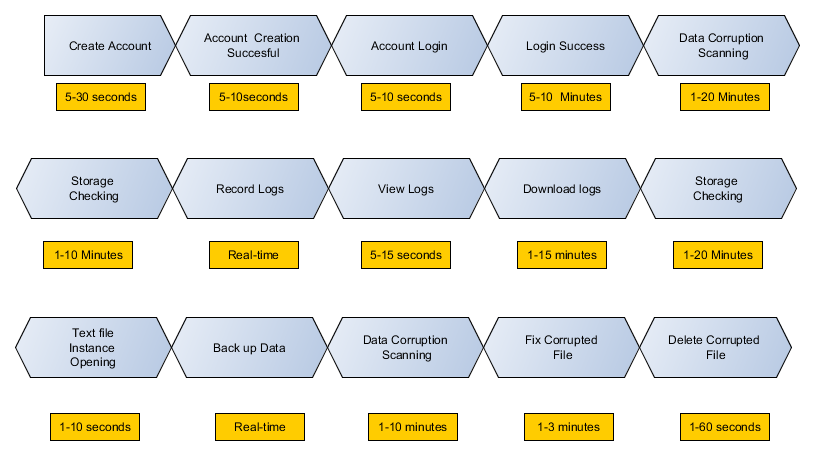
### Communication Diagram



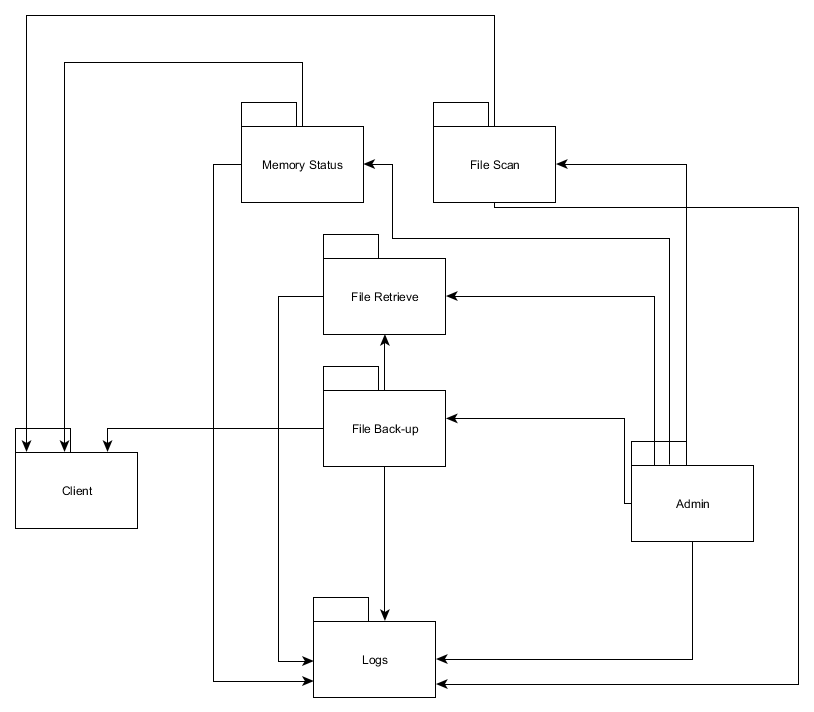
### State Diagram



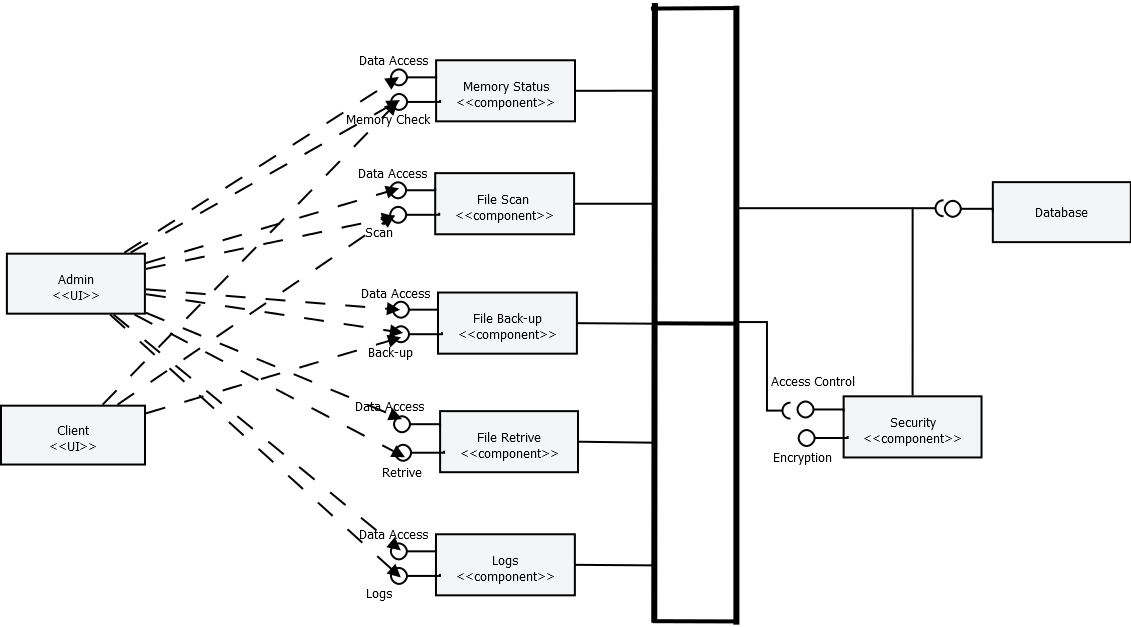
### Timing Diagram



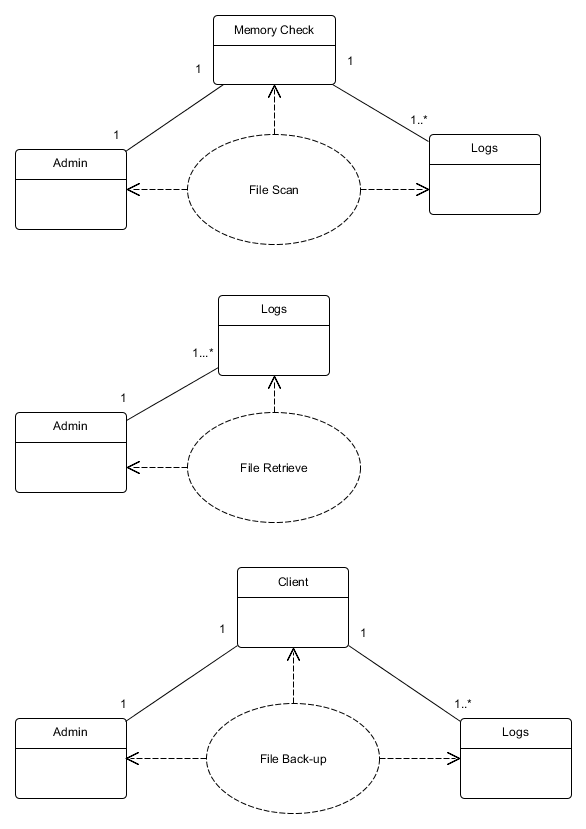
### Package Diagram



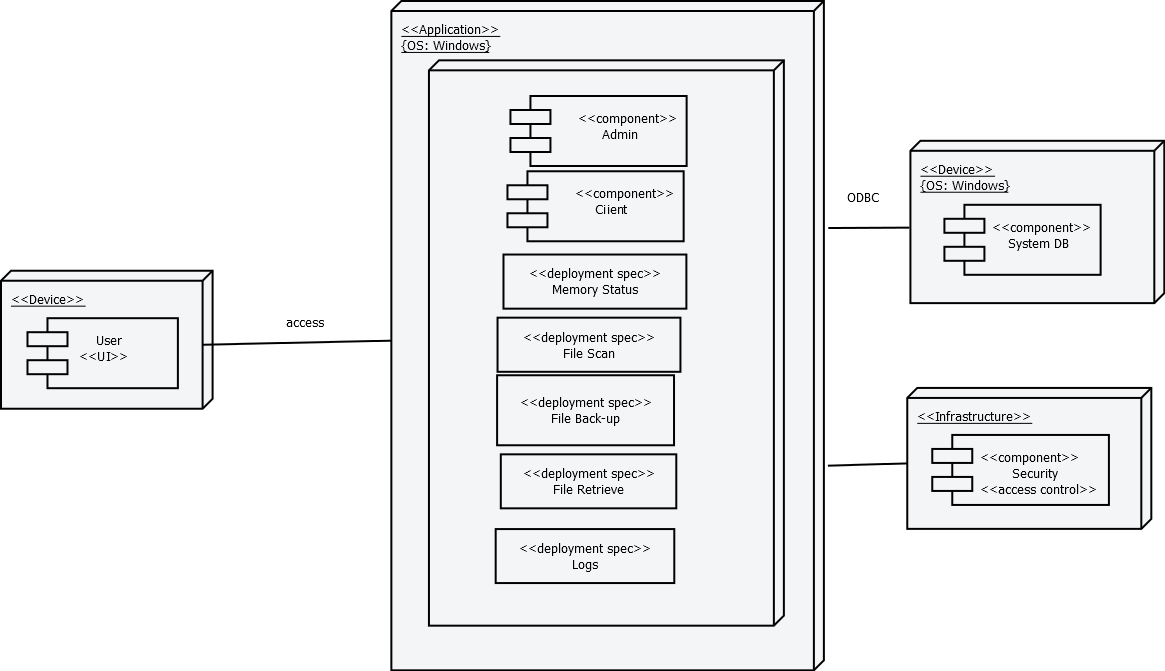
### Component Diagram



### Composite Structure Diagram



### Deployment Diagram



## Project Vision and Scope Document

## Business Requirements

Since the application is completely researched based, the teams together with its adviser establish the requirements needed, which are the following:

* Able to provide a real-time back-up.
* Able to store changes in logs.
* Able to monitor memory capacity.
* Can detect data corruption in the back-up storage.

### Background

The research idea came from an experience of one of the team member’s experience on data corruption. As he was creating a text document to his subject a sudden power outage occurs, and that all the effort inserted onto that document turn to waste and the he felt despair. Then the conceptualization of data corruption prevention came into their minds.

### Business Opportunity

The potential market of this innovation are those people whom using external storage devices or flash drives, which contents are often, made up of text documents.

Most people thought that maintaining back-up is a chore. These is a problem that can be considered as an opportunity, since the innovation offers real-time back-up, people would consider using a much easier tool such as this innovation, as compared to a manual back-up.

### Business Objectives and Success Criteria

The objective of this innovation is to provide a handy tool that can be easily used by the consumers. The tool should be capable of real-time back up, monitoring changes that are stored in logs, scanning for data corruptions. Success is achieved if the three main functions are working properly.

### Customer or Market Needs

In the time and aged we had, most of the people keep their documents in soft copies and have had own personal laptops or desktop computers. But some of them aren’t doing back-up on their files as a practice or routine. The system introduces real-time back up and it’s embedded in the flash drive that can be brought anywhere. With this, the issue on manual back-up is addressed, such as maintaining a weekly or monthly routine to back-up file. It provides security on data in event of corruption.

### Business Risks

One of the risk that the developers trying to manage is the lack of knowledge since the area of data corruption has a wide range of variations, and the researchers require vast knowledge on data corruption. Another risk is that the time constraint of the team developers.

## Vision of the Solution

The solution would gradually evolve and later include other file type that contains video and music to be back-up in real-time. The system should be further developing to be more efficient.

### Vision Statement

We tend to provide users an easy way to protect their files or information from sources of corruption, with the least learning curve needed, with real-time capabilities, and handy.

### Major Features

1. **Real-Time Back Up** – In this feature, while the user is working on its text file, it will automatically save and back-up the file.
2. **Synchronization** - While the user is working on the file, the work that has been done is saved gradually.
3. **Mobile** – The application can be with the user anywhere and anytime.

### Assumptions and Dependencies

There are assumptions made during the creation of the project and it is necessary since it is out of the scope of the project but could probably have an impact to the system.

* It is assumed that the computers are properly equipped with anti-virus such that the storage device wouldn’t be affected by any malicious program.
* The user is responsible enough to protect the hardware, where the software is stored.

## Scope and Limitations

This Project aims to help students and/or office-workers to secure their information or data on availability issues, whom are using windows OS- 7 and higher. The project primarily focuses on data corruption and prevention. It also assumes that the interaction is just between the players of the system such as the admin, system, and user. The prevention of data corruption is only focus on text documents, and it is beyond the systems capability if the flash drive itself became corrupted since it should be the users’ responsibility to protect the hardware itself.

The flash drive that will be used should have a NTFS file structure with a memory space not below 4 gigabytes. The optimal performance of the application could be achieved if the memory space of the flash drive is less than 90%.

### Scope of Initial Release

During the initial release of the system, a handy flash drive is produced which is capable of real-time back up on text file. It also records any changes stored in logs and capable of scanning data corruption that exist in the back-up flash drive.

### Scope of Subsequent Releases

In subsequent release, the software capabilities will include other file types to be back-up in real-time. The bugs or problems during the initial release would be fixed.

## Business Context

### Stakeholder Profiles

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Stakeholder** | **Major Value** | **Attitudes** | **Major Interests** | **Constraints** |
| User | Improves the system. | Reports errors and bugs. | error correction; ease of use; high reliability | Limited access |
| Administrator | Monitors the overall system. | Keen in detecting errors and bugs. has a lot of patience | Determining and fixing inconsistencies; easy to use | Budget |

### Project Priorities

|  |  |  |  |
| --- | --- | --- | --- |
| **Dimension** | **Driver (state objective)** | **Constraint (state limits)** | **Degree of Freedom (state allowable range)** |
| Schedule | release 1.0 to be available at the end of the course | Time constraint | 90-100% of the utility functions must be done. |
| Features | The main functions must properly working | Real-time back up are focused on text-files only at release 1.0 | 70-80% of high priority features must be included in release 1.0 |
| Quality | Provides easy tool to the consumers to use. | Errors and bugs are expected to occur at release 1.0 | 90-95% of user acceptance tests must pass for release 1.0, 95-98% for release 1.1 |
| Staff | Objective oriented persons that aim for completion. | maximum team size is 6 developers + 4 testers | 90-100% of the allowable time should be achieve for release 1.0 |
| Cost | Expenses should not exceed the maximum budget. | Maximum budget | budget overrun up to 15% acceptable without executive review |

### Operating Environment

The application would be placed in an external storage device or flash drives. The foundation of the software will be scripts and java language. The users of the system will often be students or office workers; this also means that the software will function 24 hours regardless of geography since the target are office workers, which office hours are during day and night, though it will be expected to have more work load during days since both students and office workers are present.

## Project Statement of Work

### Introduction/Background

The existence of data corruption has always been an issue in technology. Data that traverses through devices are important in today’s society. Most of the transactions right now is converted to a much easier mechanize system. The number of people whom using automation increases together with their data usage while there are only few ways to protect themselves from data corruption. The most popular is the back-up of data. Usually data back-up is done as a weekly routine so that if failure occurs in some point in time, then you can at least recover the files that you have during the past week.

Since this practice can actually consume a lot of time and effort, the team of data corruption conceptualizes an idea of creating a software application that could offer a real-time back up capability. To address the problem that could potentially harm a lot of people.

### Scope of Work

The scope of work for the innovation includes all planning, execution, implementation, testing and training that would outperformed the existing solutions on data corruption. Each stage of the project will be documented and will properly be guided by its adviser. The feedback would be acquired through series of survey after the application was created.

### Period of Performance

Since time is of the essence, each day should properly be scheduled to ensure that the final product would be finished on time. The period of performance is one year (365 days) beginning on july 17, 2016 through july 18, 2017.

### Place of Performance

The area where the researches and developers are mostly on the vicinity of Asia Pacific College or the school where the researchers and developers started the project and on the Villamor air base. The researchers are required to have a meeting at least once a week, to monitor the overall progress of the system to prevent delays from happening.

### Work Requirements

As part of the Data corruption project, the team will be responsible for performing tasks throughout various stages of this project. The following is a list of these tasks which will result in the successful completion of this project:

Kickoff:

* The researchers will research and educate themselves on different ways how to solve the issue of data corruption.
* The researchers will create a scheduling of task that can be presented through a WBS.
* The researchers will present the plan to its adviser for approval.

Design Phase:

* Create site design based on collected requirements
* Develop site design proposal for a panel to review and approval
* Present written status at weekly meeting

Build Phase:

* Researchers will complete all coding for approved site design
* Researchers will provide their adviser with a detailed testing plan
* Researchers will include all content provided by the adviser on redesigned software
* Researchers will resolve any coding and site issues identified in testing
* Present written status at weekly meeting

Implementation Phase:

* Researchers will implement the newly redesigned software on an external storage device or flash drive.
* Present written status at weekly meeting

Training Phase:

* Researchers will provide training in accordance with approved training plan provided in the kickoff
* Present written status at weekly meeting

Project Handoff/Closure:

* Researchers will provide the adviser with all documentation in accordance with the approved project plan
* Researchers will present project closure report to adviser for review and approval
* Researchers will complete the project requirements checklist showing that all project tasks have been completed
* Present written status at weekly meeting

### Schedule/Milestones

The below list consists of the initial milestones identified for the Website Redesign Project:

RFP/SOW Release Oct 13, 2016

Period of performance begins Oct 26, 2016

System Design Review November2, 2016

Website Implementation Review November 10, 2016

Implementation Complete November 20, 2016

Development November 20 – Feb 19, 2017

Training Complete February 20, 2017

Project Completion Review February 25, 2017

Project Closure/Archives Complete March 3, 2017

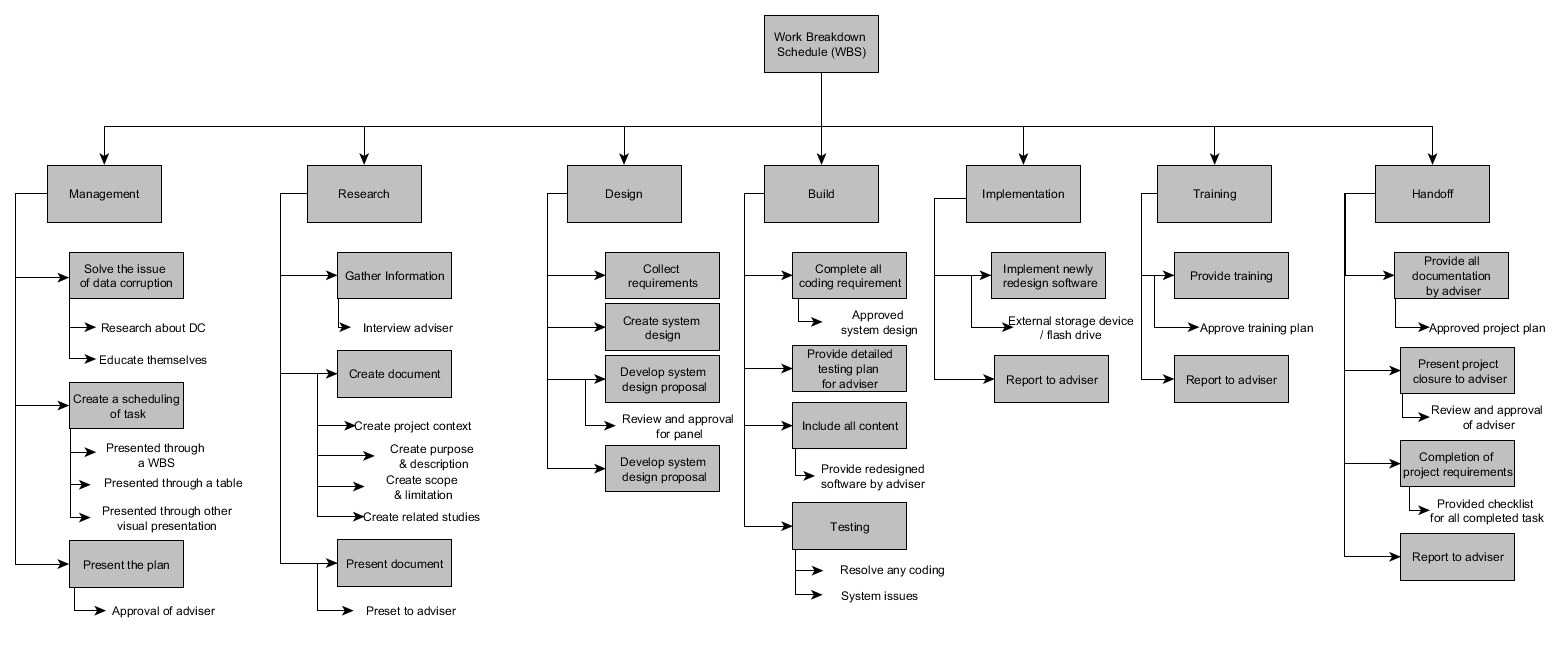
### Acceptance Criteria

For the data corruption project the acceptance of is accomplishing at least 90-100 % of the mile stone deliverable. Each milestone would be check and consulted by the projects consultant and advisor, to check if there are existing inconsistencies that should be check or corrections that has been made. Any problem that would be identify during the creation would be solved by the team’s developer. This project would have considered accepted if all the main functions was observing and all the task and miles stones was finished.

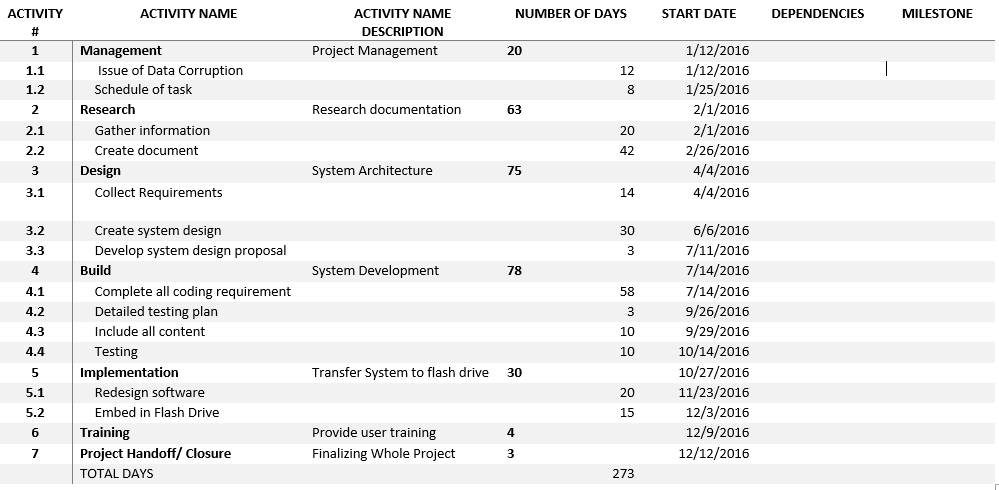
### Other Requirements

All programming and testing will be done in the vicinity of Asia Pacific College or in the Villamor Air Base. A network outage will be scheduled for the implementation phase of this project. Prior to the network outage, all servers will be backed up and a notification will be distributed to all users.

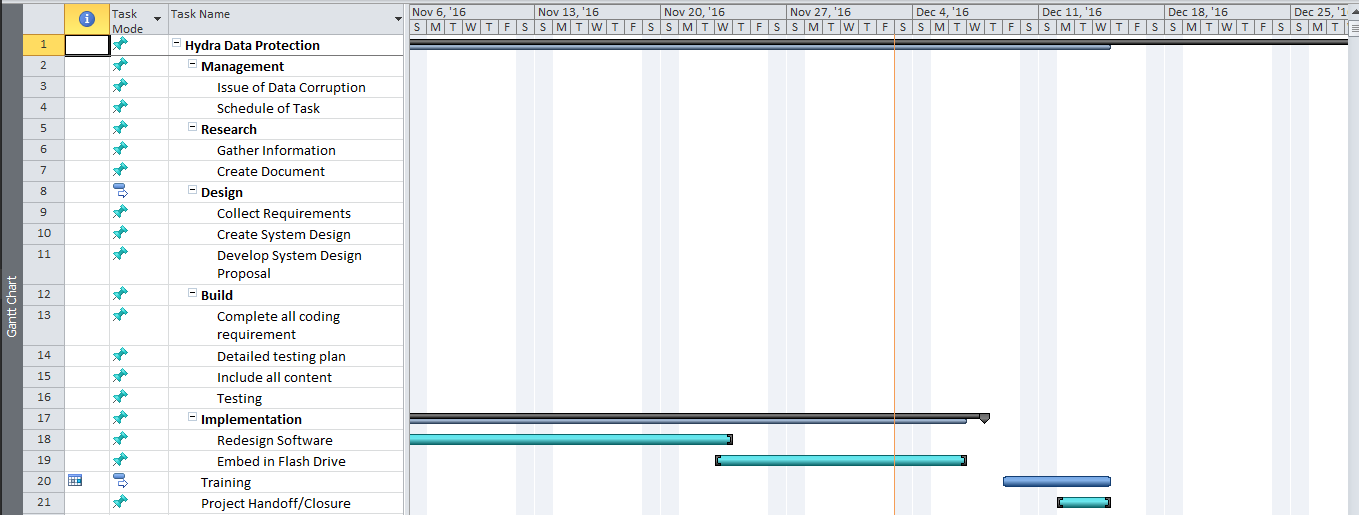
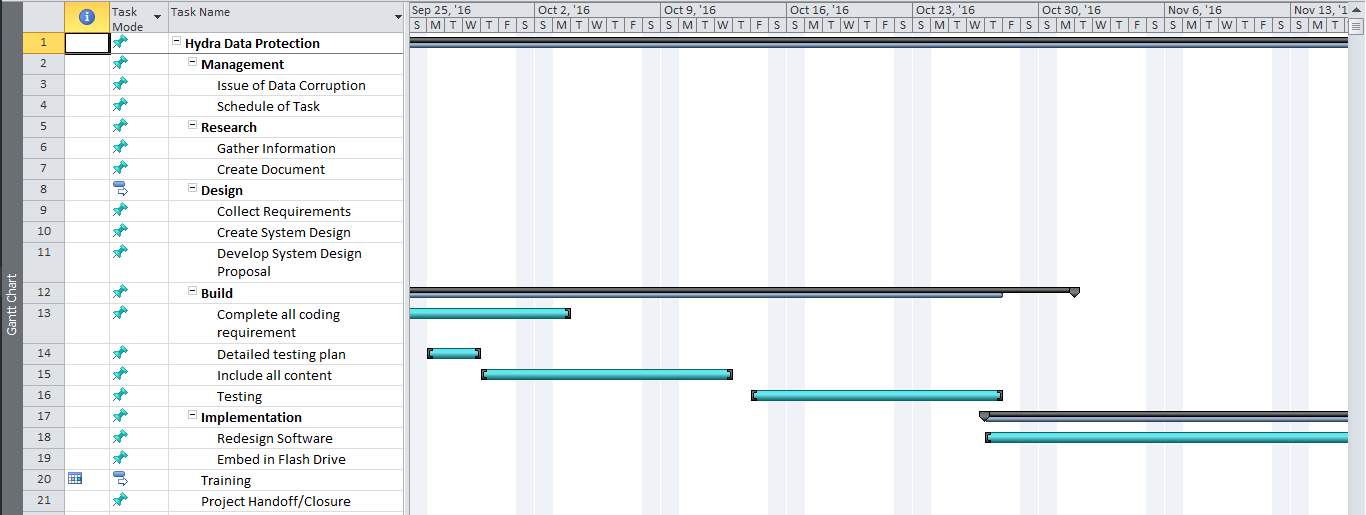
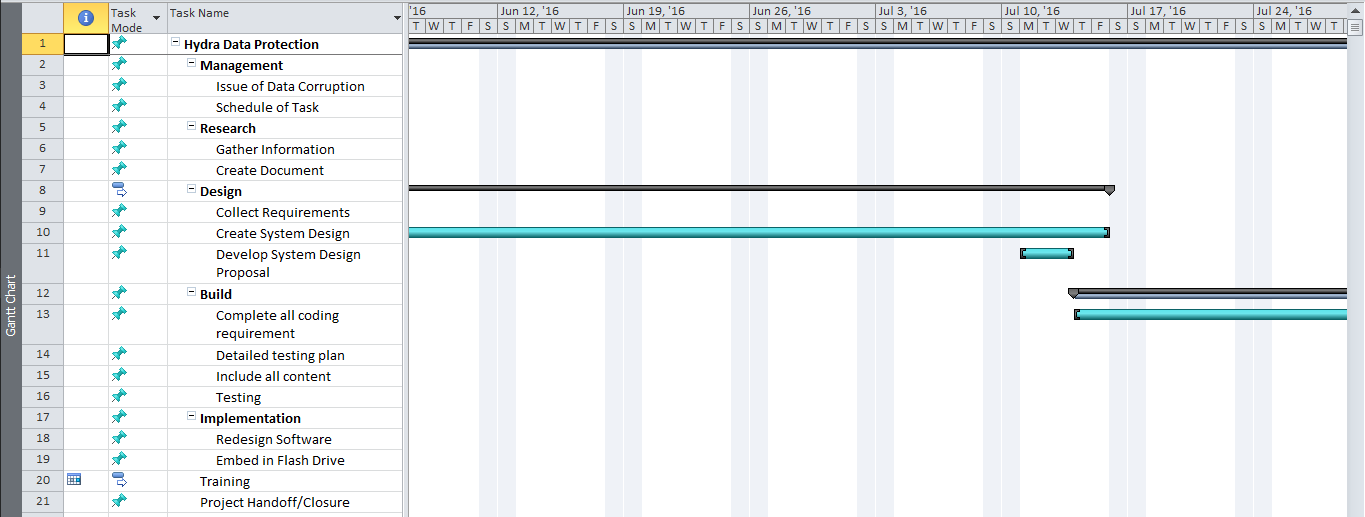
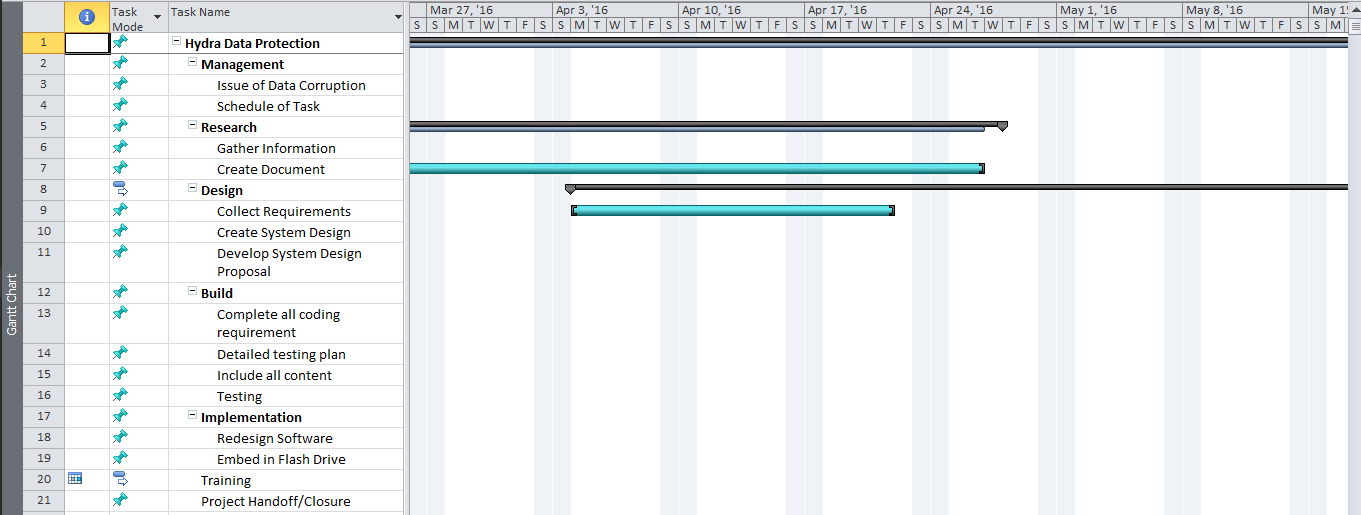
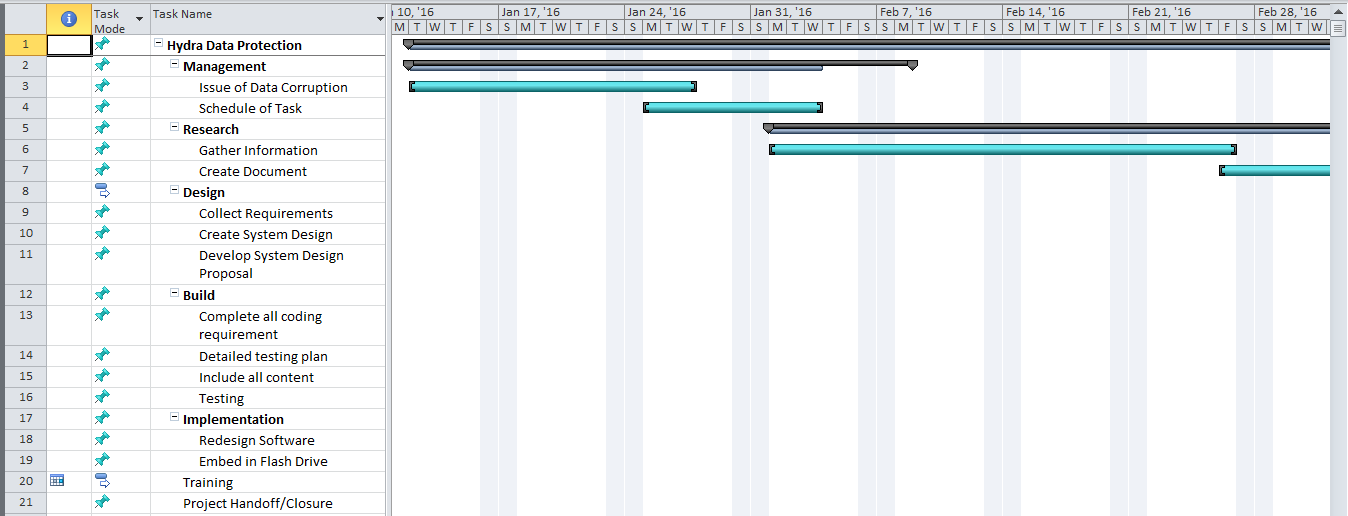
## Work Breakdown Structure (WBS)



## Activity List



## Gantt Chart



## Software Requirements Specification

### Introduction

#### Purpose

The purpose of the Software Requirement System is to clearly define the system under development, Namely Hydra Data Protection Tool (HDPT). The HDPT is a Tool embedded in a flash drive, which the main purpose is to protect the data that is currently working on. And to mitigate the effects of data corruption to the end-users.

#### Document Conventions

Upon reading this paper, technical terms might be encountered, the terms will be defined as the following:

* Checksum: act of comparing the hash value of the file, to check for its integrity.
* Hash Value: is a one-way encryption for the main purpose of maintaining the file integrity
* Data Corruption: a state where your file gets unusable due to certain causes.
* Flash drive: external storage device
* End-Users: The Users of the final product.

#### Intended Audience and Reading Suggestions

The intended audience of this document are the end-users which includes students and office workers. Other intended audience are the HDPT Project Manager, HDPT Project developer, HDPT Adviser.

#### Product Scope

The product will be used to protect the files of the end-users from events of data corruption, and aims to be more efficient and helpful than the existence similar tools. The product’s protection will be mainly focused on the ones existing in the Back-up folder located at the flash drive.

#### References

This document follows documents for the product in projects2.apc.edu.ph/wiki and GitHub. The following are some of the references for this document:

* Change Management Plan
* Project Vision and Scope
* Statement of Work
* Quality Plan

All documents listed above were documented by the project team together.

### Overall Description

#### Product Perspective

The product is a tool that aims to help the end-users maintain a back-up data of their files, which some users find it a bit hassle to maintain back-up each and every time, and most often they do it casually. The product wants to maintain a back-up of their file without being a hassle for the end-users’ perspective.

#### Product Functions

The product itself has three major function which are:

* Real-time Back-up – Where the file is automatically backed up in real-time.
* Synchronization – Where the user is working on the file, the last activity of the user will automatically save on file itself
* Mobility – The user can bring the tool anywhere does it go.
* Corruption scanning – which detect if there is an existing corrupted data in the back-up folder.
* Corruption Fix – The system will attempt to fix the corrupted data.

#### User Classes and Characteristics

The HDPT has two main users namely the normal users, and the privilege users. The normal users are allowed to scan and fix the identified corrupted data, they could also back-up their file anytime they want to. Privilege users are the only ones allowed to retrieve back-up data.

#### Operating Environment

The system will operate in a windows based platform with a NTFS file architecture, the system will be stored in a flash drive, and the system will also use java platform and AutoIt Scripting tool.

#### Design and Implementation Constraints

Design and Implementation constrains were identified as the following:

* The memory of the flash drive should at least less than 90 percent to attain the systems optimal performance
* The system will be using Java language.
* It is also assumed that the end-users will took the responsibility for protecting the hardware in cases where the flash drive itself became corrupted.

#### User Documentation

This SRS document will be delivered along with the User Manual Document, which contain the steps on how to use the software, help and tutorial would also be included there.

#### Assumptions and Dependencies

There are assumptions made during the creation of the project and it is necessary since it is out of the scope of the project but could probably have an impact to the system.

* + - * It is assumed that the computers are properly equipped with anti-virus such that the storage device wouldn’t be affected by any malicious program.
      * The user is responsible enough to protect the hardware, where the software is stored.

### External Interface Requirements

#### User Interfaces

In our product system, the UI is where the user and system can interact with. The system has buttons where these buttons are made up of functionalities of scanning, memory checking, retrieve the back-up files, viewing logs, and downloading logs. The UI also shows the files are inside of the tool.

#### Hardware Interfaces

The hardware interface that can be involve in our project is the Flash Drive where the Flash Drive is a tool that we can embed our system in it.

#### Software Interfaces

In software interface, the team used Java Language to build the system also we used the Netbeans IDE as a compiler where we can run the system prototype. Also, we used the AutoIt, where we can do the scripting.

### System Features

The product has 3 main features that work together to protect the user’s data, namely Real-time back-up, Scan for corrupted data, Repair corrupted data. Some minor feature like being Handy and Mobile, would encourage the user to back-up, since it is easy to use and doesn’t distract the user from what his doing.

#### Real Time Back-Up

* Description and Priority

The Real-time back-up feature is highly prioritized, since the best way to protect each and everyone’s documents to data corruption, is through data redundancy, which makes this feature more important. It would also encourage people to back-up their file since the method is much easier to use from the end-users’ perspective.

* Stimulus/Response Sequences

Real-time back-up: After the user execute a file, the system would duplicate the file, and would incrementally save during 2 seconds.

* Functional Requirements

Conditions must be met, before the user can use the necessary functions, such as, the memory space should at least less than 90 percent full. So that optimum performance and real-time back-up is established

REQ-1: Storage Space is less than 90 percent

REQ-2: The user’s environment must be Windows OS with NTFS file structure

REQ-3: The Flash must also have a NTFS file structure.

#### Scan for Data Corruption

* Description and Priority

This feature, would conduct a checksum on the file’s hash value, which would detect if data corruption has occurred.

* Stimulus/Response Sequences

The user must execute the “Scan for Corruption” button before the system conducts checksum on the file’s hash value.

* Functional Requirements

REQ-1: Storage Space is less than 90 percent

REQ-2: The user’s environment must be Windows OS with NTFS file structure

REQ-3: The Flash must also have a NTFS file structure.

#### Fix for Data Corruption

* Description and Priority

This feature, would conduct a checksum on the file’s hash value, which would detect if data corruption has occurred.

* Stimulus/Response Sequences

The user must have identified a corrupted data, and must execute the repair function.

The user must execute the “Scan for Corruption” button before the system conducts checksum on the file’s hash value.

* Functional Requirements

REQ-1: Storage Space is less than 90 percent

REQ-2: The user’s environment must be Windows OS with NTFS file structure

REQ-3: The Flash must also have a NTFS file structure.

REQ-4: The Scan for Corruption must be issued before this can be executed.

REQ-5: There is a detected file corruption.

### Other Nonfunctional Requirements

#### Performance Requirements

The HDPT product requires that the storage device (flash drive) to be less than 90% full, since the system also occupied space in the flash drive. And real-time back-up cannot be issued if the flash drive is almost full.

#### Safety Requirements

Due to physical causes, the corruption might occur to the flash drive itself. The user must keep it safe as always to avoid this kind of scenario to happen.

#### Security Requirements

Upon retrieving the data, the user needs to acquire the password to authenticate whether he has an admin privilege or not.

#### Software Quality Attributes

The software helps the users to protect their data with ease, since some tools are too complicated for them to use. And some find back-up data as a chore that is often done once a week.

#### Business Rules

The following are the rules of each involved including the system itself.

* The user’s file is automatically back-up in Flash Drive
* The user can view and download its logs
* The user may retrieve the files from the back-up data.
* The system will scan for the corrupted text file

### Other Requirements

There are no more required for the system. If there are bugs, it must check to the admin to fix the bugs of the system. Always keep the Flash Drive secure in order to keep data safe.

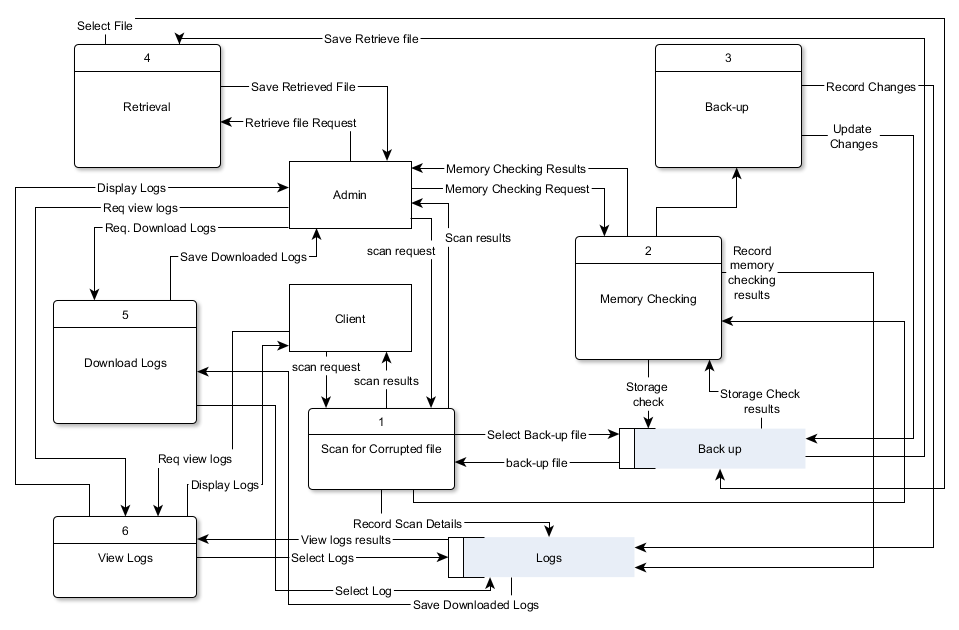
### Appendix A: Glossary

* Hash Value - is a numeric value of a fixed length that uniquely identifies data.
* Real Time Back-Up - refers to backup of computer data by automatically saving a copy of every change made to that data, essentially capturing every version of the data that the user saves.
* Java Language - a general-purpose, concurrent, strongly typed, class-based object-orientedlanguage*.*
* Netbeans IDE - a free and open source integrated development environment for application development on Windows, Mac, Linux, and Solaris operating systems.
* AutoIt - is a freeware BASIC-like scripting language designed for automating the Windows GUI and general scripting.

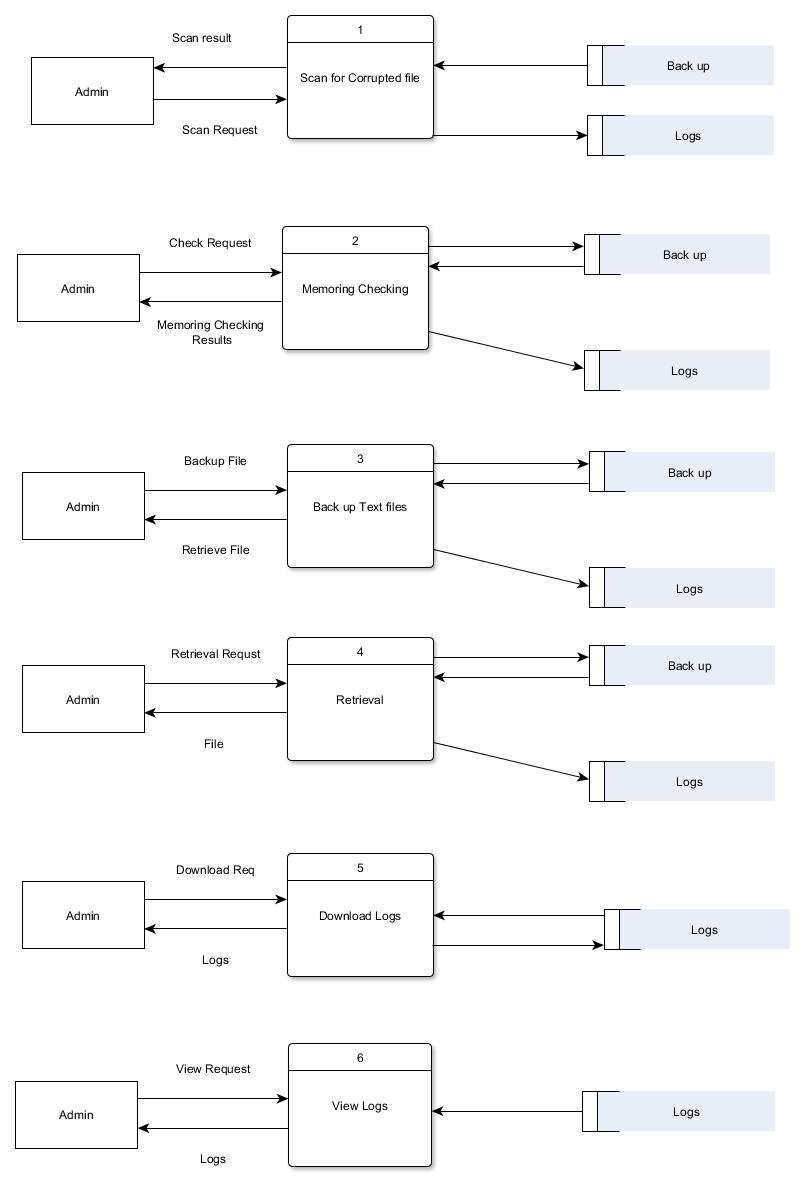
### Appendix B: Analysis Models

Data Flow Diagram

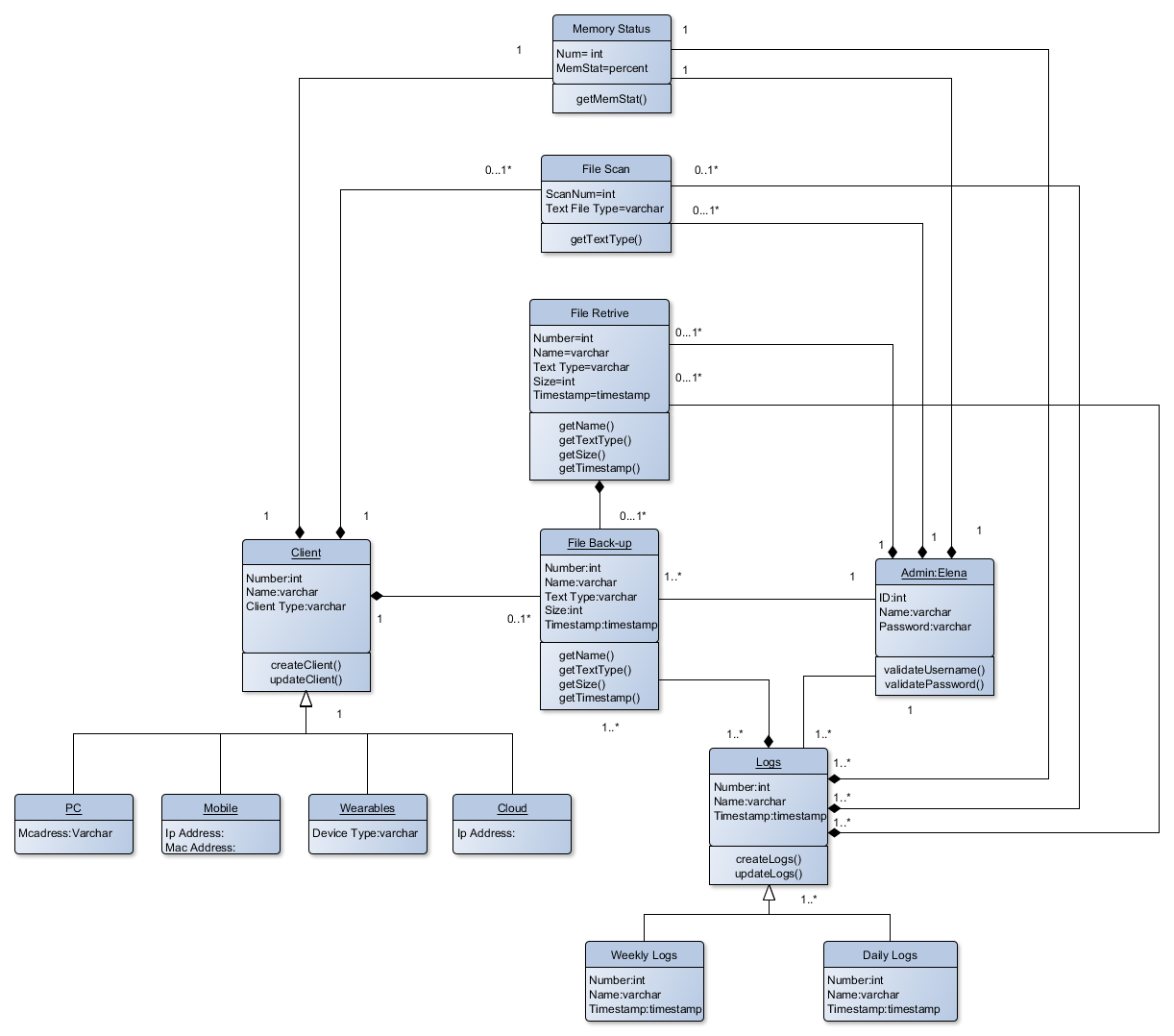
Level 0



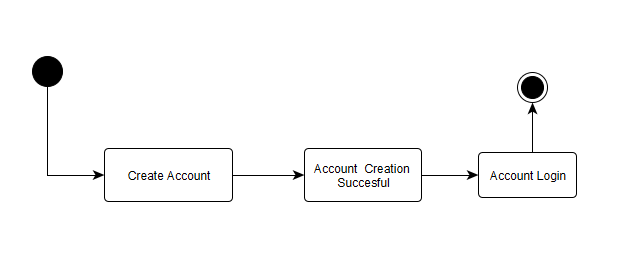
DFD Fragments

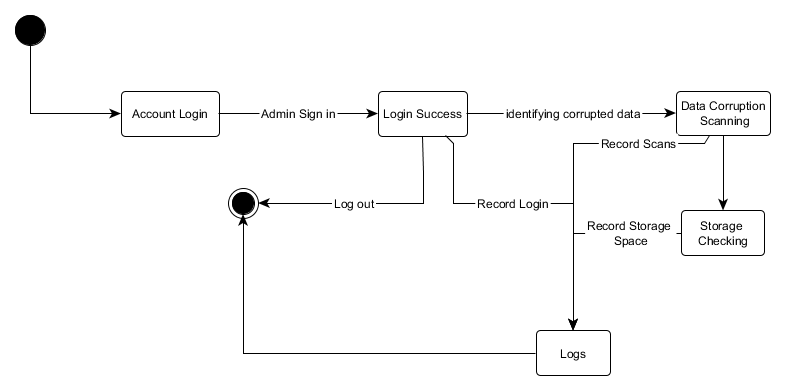


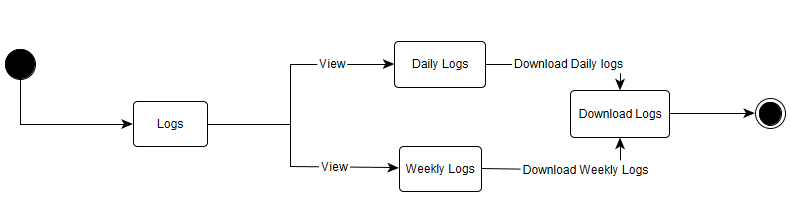
Class Diagram

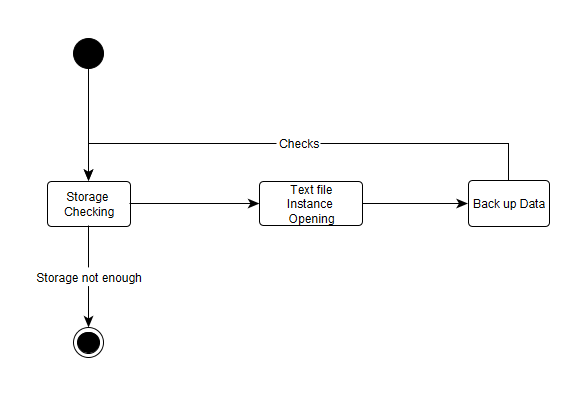


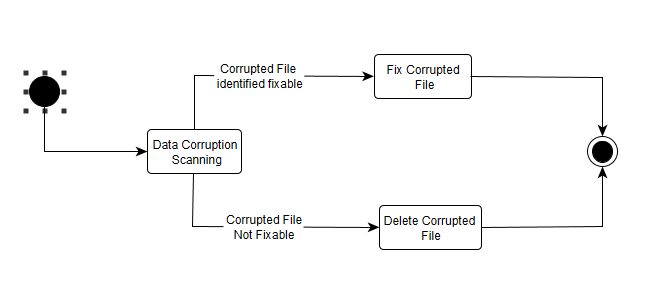
State Diagram



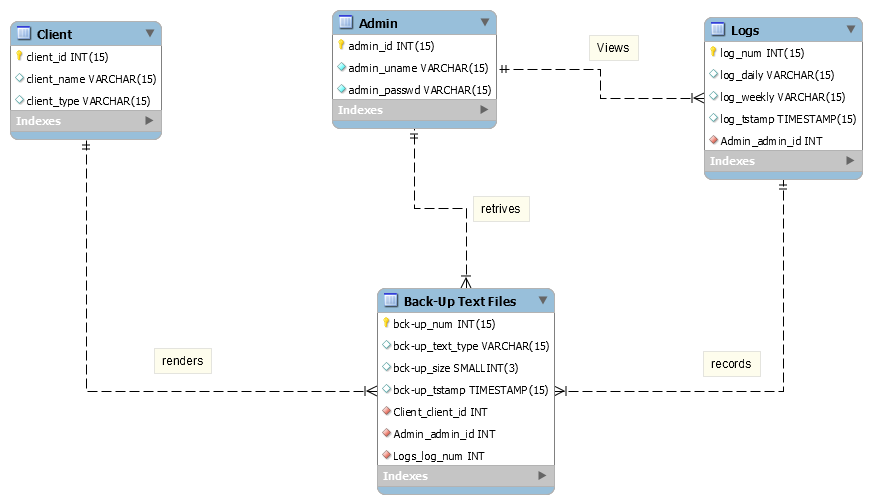








Entity- Relationship Diagram



## Change Management Plan

### Introduction

The Change Management Plan was created for the Hydra Data Protection Tool (HDPT) Project in order to set expectations in how the approach to changes will be managed, what defines a change, the purpose and role of the change control board, and the overall change management process. All Team members will be expected to submit or requests to the DCBAR Project in accordance with this Change Management Plan and all requests and submissions will follow the process detailed herein.

### **Change** Management **Approach**

The Change Management approach for the HDPT Project will ensure that all proposed changes are defined, reviewed, and agreed upon so they can be properly implemented and communicated to all team members. This approach will also ensure that only changes within the scope of this project are approved and implemented.

The Change Management approach is not to be confused with the Change Management Process which will be detailed later in this plan. The Change Management approach consists of three areas:

* Ensure changes are within scope and beneficial to the project
* Determine how the change will be implemented
* Manage the change as it is implemented

The Change Management process has been designed to make sure this approach is followed for all changes. By using this approach methodology, the HDPT Project Team will prevent unnecessary change from occurring and focus its resources only on beneficial changes within the project scope.

### Definitions of Change

There are several types of changes which may be requested and considered for the HDPT Project. Depending on the extent and type of proposed changes, changes project documentation and the communication of these changes will be required to include any approved changes into the project plan and ensure all stakeholders are notified. Types of changes include:

* **Scheduling Changes:** Changes which will impact the approved project schedule. These changes may require fast tracking, crashing, or re-baselining the schedule depending on the significance of the impact.
* **Budget Changes:** changes which will impact the approved project budget. These changes may require requesting additional funding, releasing funding which would no longer be required, or adding to project or management reserves. May require changes to the cost baseline.
* **Scope Changes**: changes which are necessary and impact the project’s scope which may be the result of unforeseen requirements which were not initially planned for. These changes may also impact budget and schedule. These changes may require revision to WBS, project scope statement, and other project documentation as necessary.
* **Design changes:** GUI of the HDPT requires further improvement, consistency of each module’s design must be observed.

The project manager must ensure that any approved changes are communicated to the team members. Additionally, as changes are approved, the project manager must ensure that the changes are captured in the project documentation where necessary. These document updates must then be communicated to the project team and stakeholders as well.

### Change Control Board

The Change Control Board (CCB) is the approval authority for all proposed change requests pertaining to the HDPT Project. The purpose of the CCB is to review all change requests, determine their impacts on the project risk, scope, cost, and schedule, and to approve or deny each change request. The following chart provides a list of the CCB members for the HDPT Project:

|  |  |  |
| --- | --- | --- |
| **Name** | **Position** | **CCB Role** |
| K. Miculob | Project Manager/Developer | CCB Co-Chair |
| M. Laureta | Project Editor/Developer | CCB Member |
| R. Alberca | Project Researcher | CCB Member |
| J. Pineda | Adviser | CCB Chair |

As change requests are submitted to the Project Manager by the project team members, the Project Manager will log the requests in the change log and the CCB will convene every other Week to review all change requests. For a change request to be approved, all CCB members must vote in favor. In the event more information is needed for a particular change request, the request will be deferred and sent back to the requestor for more information or clarification. If a change is deemed critical, an ad hoc CCB meeting can be called in order to review the change prior to the next scheduled bi-weekly CCB meeting.

### Roles and Responsibilities

The following are the roles and responsibilities for all change management efforts related to the HDPT Project:

Project Adviser:

* Reviews the change in product system and document
* Approve all changes to schedule baseline
* Approve any changes in project scope
* Chair the CCB

Project Manager:

* Receive and log all change requests from project stakeholders
* Conduct preliminary risk, cost, schedule, scope analysis of change prior to CCB
* Seek clarification from change requestors on any open issues or concerns
* Make documentation revisions/edits as necessary for all approved changes
* Participate on CCB.yy312z

Project Team:

* Submit all change requests on standard organizational change request forms
* Provide all applicable information and detail on change request forms
* Be prepared to address questions regarding any submitted change requests
* Provide feedback as necessary on impact of proposed changes.

### Change Control Process

The Change Control Process for the HDPT Project will follow the structural standard change process for all projects. The project manager has overall responsibility for executing the change management process for each change request.

1. Identify the need for a change (Stakeholders) – Change requestor will submit a completed change request form to the project manager.
2. Log change in the change request register (Project Manager) – The project manager will keep a log of all submitted change requests throughout the project’s lifecycle.
3. Evaluate the change (Project Manager, Team, Requestor) – The project manager will conduct a preliminary analysis on the impact of the change to risk, cost, schedule, and scope and seek clarification from team members and the change requestor.
4. Submit change request to CCB (Project Manager) – The project manager will submit the change request, as well as the preliminary analysis, to the CCB for review.
5. Obtain Decision on change request (CCB) – The CCB will discuss the proposed change and decide whether or not it will be approved based on all submitted information.
6. Implement change (Project Manager) – If a change is approved by the CCB, the project manager will update and re-baseline project documentation as necessary.

## Quality Plan

### Introduction

This document, together with other referenced documents, defines the responsibilities and procedures to be adopted to ensure that the data and information produced as part of Project 116 are reliable, fit for purpose and consistent with documented objectives and deliverables. It summarizes the system of internal management that governs the decisions and instructions concerning project quality assurance.

### Project Contractual Information

|  |  |
| --- | --- |
| Project: | Hydra Data Protection Tool |
| Project Number: | 116 |
| Programme Co-ordinator: | Mr. Justin Pineda |
| Principal Investigators(s): | Mr. Manuel Sebastian Sanchez |

### Scope of Work and Quality Objectives

The scope of work for the innovation includes all planning, execution, implementation, testing and training that would outperformed the existing solutions on data corruption. Each stage of the project will be documented and will properly be guided by its adviser. The feedback would be acquired through series of survey after the application was created.

### Project Organization

|  |  |
| --- | --- |
| Project Manager(s): | Kent Michael Miculob |
| Task Manager: | Maria Letty Laureta |
| Other Team Member: | Reginald John Steven Alberca |
| Subcontractors: | Mr. Jacob Catayoc |
| Technical Reviews: | Mr. Justin Pineda |

### Project Duration and Scheduling

|  |  |
| --- | --- |
| Start Date: | January 11, 2016 |
| Completion Date: | December 16, 2016 |
| Scheduling of Activities: | Gantt charts may be used to clarify complex scheduling; any milestones or hold points should be identified. |
|  |  |

### Deliverables

Deliverables specified for the project include:

1. Running System / Research Paper
2. Project’s Wiki
3. Project GitHub
4. Project/Research Status/Progress Report
5. Vision and Scope Document
6. Project Plan / Project Statement of Work / Project Risk Plan
7. Work Breakdown Structure / Activity List / Gantt Chart
8. Software Requirements Specification
9. Change Management Plan
10. Quality Plan
11. User/Admin Manuals
12. Analysis diagrams (Event Table, Use Case, Activity Diagrams, Entity Relationship Diagrams, Data Flow Diagrams, Context Diagrams and Data Dictionary, UML Diagrams)

### Review of Quality Plan

This Quality Plan is reviewed once a month, to give team developers the time they need to maintain the products quality and effectiveness.

### Document and Record Control

The documentation of the project is available on project’s wiki, github, one note. Each revision is properly recorded and specified in each document. The copies of documents are also available on the project manager’s device and project developer.

The Quality Plan and Data Management Plan will be issued to all members of the consortium.

Project Progress Reports will be issued to the following:

List of names.

* Kent Michael Miculob
* Maria Letty Laureta
* Reginald John Steven Alberca
* Mr. Justin Pineda
* Mr. Jacob Catayoc
* Mr. Manuel Sanchez

### Documented Procedures

The project’s team together with its adviser uses Joint Application Development, on the first part of the project, the team had some intense meetings to its adviser, to clearly define the functions features and uniqueness of the system.

## User/Admin Manual

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