

Mock OS (Bit OS)

Design Specification Document

08/15/2020 04:00 PM

Version 3.0

Bachelor of Science in Information Technology – 2B

Technological University of the Philippines

Table of Contents

[Revision History 5](#_Toc48397090)

[1. Introduction 6](#_Toc48397091)

[1.1 Purpose 6](#_Toc48397092)

[1.2 Scope 6](#_Toc48397093)

[1.3 Intended Audience 6](#_Toc48397094)

[1.4 Definitions, Acronyms, and Abbreviations 7](#_Toc48397095)

[1.6 References 8](#_Toc48397096)

[2. Overall Description 9](#_Toc48397097)

[2.1 Product Perspective 9](#_Toc48397098)

[2.2 Product Functions 10](#_Toc48397099)

[2.3 User Classes and Characteristics 12](#_Toc48397100)

[2.4 Operating Environment 12](#_Toc48397101)

[2.5 Design and Implementation Constraints 12](#_Toc48397102)

[2.6 Assumptions and Dependencies 12](#_Toc48397103)

[3. External Interface Requirements 13](#_Toc48397104)

[3.1 User Interfaces 13](#_Toc48397105)

[3.2 Hardware Interfaces 67](#_Toc48397106)

[3.3 Software Interfaces 67](#_Toc48397107)

[3.4 Communication Interfaces 67](#_Toc48397108)

[4. System Features 68](#_Toc48397109)

[4.1 Sign Up 68](#_Toc48397110)

[4.1.1 Description and Priority 68](#_Toc48397111)

[4.1.2 Stimulus / Response Sequences 68](#_Toc48397112)

[4.1.3 Functional Requirement 69](#_Toc48397113)

[4.2 Log In 70](#_Toc48397114)

[4.2.1 Description and Priority 70](#_Toc48397115)

[4.2.2 Stimulus / Response Sequences 70](#_Toc48397116)

[4.2.3 Functional Requirement 72](#_Toc48397117)

[4.3 Desktop 74](#_Toc48397118)

[4.1.1 Description and Priority 74](#_Toc48397119)

[4.1.2 Stimulus / Response Sequences 74](#_Toc48397120)

[4.1.3 Functional Requirement 76](#_Toc48397121)

[4.4 Menu 78](#_Toc48397122)

[4.4.1 Description and Priority 78](#_Toc48397123)

[4.4.2 Stimulus / Response Sequences 78](#_Toc48397124)

[4.4.3 Functional Requirement 79](#_Toc48397125)

[4.5 Settings 81](#_Toc48397126)

[4.5.1 Description and Priority 81](#_Toc48397127)

[4.5.2 Stimulus / Response Sequences 81](#_Toc48397128)

[4.5.3 Functional Requirement 83](#_Toc48397129)

[4.6 File Manager 85](#_Toc48397130)

[4.6.1 Description and Priority 85](#_Toc48397131)

[4.6.2 Stimulus / Response Sequences 85](#_Toc48397132)

[4.6.3 Functional Requirement 88](#_Toc48397133)

[4.7 Trash Bin 93](#_Toc48397134)

[4.7.1 Description and Priority 93](#_Toc48397135)

[4.7.2 Stimulus / Response Sequences 93](#_Toc48397136)

[4.7.3 Functional Requirement 94](#_Toc48397137)

[4.8 Task Manager 96](#_Toc48397138)

[4.8.1 Description and Priority 96](#_Toc48397139)

[4.8.2 Stimulus / Response Sequences 96](#_Toc48397140)

[4.8.3 Functional Requirement 97](#_Toc48397141)

[4.9 Run 98](#_Toc48397142)

[4.9.1 Description and Priority 98](#_Toc48397143)

[4.9.2 Stimulus / Response Sequences 98](#_Toc48397144)

[4.9.3 Functional Requirement 98](#_Toc48397145)

[4.10 Command Prompt 99](#_Toc48397146)

[4.10.1 Description and Priority 99](#_Toc48397147)

[4.10.2 Stimulus / Response Sequences 99](#_Toc48397148)

[4.10.3 Functional Requirement 101](#_Toc48397149)

[4.11 Text Editor 107](#_Toc48397150)

[4.11.1 Description and Priority 107](#_Toc48397151)

[4.11.2 Stimulus / Response Sequences 107](#_Toc48397152)

[4.11.3 Functional Requirement 110](#_Toc48397153)

[4.12 Camera 113](#_Toc48397154)

[4.12.1 Description and Priority 113](#_Toc48397155)

[4.12.2 Stimulus / Response Sequences 113](#_Toc48397156)

[4.12.3 Functional Requirement 114](#_Toc48397157)

[4.13 Calculator 115](#_Toc48397158)

[4.13.1 Description and Priority 115](#_Toc48397159)

[4.13.2 Stimulus / Response Sequences 115](#_Toc48397160)

[4.13.3 Functional Requirement 116](#_Toc48397161)

[5. Other Nonfunctional Requirements 117](#_Toc48397162)

[5.1 Performance Requirement 117](#_Toc48397163)

[5.2 Compatibility Requirements 117](#_Toc48397164)

[5.3 Data Integrity Requirements 117](#_Toc48397165)

[5.4 Usability Requirements 117](#_Toc48397166)

[5.5 Reliability Requirements 117](#_Toc48397167)

# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Version | Author | Description |
| 19 March 2020 | 0.1 | SR | Planning, data gathering and listing of requirements |
| 07 April 2020 | 1.0 | SR | Initial Draft |
| 22 June 2020 | 1.1 | UX  Trinidad | Organized the sequence of wireframes and specified the external requirements |
| 22 June 2020 | 1.2 | Dado | Added overall description of the project |
| 23 June 2020 | 1.3 | San Diego  Ramos | Added introduction |
| 23 June 2020 | 1.4 | Prepose  Rama | Added non-functional requirements |
| 24 June 2020 | 1.7 | Cosico | System feature: Initial Set Up, Log In, Desktop |
| 27 June 2020 | 1.8 | Cosico | System feature: Menu  Revision of Initial Set up to Sign Up, and Log In |
| 29 June 2020 | 2.0 | Cosico | System feature: Settings and File Manager |
| 02 July 2020 | 2.2 | Cosico | System feature: Trash Bin, Task Manager, Run |
| 03 July 2020 | 2.3 | Prepose  Cosico | System feature: Text Editor |
| 04 July 2020 | 2.5 | Cosico | System feature: Camera, Calculator |
| 05 July 2020 | 2.6 | Dado  Cosico | System feature: Command Prompt  Finalization of Document |
| 06 July 2020 | 2.7 | SR | First Official Release |
| 13 August 2020 | 2.13 | Cosico  Trinidad | Major revision with system features |
| 14 August 2020 | 3.0 | SR | Second Official Release |

# 1. Introduction

## 1.1 Purpose

The purpose of this document is to present complete detailed information about the mock operating system BiT OS. This document specifies the objectives, features, functional requirements, and specifications needed for the development of the system. This document is also a guide for users on how the system works, how to use it, and what services the system provides.

## 1.2 Scope

The main goal of this project is to come up with a mockup of an operating system as an application of concepts and implementation of knowledge and ideas on how the operating system works. The specific objectives of this project are the following:

* To attain key functionalities and services provided by an operating system such as Booting, File Management, Memory Management, and Process Management, I/O Management and Security Management.
* To provide a user interface for a convenient way to interact with the computer’s software and hardware.
* To enhance and improve the user experience for greater efficiency and ease of use.

## 1.3 Intended Audience

**Users**

This document is intended for a user who is interested to know about the specification and capabilities of the system BiT OS. All who want to explore and know more about how an operating system works this document could be beneficial.

**UI and UX Team**

This document is intended for the system designers. It would help them visualize user interfaces and to come up with better user experience.

**Development Team**

This document is intended for the system development team that would develop and built the project BiT Operating System. Reading this document would lead them to the desired outcome of the system project. The developers must implement and comply with the functional requirements of each system feature specified in chapter 4. Because the time for developing this project is limited, developers may opt to use the given priority levels of each feature.

**Testing Team**

This document is intended for the testing team as it would serve as the guide on how the system should function, work, handle errors, and respond to the user's activities. They must be able to test and check if all the requirements are met.

**Other Developers**

This might contain helpful ideas or suggestions that would be useful for the improvement of existing operating systems.

## 1.4 Definitions, Acronyms, and Abbreviations

|  |  |
| --- | --- |
| Abbreviation | Definition |
| .BAT | DOS-Batch file used to execute commands with the Windows Command Prompt |
| .EXE | Executable File contains an executable program for Windows |
| .JPG | JPG file is an image saved in a compressed image format standardized by the Joint Photographic Experts Group (JPEG) and is commonly used for storing digital photos |
| .MP3 | MPEG Audio Layer-3 is a compressed audio file format |
| .MP4 | MPEG-4 Video File is a multimedia file commonly used to store a movie or video clip |
| .TXT | Text File is a standard text document that contains unformatted text |
| Bit | Binary Digit is the smallest unit of measurement used to quantify computer data with a single binary value of 0 or 1 and used to describe processor architecture |
| Hz | Hertz is a measurement used to determine the speed of computer processors |
| GHz | Gigahertz = 1,000 MHz = 1,000,000,000 Hz and is used to measure processor speed, RAM and backside cache |
| MHz | Megahertz = 1,000,000 Hz and is also used to measure processor clock speeds |
| Acronyms | **Definition** |
| CPU | Central Processing Unit is the primary component of a computer that processes instructions |
| GB | Gigabytes is equal to 1,000 megabytes bytes and is used to measure storage capacity (such as hard drive, SSD, and RAM) |
| GUI | Graphical User Interface is a user interface that includes graphical elements, such as windows, icons, and buttons. |
| KB | Kilobytes is equal to 1000 bytes and is used to measure the size of small files (such as plain text) |
| MB | Megabytes is equal to 1,000,000 bytes and is used to measure the size of large files (such as images, videos, and audio files) |
| Mbps | Megabits Per Second is a measurement used to determine the amount of data being transmitted per second (data transfer rate) |
| OS | Operating System is software that communicates with the hardware and allows other programs to run |
| RAM | Random Access Memory determines how much memory the operating system and open applications can use |

## 1.6 References

**Operating System Concepts**

* SILBERSCHATZ, A., GALVIN, P. B., & GAGNE, G. (2018). *Operating System Concepts* [PDF]. Hoboken: John Wiley & Sons, Inc.

**IEEE Template for System Requirement Specification Documents:**

* WIEGERS, K.E (1999)*. Software Requirements Specification for <Project>* [DOCX] retrieved from https://goo.gl/nsUFwy

# 2. Overall Description

## 2.1 Product Perspective

BiT OS is a mock operating system developed for everyone willing to experience the functionality of an operating system. BiT OS provides features, applications, and built-in programs to imitate the functionality and the utilization of an operating system.

BiT OS is based on an existing operating system, which is Microsoft Windows 10, to help the user familiarize and easily navigate through the system. It is capable of imitating operating system tasks such as booting, file management, process management, and memory management, device control, and security.

**Booting**

* Starting the computer operating system and preparing to operate.

**File Management**

* Providing a file system to store files and folders properly.
* Allowing creating, deleting, opening, closing, reading, writing files.
* Allowing files and directories manipulation.
* Mapping files onto mass storage.
* Allowing users to share files.

**Process Management**

* Run Program/Task (creation of a process).
* End Program/Task (termination of a process).
* Allocate resources to processes.
* Protect the resources of each process form the others and allow synchronization.
* Implement prioritization among tasks.

**Memory Management**

* Manages primary memory.
* Loads a program into memory and executes.
* Tracks whenever some memory gets freed or unallocated and correspondingly updates the status
* Helps protect different processes from each other and make sure that they do not interfere with each other

**Device Control**

* Recognize and handle I/O devices connected to the computer.
* Provides access to the required I/O device when needed.
* Allows I/O operation such as read or write with any file or any I/O device.

**Security**

* Provides authentication features for each user through passwords.
* Protects stored data from illegal use, modification, or deletion.

## 2.2 Product Functions

* Initial account set up(Register) – The user must input a username and have an option to set up a password; if the user sets up a password, the user must pick and answer three questions provided by the BiT operating system.
* Log In – A registered user have to enter his/her unique password to access the system.
* Desktop – serves as the home screen of the operating system where the clickable program icons and taskbar are displayed.
* Taskbar - Contains the application/s currently running. It also displays the volume icon, brightness icon, time, date, & battery.
* Menu – This is where settings, search, power, and list of application could be found.
* File explorer - used to navigate and manage the drives, folders, and files of the computer.

Toolbar:

* + Copy – Copies selected file/s.
  + Paste – Paste copied file/s.
  + Cut – Paste cut file/s.
  + Move to – Move selected file/s to a specific location.
  + Copy to – Copies selected file/s and paste it to a specific location.
  + Delete – Deletes selected file/s.
  + Rename – Renames selected file/s.
  + Create folder or text file – Creates a new folder or text file.
  + Select all items – Selects all listed items in current location.
  + Unselect items - Unselects all selected listed items in current location.

Navigation bar:

* Search box – Used to find files.
* Back and forward button – Back button returns user screen to previous directory or location and forward button brings user screen to the current location subdirectory.

Navigation Pane – Includes This PC and its sub directories

Status bar - Displays information about the current location and each item on the screen.

* Text editor - Allows the user to create, open, edit, and save plain text files.

File:

* + New – Creates new text file.
  + Open – Loads a text file.
  + Save - Saves text file without changing its name and directory.
  + Save As - Saves text and allows the user to change its name and directory.
  + Page Setup – Allows the user to change the page size, orientation, and margins.
  + Print – Prints the text file to a selected printer.
  + Exit – Terminates text editor.

Edit:

* + Select All – Selects all text.
  + Undo – Undoes anything the user does.
  + Cut – Cuts selected text/s.
  + Copy – Copies selected text/s.
  + Paste – Paste copied text/s.
  + Delete – Deletes selected text.
  + Find – Finds selected text/s.
  + Replace – Replace selected text/s.

Format:

* + Text Wrap - Forces all the text contents of a line so they can be viewed instead of disappearing outside the viewing area
  + Font – Allows the user to change text font, font style, and size.
* Command Prompt – Provides an interface to communicate with the computer by typing commands.
* Task Manager – Provides details about programs and processes running on your computer.
  + Processes – Displays process name, status, CPU usage, memory usage, DISK usage
  + Run new task – Runs a new task.
  + End task – Ends a currently running task.
* Run – Prompt user to input a name of a program, folder, document to open or execute.
* Settings – Contains account, system details, personalization, and time and date settings.
  + Account – Contains all users information and allows the user to manage his/her account.
  + System – Displays Operating System and Device specification
  + Date and time – Allows the user to set date and time.
* Trash – Temporarily stores files and folders before they are permanently deleted.

Toolbar:

* + Empty trash – Permanently deletes all items.
  + Delete selected item/s - Permanently deletes all selected item/s.
  + Restore all items – Restores all items.
  + Restore the selected item/s - Restores all selected item/s.

Navigation bar:

* + Search bar – searches for an item to be restored or deleted.
* Standard calculator – Performs basic arithmetic operations.

Arithmetic operations:

* + Division
  + Subtraction
  + Multiplication
  + Addition
* Camera - A program that captures images.

Control bar:

* + Capture button – Allows the user to capture what is seen on the camera.
  + Camera roll – Displays recently captured photos.

## 2.3 User Classes and Characteristics

* Types of users:
  + Typical users, such as students, who want to experience the functionality of an operating system.
  + Programmers who are interested in understanding the concepts and importance of an operating system.
* Technical expertise:
  + Users who have experience of using a computer.
  + Users that are knowledgeable about using an IDE (integrated development environment).

## 2.4 Operating Environment

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| OE-1: | The system shall use the NetBeans IDE 8.2 platform. |
| OE-2: | The system shall use the Swing toolkit for GUI elements. |

## 2.5 Design and Implementation Constraints

BiT operating system is developed using the programming language JAVA. The system is a mock operating system developed to imitate the functionality and services provided by an operating system. The BiT operating system does not communicate directly to the computer’s hardware but instead utilizes the said high-level programming language to have access to it. It is purely developed to understand the concepts and importance of an operating system.

## 2.6 Assumptions and Dependencies

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| AD-1: | The computer device runs a windows operating system. |
| AD-2: | The access to the camera is allowed on the device. |
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# 3. External Interface Requirements

## 3.1 User Interfaces

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| UI-1 | Sign Up - Welcome Screen – The Welcome screen is displayed, asking the user to enter a preferred username. |
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| UI-2 | Sign Up - Welcome Screen - Create Password – Create a password screen appeared, asking the user to either enter a password or skip creating a password. |
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| UI-3 | Sign Up - Welcome Screen - Create Password - Confirm Password – After creating Password, user will confirm it and enter the password again. |
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| UI-4 | Sign Up - Welcome Screen - Create Password - Confirm Password - Security Question – For additional security, the user shall be able to fill-up security questions for account recovery in case the user forgot his/her password. |
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| UI-5 | Sign Up - Welcome Screen - Create Password - Skip Password – User can skip creating password. |
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| UI-6 | Sign Up - Welcome Screen - Create Password - Skip Password - Just a Moment – A loading screen with BIT OS logo is shown. |
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| UI-7 | Sign Up - Welcome Screen - Create Password - Skip Password - Just a Moment - Ready – After loading screen when everything is settled, a message ready to go with Let’s go button is shown. |
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| UI-8 | Log In - Enter Password – A user with password-protected accounts is prompted to enter his password. If the password is forgotten, Forgot Password is an option to recover it. The user can also sleep, shut down, and restart the system by clicking on the power icon and select one. |
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| UI-9 | Log In - Enter Password - Incorrect Password – If user inputs an invalid password, an error message will be shown on screen. |
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| UI-10 | Log In - Enter Password - Incorrect Password - Answer Security Question - Security questions are required in resetting password. If there’s any wrong answer and if the field is empty then corresponding error message is shown. |
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| UI-11 | Log In - Reset Password - The user must be able to create a new password. Creating a new password must also comply with the password requirements specified in the Sign Up feature. |
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| UI-12 | Log In - Multiple Users – One desktop/laptop can create multiple accounts. |
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| UI-13 | Log In - Multiple Users – Invalid Password - If user inputs invalid password, an error message will be shown on screen. |
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| UI-14 | Log In - Multiple Users - No Password – Users without created password can directly sign in just by clicking the *Sign In* button. |
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| UI-15 | Sign In - Multiple Users - Invalid Password - Account Lockout – After attempting to input invalid passwords 10 times, the account will be locked out. |
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| UI-16 | Sign In - Loading Screen – Loading screen of BIT OS after signing in. |
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| UI-17 | Sign In - Lock Screen – The lock screen will show the current date and time. |
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| UI-18 | Desktop - Battery – Device battery level can be seen on the lower right area of the screen. The battery panel shows up if the user clicks on the battery icon. |
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| UI-19 | Desktop - Menu - Account – When the account name is clicked, lock and sign out account option will be shown. |
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| UI-20 | Desktop - Menu – Search – Right Click – Right click a file in the search list to show pop-up menu with items open and open file location. |
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| UI-21 | Desktop - Volume – Volume can be adjusted depending on the user’s preference. |
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| UI-22 | Desktop - Brightness – The user must be able to adjust the device’s brightness using the slider interface or brightness keys (if accessible). |
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| UI-23 | Settings – In Settings, user can choose from the two options: accounts and system. |
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| UI-24 | Settings - Account - Profile – Display information about the user account. |
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| UI-25 | Settings - Account - Security – If user decided to skip creating password before, user can set password anytime. |
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| UI-26 | Settings - Account - Security - Set Password – In setting a password, user needs to enter chosen password and re-enter for confirmation. |
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| UI-27 | Settings - Account - Security - Set Password - Security Question – After creating password, user is required to create security question for additional security and privacy. |
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| UI-28 | Settings - Account - Security - Set Password - Security Question - Loading – After creating password, loading screen will be shown during the saving process. |
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| UI-29 | Settings - Account - Security - Dialog - Set Password Successful – After successfully creating a password, message dialog will be shown. |
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| UI-30 | Settings - Account - Security – The users with password-protected account have 3 security options: Change or Remove Password and Update Security Questions. |
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| UI-31 | Settings - Account - Security - Dialog - Change Password – The user is required to enter the current password in order to change the password. If the user inputs an invalid password, then error message will be shown. |
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| UI-32 | Settings - Account - Security - Change - User can change password by entering old password and new password. |
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| UI-33 | Settings - Account - Security – Change - After changing password, loading screen will be shown during the saving. |
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| UI-34 | Settings - Account – Security - Dialog - New Password – After successfully changing the old password, user can now use the new password. |
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| UI-35 | Settings - Account – Security - Dialog - Remove Password – Before removing the password, message dialog will appear to ask the user. |
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| UI-36 | Settings - Account - Security - Dialog - Update Security Questions – Before updating the security questions, the user need to enter the account password. |
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| UI-37 | Settings - Account - Security – Update - After creating password, user is required to create security question for additional security and privacy. |
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| UI-38 | Settings - Account - Security – Update Security Question - After updating security questions, loading screen will be shown during the saving. |
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| UI-39 | Settings - Account - Security – Update Security Question - After updating security questions, message dialog will be shown after saving. |
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| UI-40 | Settings - Account – Security - Dialog - Remove Password – Before removing the password, message dialog will appear to ask the user. |
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| UI-41 | Settings - Account - Security Options – In Lockout Policy, user has options to change lockout threshold, lockout duration and lockout reset counter. |
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| UI-42 | Settings - Account – Profile – User has option to add another user/account. |
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| UI-43 | Settings - Account – Profile – In creating new account, user is required to input username and password. |
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| UI-44 | Settings - Account – Security – Update - After creating password, user is required to create security question for additional security and privacy. |
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| UI-45 | Settings - Account – Profile – Dialog – Account – After successfully creating an account, message dialog will be shown. |
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| UI-46 | Settings - Account - Profile – User has options to change account type or remove an account. |
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| UI-47 | Settings - Account - Profile – Dialog – Delete – Before deleting an account, message dialog will be shown. |
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| UI-48 | Settings - Account - Security – Deleting – After deleting account, loading screen will be shown during the saving. |
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| UI-49 | Settings - Account - Profile – Other Users - Change Account Type – User can change the account type. |
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| UI-50 | Settings – Time - User can set the time automatically or set the date manually. |
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| UI-51 | Settings – Date - User can set the date and time manually. |
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| UI-52 | Settings – System - OS specification shows the OS version installed and date of installation. |
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| UI-53 | Settings - Device Specification - It shows the device manufacturer, device name, type of processor, the installed RAM and system type. |
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| UI-54 | File Manager – User’s files are stored properly and can see the files in the file manager. |
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| UI-55 | File Manager – Folder No Items – When there is no folder save in the account. |
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| UI-56 | File Manager – No Items – When there is no items match in the search result. |
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| UI-57 | File Manager – Selected Items – User can select one or multiple items. |
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| UI-58 | File Manager – Copy To – User can copy file/s and enter the path where it will be transferred. |
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| UI-59 | File Manager – Move To – User can move file/s and enter the path where it will be transferred |
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| UI-60 | File Manager – File Properties – File’s properties: type, size, location and date created will be shown in File Properties. |
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| UI-61 | File Manager – Rename – User can rename any files in the file manager. |
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| UI-62 | File Manager - Dialog – Permission – Before opening an accessible folder, user needs to enter the authorization password. |
|  |  |

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| UI-63 | File Manager – Dialog - File Not Found – When a file is not found, message dialog will be shown. |
|  |  |
| UI-64 | File Manager – Dialog – Permission - Before opening an accessible folder, user can choose to continue or cancel. |
|  |  |
| UI-65 | File Manager – Dialog - File Not Found - When a file is not found, message dialog will be shown. |
|  |  |

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| --- | --- |
| UI-66 | My Computer – Drive Properties – Displays information such as name, type, used space, free space, and total capacity size. |
|  |  |
| UI-67 | My Computer – Device Properties –Displays information such as name, model name and manufacturer. |
|  |  |
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| UI-68 | Trash Bin – Default - It is a location which temporarily stores deleted files. User can choose to empty trash bin, delete selected files, restore all files or restore selected files. |
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| --- | --- |
| UI-69 | Trash Bin - Home Tool Bar - It is disabled unless user selected file/s. After selecting, different options can be done with trash bin. |
|  |  |
| UI-70 | Trash Bin – Empty – User can delete all files in the trash bin. |
|  |  |

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| --- | --- |
| UI-71 | Trash Bin – Empty - It is a location which temporarily stores deleted files. User can choose to empty trash bin, delete selected files, restore all files or restore selected files. |
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| UI-72 | Trash Bin – No Match – User can search for a specific file in the trash bin. |
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| UI-73 | Trash Bin – Properties – User can see the properties of a file and option to restore it. |
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| UI-74 | Trash Bin – Properties – In properties, space available will be shown. |
|  |  |
| UI-75 | Trash Bin - Empty – Message dialog will appear before permanently deleting selected files. |
|  |  |
| UI-76 | Trash Bin – Empty – Message dialog will appear before restoring all items in the trash bin. |
|  |  |

|  |  |
| --- | --- |
| UI-77 | Trash Bin – Empty - Message dialog will appear before permanently deleting all files. |
|  |  |

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| UI-78 | Task Manager - It provides information about computer performance and running software, including name of running [processes](https://en.wikipedia.org/wiki/Process_(computing)), CPU usage, memory usage and disk usage. |
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| UI-79 | Run - Allows the user to run a process, either a program, file, or folder. |
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| UI-80 | Command Prompt - It is used to execute entered commands. Most commands automate tasks via scripts and batch files, perform advanced administrative functions, and troubleshoot or solve certain kinds of issues. |
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| UI-81 | Run Error Message – Message dialog will appear after entering an invalid name. |
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| --- | --- |
| UI-82 | Text Editor – File - It provides options to create new, open file, save, save as, print file and exit. |
|  |  |

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| --- | --- |
| UI-83 | Text Editor – Edit - It can select all text, undo, redo, cut, copy, paste, delete, find and replace text. |
|  |  |

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| --- | --- |
| UI-84 | Text Editor – Format - Text format can change text font style, font size and text wrap. It can be also changed into bold, italic and underline. |
|  |  |

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| --- | --- |
| UI-85 | Text Editor – View - It can change the magnification of text documents. |
|  |  |

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| --- | --- |
| UI-86 | Text Editor - Status Off – User can select or deselect the status bar. |
|  |  |

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| --- | --- |
| UI-87 | Text Editor - Find Box – User can search for a keyword in the text editor. |
|  |  |

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| --- | --- |
| UI-88 | Text Editor Cannot Find – Message dialog will be shown after entering an invalid text. |
|  |  |
| UI-89 | Text Editor – Save – *Save, Don’t save* and *Cancel* options before changing text filename. |
|  |  |
| UI-90 | Text Editor -Replacement Box –Text editor has an application to find a keyword and replace it to another keyword. |
|  |  |
| UI-91 | Text Editor - Dialog- Replacement Prompt – After replacing selected text, message dialog will be shown. |
|  |  |
| UI-92 | File Chooser - Save As - A file chooser is prompted to the user to specify the name and select a location where to save a new instance of the text document. |
|  |  |

|  |  |
| --- | --- |
| UI-93 | File Chooser - Save As - A file chooser is prompted to the user to specify the name and select a location where to save a new instance of the text document. |
|  |  |

|  |  |
| --- | --- |
| UI-94 | File Chooser - Open - A file chooser that allows the user to browse and select a text file appeared. |
|  |  |

|  |  |
| --- | --- |
| UI-95 | File Chooser – Open - A file chooser that allows the user to browse and select a text file appeared. |
|  |  |

|  |  |
| --- | --- |
| UI-96 | File Chooser – Save As – If an existing filename is entered, user has options to replace it or not. |
|  |  |

|  |  |
| --- | --- |
| UI-97 | File Chooser – Not Found – When user entered an invalid file name, message dialog will appear. |
|  |  |
| UI-98 | File Chooser – Save As – If an invalid location is entered, user need to contact the administrator to obtain permission. |
|  |  |

|  |  |
| --- | --- |
| UI-99 | Camera - If your PC has a built-in camera or a connected webcam, you can use the Camera app to take photos and videos. |
|  |  |
| UI-100 | Camera – Camera Roll - The screen displayed the recent captured picture/s with options delete, open folder, back, and left and right arrow. |
|  |  |

|  |  |
| --- | --- |
| UI-101 | Camera – Camera Roll –No Photos – If there is no photo saved in the account. |
|  |  |

|  |  |
| --- | --- |
| UI-102 | Camera – Delete – User has option to delete picture/s. |
|  |  |

|  |  |
| --- | --- |
| UI-103 | Calculator - allows the user to perform basic arithmetic operations for both whole and decimal numbers, such as addition, subtraction, multiplication, and division. |
|  |  |

|  |  |
| --- | --- |
| UI-104 | Shut Down Confirmation - A message screen will show up asking the user to confirm shutdown process. The user has option buttons yes and cancel. |
|  |  |

|  |  |
| --- | --- |
| UI-105 | Shut Down - A loading screen is displayed until the BiT OS application is closed. |
|  |  |

|  |  |
| --- | --- |
| UI-106 | Restart Confirmation – A message screen will show up asking the user to confirm restart process. The user has option buttons yes and cancel. |
|  |  |

|  |  |
| --- | --- |
| UI-107 | Restart Screen - A loading screen is displayed until the BiT OS application restarted. |
|  |  |

|  |  |
| --- | --- |
| UI-108 | Sign-out Confirmation - A message screen will show up asking the user to confirm sign-out process. The user has option buttons yes and cancel. |
|  |  |

|  |  |
| --- | --- |
| UI-109 | Sign Out Screen - A loading screen is displayed until the Login Screen is displayed. |
|  |  |

## 3.2 Hardware Interfaces

|  |  |
| --- | --- |
| HI-1: | A processor (CPU) with a clock rate of at least 1GHz or faster. |
| HI-2: | At least 1 to 2GB of memory (RAM), but recommends 4GB or higher. |
| HI-3: | Hard disk space at least 16GB (32bit) or higher. |

## 3.3 Software Interfaces

|  |  |
| --- | --- |
| SI-1: | Netbeans IDE 8.2 must be installed to run the software. |
| SI-2: | Microsoft Windows will be used as the operating system. |

## 3.4 Communication Interfaces

The system requires HTTP or HTTPS protocol(s) to communicate with the server. The system can be configured to be accessed via any available port. The web-based UI is the only means of communication between the user and the system.

# 4. System Features

This section describes each feature and component of the BiT operating system and how it works. It provides all the sequences of user activities and corresponding system responses and detailed functional requirements associated with each feature.

## 4.1 Sign Up

### 4.1.1 Description and Priority

One of the functions of the BiT operating system is to ensure the security of a computer system. Sign up allows the user to create an account by entering a username, and followed by setting up a password and security questions in case of user forgotten password. This password would control access on each user accounts. This feature has a high priority because this is part of the initial set up of BiT OS to a computer device.

### 4.1.2 Stimulus / Response Sequences

|  |  |
| --- | --- |
| Stimulus: | The user opens the BiT OS for the first time on a computer device. |
| Response: | The Welcome screen is displayed, asking the user to enter a preferred username. |
|  |  |
| Stimulus: | The user enters a username and clicks on the *Next* button. |
| Response: | Create a password screen appeared, asking the user to either enter a password or skip creating a password. |

**Skip Creating a Password**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on *Skip creating a password* button. |
| Response: | A Reminder screen appeared, reminding the user of the importance of creating a password. It asked the user if she/ he wants to go back to set up a password or set it later. |
|  |  |
| Stimulus: | The user clicks on *I’ll set it later* button. |
| Response: | A loading screen is displayed until everything is settled up and prompts a message ready to go with Let’s go button. |

**Creating a password**

|  |  |
| --- | --- |
| Stimulus: | On the Reminder screen, the user clicks on *Set up a password* button. |
| Response: | The user is back to Create a password screen. |
|  |  |
| Stimulus: | The user enters a valid password and clicks on the *Next* button. |
| Response: | A screen appeared, asking the user for password confirmation. |
|  |  |
| Stimulus: | The user enters a confirmation password and clicks on the *confirm* button. |
| Response: | The user is prompted to the Security question screen to fill out the form for account recovery in case of a forgotten password. |
|  |  |
| Stimulus: | The user selects three questions from a given list of questions and answers each of them, then clicks on the save button. |
| Response: | A loading screen is displayed until everything is settled up and prompts a message ready to go with Let’s go button. |
|  |  |
| Stimulus: | The user clicks on *Let’s go* button. |
| Response: | The Desktop screen is prompted. |

### 4.1.3 Functional Requirement

Feature Requirements: Sign-up (FR-S)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-S1 | Initial Set-Up | On the first run of BiT OS application on a device, the system must create a BiT OS folder on the main drive (usually C:). BiT OS folder must contain a folder named Accounts. The user then must proceed to sign up. |
| FR-S2 | Sign-up | The user must be able to create an account. Upon the creation of an account, the system must comply with all the requirements specified in the username (FR-S3), password (FR-S4), and Security Questions (FR-S5).  Before the sign-up process ends, the system must create a folder named with the new user's name on the Accounts folder. It must contain folders such as Desktop, Documents, Downloads, Music, and Gallery. |
| FR-S3 | Username | The user shall be able to enter a username.  User names can't contain the following characters: / \ [ ] " : ; | < > + = , ? \* % @  No usernames must be the same. When the user entered a used username, an error message "Username already used." should appear.  The username must be at least one character long before the next button is enabled, and the user can proceed. |
| FR-S4 | Password | Upon creation of an account, the user may or may not create a password.  A password requirement must be imposed upon the creation of a password. Password must have:   * At least one (1) uppercase letter (A - Z) * At least one (1) lowercase letter (a - z) * At least one (1) number (0 - 9) * At least eight (8) characters long   If the requirements are satisfied, only the user can proceed to confirmation password.  The system must always check that the entered password and confirmation password is identical or else an error message "Passwords don't match." must be displayed and should not proceed to the next step. |
| FR-S5 | Security Questions | The user shall be able to fill-up security questions for account recovery in case the user forgot his/her password.  The user must select a question from each of the three drop-down menus and answer them on the text field provided. Once a question is selected, it can't be chosen again in other drop-down menus.  The user must fill all the fields before proceeding to the next step, or else an error message *"This field is required"* is prompted. |
| FR-S6 | Back Button | Throughout the sign-up process, the user must be able to go back to previous screens whenever he/she wants to. |
| FR-S7 | Password Eye | The user must be able to mask and unmask a typed password. This requirement applies whenever the user is asked to enter for a password and confirmation password. |

## 4.2 Log In

### 4.2.1 Description and Priority

The BiT operating system supports the creation of multiple accounts. Login is a feature to protect the user accounts from unauthorized access to accounts and files, especially when someone is trying to guess the users' password. It is where the user selects an account and enter the corresponding password to that account. This feature has a high priority because this is one of the primary functions of any operating system.

### 4.2.2 Stimulus / Response Sequences

|  |  |
| --- | --- |
| Stimulus: | The user runs the system with an existing account/s on a computer device. |
| Response: | A loading screen is displayed while the system is booting up until the lock screen appears. |
| Stimulus: | The user types any key or clicks anywhere on the lock screen. |
| Response: | The Login screen appeared with a password field if the account (first on the list) is password-protected, while a Login screen with a *Sign In* button appeared if not. The Account selection panel, with a list of all user accounts, is displayed at the bottom-left side of the Login screen if there are more than one accounts. |

|  |  |
| --- | --- |
| Stimulus: | The user clicks another account from the list at the bottom left of the Login screen. |
| Response: | The Login screen prompted with a password field if the selected account is password-protected, or a *Sign In* button if not. |

**Password-Protected Account**

|  |  |
| --- | --- |
| Stimulus: | The user whose (selected) account is password-protected, enters a password. |
| Response: | The Desktop screen is displayed if the entered password is correct.  Otherwise, an error message “The password is incorrect. Try again.” is prompted. |

**Non-Password-Protected Account**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the *Sign In* button from the Login screen. |
| Response: | The Desktop screen is displayed. |

**Forgot Password**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the *forgot password* button. |
| Response: | The screen with security questions answering form appeared. |
|  |  |
| Stimulus: | The user answers each question and clicks on the submit button. |
| Response: | The Reset password screen, asking for a new password is prompted to the user if the answers are all correct. Otherwise, an error message “One or more answers are incorrect. Please try again.” is prompted. |
|  |  |
| Stimulus: | After successfully answering the security questions, the user enters a new password and a corresponding confirmation password. |
| Response: | The Login screen is displayed if the confirmation password is matched to the new password. Otherwise, an error message “Passwords don’t match” is prompted. |

**Power Icon**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the power icon. |
| Response: | A context menu appeared with items *Shut down*, *Restart*, and *Sleep*. |
|  |  |
| Stimulus: | The user clicks on the power menu item *Shut down*. |
| Response: | A dialog box appeared asking the user “Are you sure you want to shut down?” with option yes and cancel. |
|  |  |
| Stimulus: | The user clicks on the option yes to shut down. |
| Response: | A loading screen is displayed until the BiT OS application is closed. |
|  |  |
| Stimulus: | The user clicks on the power menu item *Restart*. |
| Response: | A dialog box appeared asking the user “Are you sure you want to restart?” with option yes and cancel. |
|  |  |
| Stimulus: | The user clicks on the option yes to restart. |
| Response: | A loading screen is displayed until the BiT OS application restarted. |
|  |  |
| Stimulus: | The user clicks on the power menu item *Sleep*. |
| Response: | **BiT OS application window is hidden or minimized.** |
|  |  |
| Stimulus: | The user wakes up the computer. |
| Response: | **The user is prompted to the windows lock screen before it proceeds to where the user left off.** |

### 4.2.3 Functional Requirement

Feature Requirements: Log In (FR-L)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-L1 | Booting Screen | The system must start up with a loading screen indicating the booting of the BiT OS. |
| FR-L2 | Lock Screen | Lock Screen appears after the booting, when the user locks an account, or when the system wakes up from sleep (restores minimized BiT OS program window).  It displays the date, time, and battery life icon.  It disappears when the user types any key or clicks the mouse and prompts the user to the Login screen. |
| FR-L3 | Login Screen | The Login screen must contain the following:   * A power icon that enables the user to shut down, restart, and sleep the system * The selected user icon and username at the middle of the screen. * Account selection list at the bottom-left side of the screen for a device with multiple accounts. There must be a highlight on the selected account. By default, the first account on the list is the selected account, unless the user changes it. The list must be visible when there is no current signed in account, otherwise the list must be hidden. * A password field with forgot password button if the selected account is password-protected, or a sign-in button if not. |
| FR-L4 | Enter Password | The user must enter a correct password for password-protected accounts.  If the user tried to press enter without any character on the password field, then an error message *"Provide a password"* will appear. This attempt would not count as a failed attempt.  If the user enters an incorrect password, then an error message *"The password is incorrect. Try again."* will appear. This attempt counts as one failed attempt.  BiT OS has a lockout policy. If the number of failed attempts exceeds the threshold limit of 10, the account will lockout for a period of time and prompts the message, "Due to multiple failed login attempts, this account is currently locked out, and may not be logged on to."  The period of time the account will be locked out would be 3 minutes multiplied by number of times account has been locked out.  During account lockout, other accounts won’t be available unless the lockout duration is over.  Shutting down or restarting the computer, or the BiT operating system must not reset the lockout duration and lockout counter. |
| FR-L5 | Forgot Password | The user must be able to reset his/her password through answering security questions.  For every failed attempt, an error message "One or more answers are incorrect. Please try again." will appear.  If the user tried to submit with at least one blank field, it must not proceed, and an error message "Please fill all the fields" will appear.  Forgot password option is not accessible during account lockout.  Once the user succeeds in answering the security question, reset password screen should appear. |
| FR-L6 | Resetting Password | The user must be able to create a new password. Creating a new password must also comply with the password requirements specified in the Sign-up feature ([FR-S4](#_4.1.3_Functional_Requirement)). After resetting the password, the user must be prompted back to the login screen. |
| FR-L7 | Power | The user must be able to shut down, restart, or sleep the BiT operating system. When the user clicks the power button, a pop-up menu must appear with menu items shut down, restart, and sleep. The power pop-up menu closes when the user clicks anywhere outside of it or clicks again on the power icon.  **Shut down** means closing all applications and turning off BiT OS. When the user clicks the shutdown item, a message screen will show up saying, “*Are you sure you want to shut down?”* The user has option buttons yes and cancel.   * If the user clicks on the yes button, a loading screen will appear indicating the shutdown process, such as closing all the programs until the BiT OS application is closed. * If the user clicks on the cancel button, the message screen disappears and prompts back to where the user left off.   **Restart** means closing all applications, turning off the system, and turning it on again.   * When the user clicks the restart item, a message screen will show up saying, “*Are you sure you want to restart?”* The user has option buttons yes and cancel. * If the user clicks on the yes button, a loading screen will appear indicating the restart process, until the BiT OS application starts again from the beginning. * If the user clicks on the cancel button, the message screen disappears and prompts back to where the user left off.   **Sleep** means putting the computer in to sleep state where it stays on but uses low power. BiT OS stays open so the user can easily go back to how it is left off.   * When the user wakes up the computer, the user must pass through the windows login before the user proceeds to where he/she lefts off. |

## 4.3 Desktop

### 4.1.1 Description and Priority

The desktop is like a home screen of all operating systems. It serves as the base of the system where the first step to interact with a computer takes place. BiT Desktop contains the trash icon, taskbar including menu button, running program icons, battery life icon, brightness icon, volume icon, time & date, and desktop button. This feature is the mainframe of the system, but some of the functional requirements have a medium priority.

### 4.1.2 Stimulus / Response Sequences

**Trash Bin Icon**

|  |  |
| --- | --- |
| Stimulus: | The user double clicks on the trash bin icon. |
| Response: | The program window of trash bin appeared, and the trash bin icon appeared on the taskbar highlighted. |
|  |  |
| Stimulus: | The user clicks on the icon of running program trash bin that is on the taskbar. |
| Response: | The program window of trash bin is hidden or minimized. |
|  |  |
| Stimulus: | The user clicks on again on the icon of running program trash bin that is on the taskbar. |
| Response: | The program window of trash bin restored or appeared back to the desktop. |

**Desktop Button**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the desktop button while there is an active running program. |
| Response: | All opened or prompted program windows on the desktop are minimized or hidden. |

**Brightness**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the brightness icon. |
| Response: | The brightness level slider showed up. |
|  |  |
| Stimulus: | The user moves or drags the slider controller either left or right. |
| Response: | The system checks for the current position of the slider controller whenever there are changes made by the user, and adjusts the device's brightness. |
|  |  |
| Stimulus: | The user clicks anywhere outside the slider or clicks again on the brightness icon. |
| Response: | The slider interface is closed. |

**Volume**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the volume icon. |
| Response: | The volume level slider showed up. |
|  |  |
| Stimulus: | The user moves or drags the slider controller either left or right. |
| Response: | The system checks for the current position of the slider controller whenever there are changes made by the user, and adjusts the device's volume. |
|  |  |
| Stimulus: | The user clicks anywhere outside the slider or clicks again on the volume icon. |
| Response: | The slider interface is closed. |

**Battery**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the battery icon. |
| Response: | A pop-up panel showed up indicating the battery life percentage, remaining battery time, and battery status. |
|  |  |
| Stimulus: | The user clicks outside the battery panel or clicks again on the battery icon. |
| Response: | The battery panel is closed. |

**Menu**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the menu icon at the bottom left corner of the desktop screen. |
| Response: | A pop-up panel showed up containing a power icon, accounts option, search icon, and app-list arranged in alphabetical order. |
|  |  |
| Stimulus: | The user clicks anywhere outside the menu panel or clicks again on the menu icon. |
| Response: | The menu panel interface is closed. |

### 4.1.3 Functional Requirement

Feature Requirements: Desktop (FR-D)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-D1 | Trash Bin Icon | The icon must be emphasized with a highlight if the user clicks the trash bin icon once.  The trash bin application opens, prompts the user its program window, and adds its icon on the taskbar if the user double clicks the trash bin icon on the desktop.    The trash bin program window prompts back and sets it as the active running program if the user double clicks the trash bin icon on the desktop when it is still running but minimized or hidden.  The trash bin program window prompts at the topmost and sets it as the active running program if the user double clicks the trash bin icon on the desktop when it is still running but covered by other program windows. |
| FR-D2 | Desktop Button | If the user clicks the desktop button while all running programs are minimized or hidden, then nothing will happen. Otherwise, all the opened or prompted program windows on the desktop are minimized or hidden but no closed. |
| FR-D3 | Brightness | The user must be able to adjust the device’s brightness using the slider interface or brightness keys (if accessible).  Moving or dragging the slider controller to the left decreases the brightness level while sliding it to the right increases the brightness level. If the user utilizes the brightness keys, the slider must be synchronized.  The slider interface closes when the user clicks anywhere outside of it or clicks again on the brightness icon. |
| FR-D4 | Volume | The user must be able to adjust the device’s volume using the slider interface or volume keys (if accessible).  Moving or dragging the slider controller to the left decreases the volume level while sliding it to the right increases the volume level. If the user utilizes the volume keys, the slider must be synchronized.  The slider interface closes when the user clicks anywhere outside of it or clicks again on the volume icon. |
| FR-D5 | Battery | The user must be able to view information about the device’s battery. The battery panel shows up if the user clicks on the battery icon. This panel informs the user of the following:   * battery life in percentage, * battery time in hours and minutes, and * battery status such as battery-full and plugged in.   The battery panel closes when the user clicks anywhere outside of it or clicks again on the battery icon. |
| FR-D6 | Menu Icon | The menu panel must pop-up if the user clicks the menu icon at the bottom left corner of the desktop screen once.  Menu panel contains a power icon, accounts option, search icon, and app-list arranged in alphabetical order. Each menu component will be discussed in chapter 4.4.  The menu panel closes when the user clicks anywhere outside the menu panel or clicks again on the menu icon. |
| FR-D7 | Running Programs | The taskbar must display the icons of all running programs. One running program equals one program icon.  When a program is closed, its program icon on the taskbar must also be removed.  The user must be able to minimize and restore all running program that has control button minimize.   * When the user clicks on a program icon on the taskbar while its program window is minimized, the system restores the program window and sets it as the active running program. * When the user clicks on a program icon on the taskbar while its program window is open but not active, the system sets it as the active running program. * When the user clicks on a program icon on the taskbar while its program window is the active running program, the system minimizes its program window. |
| FR-D8 | Active Running Program | The active running program is the program prompted at the topmost layer on the desktop. Its icon on the taskbar must be highlighted as an indication that it is active from the rest of the running program icons.  Whenever a window is minimized, maximized, or closed, the system must check for the topmost layer on the desktop and set it as the active program.  If the program is not the active running program anymore, then the highlight on the icon must be removed.  If there is no active running program (all the programs are minimized), then no icon on the taskbar should be highlighted. |
| FR-D9 | Mouse-over | There must be a mouse-hover style to all icons or buttons whenever the mouse cursor points at the icon’s or button’s scope position. |
| FR-D10 | Context-Menu | A context menu must appear showing a short description (could be a name or status) of the icon or button or program whenever the user’s mouse cursor stays at scope position for one second. |
| FR-D11 | Shortcut Keys | The user must be able to interact with the system through shortcut keys.  The following shortcut keys must execute the following commands:   * Open Run Application Ctrl + Alt + R * Open Command Prompt Ctrl + Shift + C * Open Task Manager Ctrl + Shift + T * Open Menu Ctrl + E * Close Applications Alt + 4 |

## 4.4 Menu

### 4.4.1 Description and Priority

The Menu is a sub-feature of the desktop feature. It is a pop-up panel that enables or directs the user to a lot more features. The menu consists of power options to shut down, restart, and sleep the system; account option for signing out and locking and switching accounts; search function to find files or apps for the user; application list that allows the user to open application/s. This sub-feature is the gateway for other features and sub-features of the BiT OS that why it has a high priority.

### 4.4.2 Stimulus / Response Sequences

**Account Option**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the account username with its icon. |
| Response: | A pop-up menu showed up with items lock and sign out. |
|  |  |
| Stimulus: | The user clicks on the item lock. |
| Response: | The lock screen is prompted. |
|  |  |
| Stimulus: | The user clicks on the sign-out item. |
| Response: | The account is signed out and the login screen is prompted. |
|  |  |
| Stimulus: | The user clicks anywhere outside the pop-up menu or clicks again on the account username with its icon. |
| Response: | A pop-up menu is closed. |

**Search Icon**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the search icon. |
| Response: | A search text field is prompted. |
|  |  |
| Stimulus: | The user types a file name and press enter key. |
| Response: | The application list switched to a list of all files or applications that matched the entered word/s. |
|  |  |
| Stimulus: | The user right-clicks on a file from the searched list. |
| Response: | A pop-up options Open and Open file location appeared. |
|  |  |
| Stimulus: | The user clicks on the option Open file location. |
| Response: | The menu panel disappeared, and a new program window of File Manager is created and opened to the specified location of the selected file. |

**Application List**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on an app from the application list. |
| Response: | The menu panel disappeared, and the application is opened, and its icon appeared on the taskbar. |

### 4.4.3 Functional Requirement

Feature Requirements: Menu (FR-M)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-M1 | Power Option | The power option applies the same requirement specified in Log in functional requirements ([FR-L7](#_4.2.3_Functional_Requirement)). |
| FR-M2 | Sign out | The user must be able to sign out. Signing out means closing all applications and logging out on an account. When the user clicks the sign out item, a message screen will show up saying, “Are you sure you want to sign out?” The user has option buttons yes and cancel.   * If the user clicks on yes button, a loading screen will appear indicating the sign-out process, such as closing all the programs until the login screen is displayed. * If the user clicks on the cancel button, the message screen disappears and prompts back to where the user left off. |
| FR-M3 | Lock | The user must be able to lock an account. Locking means prompting the lock screen. It applies the lock screen requirement specified in Log in functional requirements ([FR-L2](#_4.2.3_Functional_Requirement)), where the user must pass the login screen first before proceeding to where he/she lefts off. The locked account be the prompted account on the login screen requirement specified in Log In functional requirements ([FR-L3](#_4.2.3_Functional_Requirement)). |
| FR-M4 | BiT OS Applications | Once the user clicks one of the built-in applications, it applies the active running program requirement ([FR-D8](#_4.1.3_Functional_Requirement_1)) and the running program requirement ([FR-D7](#_4.1.3_Functional_Requirement_1)) discussed in the Desktop feature requirement.  Here’s the list of all built-in application:   * Calculator * Camera * Command Prompt * File Manager * Run * Settings * Task Manager * Text Editor |
| FR-M5 | Application List | The application list is a panel inside the menu panel that contains all the executable applications in alphabetical order. |
| FR-M6 | Search | The user must be able to search for an item, either an app, folder, or file. All items that matched the entered word/s must appear on the searched list.   * The searched list is a panel that masks the application list every time the user searches something using the menu’s search icon. The list must separate BiT OS applications from the computer files. |
| FR-M7 | Right-click Pop-up | All built-in BiT OS applications are not right-clickable. Only the files on the computer are right-clickable. The right-click pop-up options are open and open file location. Clicking the open option prompts the item's program window while clicking the open file location option opens the file manager and prompts to the item's location. |

## 4.5 Settings

### 4.5.1 Description and Priority

This feature is one of the built-in applications of BiT OS. There are two sections under settings, the Accounts, and the System. The Accounts section allows the local user to view the profile of the user, to create, change, or remove a password, and to update security questions. Aside from those, the admin user is allowed to add, remove, and change account types of the other users. The System section allows the users to view information about the device and operating system. This feature solidifies the security function of the BiT operating system, that is why it has a high priority.

### 4.5.2 Stimulus / Response Sequences

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the Settings from the application list. |
| Response: | The program window of settings appeared. The window displayed two sections, namely Accounts, and System. |

**Accounts: Profile Tab**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the Accounts option from the Settings. |
| Response: | For local account: Two tabs appeared, the Security tab and the Profile tab, which is the default screen. Profile tab displayed account's icon, username, and account type.  For admin account: Three tabs appeared, the Security tab, the Profile which is also the default screen, and the Other Users tab. |

**Accounts: Security Tab**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the Security tab. |
| Response: | **The security tab screen is displayed. The user has the option to change or remove the existing password or create one if not yet set. The user also can update security questions and turn on and off or edit lockout policy for an account with a password.** |
|  |  |
| Stimulus: | The user clicks on the **remove** password option. |
| Response: | A dialog pane appeared with a message “*Removing the password makes your account vulnerable to unauthorized access. Are you sure you want to remove it?”* The user has two options, yes and cancel. |
|  |  |
| Stimulus: | The user clicks on the yes button to remove the password. |
| Response: | The dialog pane asked for the user’s current password for verification. |
|  |  |
| Stimulus: | The user enters the current password and clicks on the ok button. |
| Response: | The dialog pane is closed, and the password is removed. The password option changed to set password. |
|  |  |
| Stimulus: | The user clicks on the **set** password option. |
| Response: | A screen asking for a password and confirmation password appeared. |
|  |  |
| Stimulus: | The user enters a valid password and confirmation password and clicks on the Next button. |
| Response: | A screen asking to answer three security questions is displayed if all the inputs are valid such as the password meets the requirements, the confirmation password matched the password. |
|  |  |
| Stimulus: | The user selects three questions from a given list of questions and answers each of them on the provided fields, then clicks on the save button. |
| Response: | A loading screen is displayed until a dialog box appeared saying, “You can now use your password.” |
|  |  |
| Stimulus: | The user clicks on the ok button of the dialog box. |
| Response: | The dialog box is closed, and the password option changed to change and remove. |
|  |  |
| Stimulus: | The user clicks on the **change** password option. |
| Response: | A screen asking for the user’s current password for verification appeared. |
|  |  |
| Stimulus: | The user enters the current password and clicks on the ok button. |
| Response: | A screen asking for a new password and confirmation password appeared. |
|  |  |
| Stimulus: | The user enters a valid password and confirmation password and clicks on the Next button. |
| Response: | A loading screen is displayed until a dialog box appeared saying, “You can now use your new password.” |
|  |  |
| Stimulus: | The user clicks on the **update** security questions option. |
| Response: | A screen asking for the user’s password for verification appeared. |
|  |  |
| Stimulus: | The user enters a password and clicks on the ok button. |
| Response: | A screen with security questions form appeared if the entered password is correct. |
|  |  |
| Stimulus: | The user selects three questions from a given list of questions and answers each of them on the provided fields, then clicks on the save button. |
| Response: | A loading screen is displayed until a dialog box appeared saying, “You have successfully updated security questions.” |

**Accounts: Other Users Tab (**Admin use only**)**

|  |  |
| --- | --- |
| Stimulus: | The admin user clicks on the Other Users tab. |
| Response: | **The other users tab screen is displayed. The admin user has the option to add and remove accounts and change account types.** |
|  |  |
| Stimulus: | The adminuser clicks on the **add** user account option. |
| Response: | The screen displayed a form for creating an account. It asked for account details such as username, password, and confirmation password. |
|  |  |
| Stimulus: | The adminuser enters a username, a valid password, and a confirmation password then clicks on the Next button. |
| Response: | A screen asking to answer three security questions is displayed if all the entered details are valid such as the password meets the requirements, the confirmation password matched the password, and the username is not yet in use. |
|  |  |
| Stimulus: | The adminuser selects three questions from a given list of questions and answers each of them on the provided fields, then clicks on the confirm button. |
| Response: | A dialog box appeared saying that account creation is successful. The newly created account added on the list. |
|  |  |
| Stimulus: | The adminuser clicks on the **remove** option from an account. |
| Response: | A dialog box with the message “*Are you sure to want to delete (Account’s Username) account? Deleting this account will remove all their data from this device.*” appeared. The user has two options, delete account and data or cancel. |
|  |  |
| Stimulus: | The adminuser clicks on the delete account and data option. |
| Response: | A loading screen appeared indicating the process of account deletion until the account is removed from the list. |
|  |  |
| Stimulus: | The adminuser clicks on the **change** **account type** option from a standard user account. |
| Response: | A screen with a drop-down menu containing Standard User and Administrator options appeared. |
|  |  |
| Stimulus: | The adminuser chooses the Administrator option from the drop-down menu and then clicks on the ok button. |
| Response: | The account type of the standard user changed to administrator. |

**System**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the System option from the Settings. |
| Response: | The About screen is displayed containing information about the device and the operating system. |

### 4.5.3 Functional Requirement

Feature Requirements: Settings (FR-E)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-E1 | Set Password | The user using the account without a password must be able to set a password. When the user is setting up a password, it must comply with the password requirement specified in the Sign-up feature ([FR-S](#_4.5.3_Functional_Requirement)4).  After entering a valid password and correct confirmation password, the user proceeds to the Security questions fill-up form specified in the Sign-up feature ([FR-S5](#_4.1.3_Functional_Requirement)).  The process should end with a loading screen and a message, “You can now use your password.” The password options must be changed to change and remove. |
| FR-E2 | Change Password | The user using a password-protected account should be able to change the password. For verification purposes, the user must enter the current password first before proceeding.  The system checks if the entered password is correct so the user could create a new password. Creating a new one must also comply with the password requirements specified in the Sign-up feature ([FR-S](#_4.1.3_Functional_Requirement)4).  The process should end with a loading screen and a message, “You can now use your new password.” The password options must remain to change and remove. |
| FR-E3 | Remove Password | The user using a password-protected account should be able to remove the password.  By clicking the remove password option, a dialog pane must appear with a message “*Removing the password makes your account vulnerable to unauthorized access. Are you sure you want to remove it?”*The user has two options, yes, to continue and cancel, to abort the process.  By continuing the process, the user must enter the current password for verification purposes. The system checks if the entered password is correct so it could remove the account’s password.  The process should end with a loading screen and a message, “Password successfully removed.” The password options must change to set password. The sections Update Security Questions and Account Lockout Policy should be disabled. |
| FR-E4 | Update Security Questions | The user using a password-protected account should be able to update security questions.  For verification purposes, the user must enter the account’s password first before proceeding. If the entered password is correct, the user proceeds to the Security questions fill-up form specified in the Sign-up feature ([FR-S5](#_4.1.3_Functional_Requirement)).  The process should end with a loading screen and a message, “You have successfully updated security questions.” |
| FR-E5 | Add Account | All admin users should be able to add an account. Adding an account goes with the same process and requirements of sign-up ([FR-S2](#_4.1.3_Functional_Requirement)). |
| FR-E6 | Remove Account | All admin users should be able to remove account/s.  Before the deletion of an account, a confirmation dialog must with the message, “*Are you sure to want to delete (Account’s Username) account? Deleting this account will remove all their data from this device.*” Removing an account should also delete the folder of that username from the Accounts folder on the BiT OS folder. |
| FR-E7 | Change Account Type | **All admin users should be able to change the users’ account type, excluding themselves.** |
| FR-E8 | View About | The user must be able to view information about the device such as   * device name * device's manufacturer * processor's manufacturer, model, and clock speed * installed and usable RAM (in GB) * system type   The user must be able to view information about the device's operating system (BiT OS) such as   * logo * version   date of installment |
| FR-E9 | Program Window | Setting’s program window must be resizable and have a title bar named Settings, and control buttons such as minimize, maximize/restore down, and close buttons ([FR-F9](#_4.6.3_Functional_Requirement)). The user is allowed to open only one program window of settings. |
| FR-E10 | Back/Home Button | * The back and home button should prompt back the user to the previous screen or the home screen of the settings window, respectively. |

## 4.6 File Manager

### 4.6.1 Description and Priority

File Manager is also one of the built-in applications of BiT OS. This feature allows the user to navigate and manage drives, folders, and files of the computer. This feature entails the file management function of the BiT operating system, that is why it has a high priority.

### 4.6.2 Stimulus / Response Sequences

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the File Manager from the application list. |
| Response: | The program window of the file manager appeared. The window displayed the My Computer section, including the list of folders such as Desktop, Documents, Downloads, Music, and Gallery, devices and drives list, and a navigation pane at the right side. |
|  |  |
| Stimulus: | The user double clicks on a system folder ( ex. Documents). |
| Response: | The window displayed the Documents section, including all the files and folders stored in it. If there’s no existing file or folder, a text “This folder is empty.” should appear. |
|  |  |
| Stimulus: | The user clicks on the **search box** on the navigation bar, inputs a text or a filename, and presses the enter key or clicks on the enter button. |
| Response: | A list of all files and folders that matched the entered text/s on the current directory and its subdirectories are displayed. |
|  |  |
| Stimulus: | The user selects a folder and clicks on the option **open** on the toolbar. |
| Response: | The window displayed the contents (files and folders) of the selected folder. If there’s no existing file or folder, a text “This folder is empty.” should appear. |
|  |  |
| Stimulus: | The user selects a folder and clicks on the option **open in new window** on the toolbar. |
| Response: | A new program window of file manager displayed the contents (files and folders) of the selected folder. If there’s no existing file or folder, a text “This folder is empty.” should appear. |
|  |  |
| Stimulus: | The user selects an item and clicks on the option **properties** on the toolbar. |
| Response: | The properties window of the selected item appeared. |
|  |  |
| Stimulus: | The user clicks on the option **new folder** on the toolbar. |
| Response: | A dialog box appeared asking the user for a folder name. |
|  |  |
| Stimulus: | The user enters a folder name on the provided text field and clicks ok button. |
| Response: | The file folder, with the specified name, is created. |
|  |  |
| Stimulus: | The user clicks on the option **new** **text** on the toolbar. |
| Response: | A dialog box appeared asking the user for a filename |
|  |  |
| Stimulus: | The user enters a filename on the provided text field and clicks ok button. |
| Response: | The text file, with the specified name, is created. |
|  |  |
| Stimulus: | The user clicks on the text file. |
| Response: | The text file’s icon is highlighted, and the status bar with the number of items selected and file size appeared. |
|  |  |
| Stimulus: | The user press and hold the control key and clicks on the file folder. |
| Response: | The folder’s icon is also highlighted, and the status bar with the number of items selected is updated. |
|  |  |
| Stimulus: | The user clicks on the option **unselect all** on the toolbar. |
| Response: | All the selected items are unhighlighted. The number of selected items disappeared. |
|  |  |
| Stimulus: | The user clicks on the option **select all** on the toolbar. |
| Response: | All the items in that directory are highlighted. The number of selected items appeared. |
|  |  |
| Stimulus: | The user clicks on the option **copy** on the toolbar. |
| Response: | The selected items are copied to the clipboard. |
|  |  |
| Stimulus: | The user clicks on the option **paste** on the toolbar. |
| Response: | The items on the clipboard are pasted in the current directory. If the same filenames exist, there must be unique suffixes on the duplicate files. |
|  |  |
| Stimulus: | The user clicks on the duplicate file folder and clicks the option **cut** on the toolbar. |
| Response: | The duplicate file folder is copied to the clipboard and will be removed after the user pasted it. |
|  |  |
| Stimulus: | The user clicks on the duplicate text file and clicks the option **delete** on the toolbar. |
| Response: | The duplicate text file moved to trash bin. |
|  |  |
| Stimulus: | The user clicks on a text file stored in system folder Documents and clicks the option **rename** on the toolbar. |
| Response: | A text field where the user can change the filename appeared. |
|  |  |
| Stimulus: | The user enters a filename “*Sample”* on the provided text field and clicks enter key. |
| Response: | The text file is renamed“*Sample”.* |
|  |  |
| Stimulus: | The user clicks on the *Sample* text file stored in system folder Documents and clicks the option **move to** on the toolbar. |
| Response: | A dialog box asking the user to enter a location where to move the text file appeared. |
|  |  |
| Stimulus: | The user inputs a valid path location then clicks on the move button. |
| Response: | The file “*Sample”* moved to the Downloads system Folder. |
|  |  |
| Stimulus: | The user clicks on the *Sample* text file stored in the system folder Downloads and clicks the option **copy to** on the toolbar. |
| Response: | A dialog box asking the user to enter a location where to copy the text file appeared. |
|  |  |
| Stimulus: | The user inputs a valid path location then clicks on the copy button. |
| Response: | The file “*Sample”* is copied to the Documents system Folder. |
|  |  |
| Stimulus: | The user double clicks on the *“Sample”* text file stored in system folder Documents. |
| Response: | A program window of a text editor appeared with the contents of the clicked text file. |
|  |  |
| Stimulus: | A standard user double clicks on an admin account folder. |
| Response: | A dialog box with the message “You don’t have permission to access this folder. To continue, enter the authorization password.” appeared. |
|  |  |
| Stimulus: | A standard user enters the owner’s password. |
| Response: | The user is authorized to access it. |

### 4.6.3 Functional Requirement

Feature Requirements: File Manager (FR-F)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-F1 | Program Window | The user must be allowed to open multiple program windows of the file manager at the same time.  The program window of File Manager must:   * Have a title bar named File Manager: (followed by the current file location). * Have control buttons that allow the user to minimize, maximize/restore down, or close the program window (FR-F9) * Have toolbar at the topmost (FR-F4) * Have navigation bar below the toolbar (FR-F6) * Have navigation pane at the right side (FR-F5) * Have the status bar at the bottom (FR-F7) * Have the main screen where items (with details such as file name, date modified, type, size) are displayed * Be resizable |
| FR-F2 | My Computer | My computer section is the default screen/location displayed when the file manager application opens. It contains the system folders, which are the desktop, documents, downloads, music, and gallery, and the devices and drives.  **System Folders**  BiT OS creates referenced system folders that direct to the file location of the current user’s folders. It provides the user with easy access to files on his/her account.   * The user must not have the option to delete them. * The user must be able to open these system folders and the files and folders in it.   **Devices and Drives**  All the devices and drives installed on the computer and including removable drives (ex. Flash drives) and external devices connected on it must be displayed. Each item must have a displayed name. Storage devices must provide information such as used space, free space, and total capacity size.  The only toolbar options enabled in this screen are open and properties, the rest are disabled (FR-F4).   * When the user clicks properties, the properties window for the selected item should appear (FR-F12). * When the user clicks properties when there is no selected item, a program window for system settings must appear displaying the information about the device ([FR-E8](#_4.5.3_Functional_Requirement)). |
| FR-F3 | Item Selection | The user should be able to select (highlight) and unselect (unhighlight) items.   * An item must be selected (highlighted) when the user clicks on an item * An item must be added to the selection when the user holds the control key and clicks on an item. * Selected items must be unselected (unhighlighted) when the user does things that are not stated above. |
| FR-F4 | Toolbar | The toolbar gives the user options to manage files and folders. The user must be able to open, copy, paste, cut, move, delete, rename, select all, unselect all, and create new files or folders.  Toolbar options open, properties, new folder, select all, and unselect all are always enabled (except in My Computer screen). The other options are enabled when there's a selected item.  **Properties**   * The user must be able to see properties about an item. When the user clicks properties, the properties window for the selected item should appear (FR-F12). When the user clicks properties without selected item, then the properties of the current location should appear.   **Opening File / Folder**   * The user must be able to open a file or folder in two ways. The first way is by selecting the item and then clicks the option open on the toolbar (the same way with multiple items). * If selected items are all folders, then an option Open in new window must be enabled. The second one is by double-clicking an item.   **Copying, Cutting and Pasting File / Folder**   * When pasting a copied or cut file/folder, the source file/folder must still exist otherwise, a dialog box with a message, "Item not found. The (filename) is no longer located in (file location)." should appear. * The option paste must be disabled if there the clipboard is empty. * No files of the same type must have the same name. When pasting file with a filename the same as the existing file's name, the system should provide a distinction (like suffix) for the duplicate file's name.   **Renaming or Creating New Text File / Folder**   * When renaming or creating a new file, a dialog box should appear asking the user for a filename. The system should provide a default filename with distinct suffix. * No file or folder name must not contain the following characters: / \ [ ] " : ; | < > + = , ? \* % @ When the user types any of the said characters, the system must block the input character and display the message *“A file name can’t contain the following characters: / \ [ ] " : ; | < > + = , ? \* % @.”* * All the files and folders created using BiT OS must be on the computer's storage and primary operating system. Even when the user turned off the computer or the BiT OS application, the files and folders must remain.   **Copying or Moving File / Folder**   * When copying or moving files/folders to somewhere, a dialog box should appear asking the user for a path location to copy or move the selected items. If the user enters an invalid path location, then an error message “The specified path does not exist” should appear.   **Deleting File / Folder**   * When deleting a file that is currently in use, a dialog with the message "The file is currently in use. Close the file to delete it." with try again and cancel option should appear. * When deleting a folder that is currently open in another program window/s, the program window prompts its parent folder. * A file or folder deleted must be moved to the BiT OS trash bin. To permanently delete the file or folder, the user must delete it in the BiT OS trash bin. Every user must have their own trash bin. |
| FR-F5 | Navigation Pane | The navigation pane contains the hierarchical file system of the computer. It allows the user to traverse the computer's file system starting from My Computer.   * The user must be able to show (expand) or hide (collapse) a folder's or drive's contents through the use of tree's rotating triangles. * The user must be able to go to a location and prompts its content on the main screen by a single or double click on a folder/drive. |
| FR-F6 | Navigation Bar | **Address Bar**   * The user must be able to see the directories hierarchy of the current location/folder. * The user must be allowed to copy the path location on the address bar.   **Back and Forward Button**  The user must be able to go back or forward to previous screens using the back and forward button.  **Search Bar**  The user must be able to search for a file using the search bar. The search covers only the current directory and its subdirectories.   * All the files or folders that match the word/s entered should be displayed. When there is no match found, the message "No items match your search." should appear. |
| FR-F7 | Status Bar | The status bar must display information about the current location and each item on the screen.   * It has three parts, the location status, the item status, and item size. The location status displays the total number of items in the current location, while the item status displays the number of selected item/s. The item size is only applicable to files. The total size of all selected files is the one displayed. * Every time the user selects or unselects item/s or changes screen, the status bar must be updated. |
| FR-F8 | Shortcut Keys | Shortcut Keys are applicable only within this feature and will not work outside or if the application is not active.  The following shortcut keys must function with the corresponding actions:   * Copy Ctrl + C * Cut Ctrl + X * Paste Ctrl + V * Delete Ctrl + D * Select All Ctrl + A |
| FR-F9 | Control Button | **Minimize**   * The user must be able to minimize all opened program windows that have a minimize button. * When the user clicks the minimize button, the program window from where it is invoked is minimized or hidden. If the minimized program window is the active program, then the opened layer behind it must be the active program. If there is no layer behind it, then there must be no active program. (FR-D8)   **Maximize**   * The user must be able to maximize all opened and restored down program windows. * When the user clicks the maximize button, the program window from where it is invoked must occupy the entire screen and set as the active running program.   **Restore Down**   * The user must be able to restore down all opened and maximized program. * When the user clicks the restore down button, the program window from where it is invoked must return the window to the size it was before it was maximized.   **Close**   * The user must be able to close opened program windows. * When the user clicks the close button, the program window from where it is invoked must be closed and must remove the icon on the taskbar (FR-D7). The system must update the active running program (FR-D8). |
| FR-F10 | User Account Control | All standard users are not allowed to access folders from the other users, particularly for password-protected accounts. If they try to access locations/folders from the other users, a dialog box asking for the user password must appear. If the user enters the correct password, then access should be granted. Otherwise, a message "Incorrect password" should appear.  All admin users can access folders from other standard users. If they try to access locations/folders of another admin user, a dialog box with the message "You don't currently have permission to access this folder. Click continue to get access to this folder." and continue and cancel button should appear. By continuing, access should be granted. |
| FR-F11 | System Control | The system must block any attempts to delete folders BiT created by the system that must be sustained for the system to work properly. |
| FR-F12 | Properties Window | The properties window must:   * Have a title bar named Properties: (followed by the name of the item). * Have control button close (FR-F9) * Display information about the item. * **Files and Folders**   Displays information such as file name, file type, size, location, and date created.   * **Drive**   Displays information such as name, type, used space, free space, and total capacity size.   * **Device**   Displays information such as name, model name and manufacturer. |

## 4.7 Trash Bin

### 4.7.1 Description and Priority

Trash Bin is a storage location of deleted files on a computer device. This feature prevents unwanted data lost, especially in case of accidental deletion of files. Deleting files using BiT OS would not permanently delete them, but are moved to the trash bin. The trash bin stores all the deleted files, where the user can restore them. Deleted files remain in the trash bin, not until the user deletes them in it or empties it. This feature is part of the file management function that includes data recovery function. It is then, has a high priority.

### 4.7.2 Stimulus / Response Sequences

|  |  |  |
| --- | --- | --- |
| Stimulus: | The user clicks on the Trash Bin icon on the desktop. |  |
| Response: | The program window of the trash bin appeared. The window displayed deleted items from the computer. The user has the option to empty the trash bin, delete items, restore items, or restore all. |  |
|  |  |  |
| Stimulus: | The user clicks the **empty trash bin** on the Trash Bin Tools. |  |
| Response: | A warning dialog with the message “Are you sure you want to permanently delete all of these items?” with the option yes or no appeared. |  |
|  |  |  |
| Stimulus: | The user clicks the yes button option. |  |
| Response: | All the items in the trash bin are permanently deleted and the text “This folder is empty” appeared. |  |
|  |  |  |
| Stimulus: | The user selects items and clicks the **delete selected items** on the Trash Bin Tools. |  |
| Response: | A warning dialog with the message “Are you sure you want to permanently delete these (number of items) items?” with the option yes or no appeared. |  |
|  |  |  |
| Stimulus: | The user clicks the yes button option. |  |
| Response: | All the selected items are permanently deleted. |  |
|  |  |  |
| Stimulus: | The user clicks the **restore selected items** on the Trash Bin Tools. |  |
| Response: | All the selected items are restored to their origin file location. |  |
|  |  |  |
| Stimulus: | The user clicks the **restore all items** on the Trash Bin Tools. |  |
| Response: | A warning dialog with the message “Are you sure you want to restore all the items from the trash bin?” with the option yes or no appeared. |  |
|  |  |  |
| Stimulus: | The user clicks the yes button option. |  |
| Response: | All the items in the trash bin are restored to their origin file location. |  |
|  |  |  |
| Stimulus: | The user selects an item and clicks **open** on the Home Tools. |  |
| Response: | The properties window of the selected item appeared. |  |
|  |  |  |
| Stimulus: | The user selects an item and clicks **properties** on the Home Tools. |  |
| Response: | The properties window of the selected item appeared. |  |
|  |  |  |
| Stimulus: | The user clicks **properties** on the Home Tools without a selected item. |  |
| Response: | The properties window of the trash bin appeared. |  |

### 4.7.3 Functional Requirement

Feature Requirements: Trash Bin (FR-T)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-T1 | Program Window | The user is allowed to open only one program window of the trash bin. It must be coordinated with trash bin icon requirements specified in Desktop feature ([FR-D1](#_4.1.3_Functional_Requirement_1)).  The program window of trash bin must:   * Have a title bar named Trash Bin * Have control buttons that allow the user to minimize, maximize/restore down, or close the program window ([FR-F9](#_4.6.3_Functional_Requirement)) * Have toolbar that is switchable between two ribbons, trash bin tools, and home tools, placed at the topmost * Have search box * Have the status bar at the bottom (same as [FR-F](#_4.6.3_Functional_Requirement)7) * Have the main screen where items are displayed * Be resizable |
| FR-T2 | Trash Bin Tools | **Empty Trash Bin**  The user must be able to delete all items on the trash bin by emptying the trash bin. When the trash bin is empty, the text “This folder is empty.” should appear.  **Delete Selected Items**  The user must be able to select items on the trash bin and deletes them.   * Deleting a single file, the warning dialog with the message “Are you sure you want to permanently delete this file?” should appear. * Deleting multiple files, the warning dialog with the message “Are you sure you want to permanently delete these (number of items) items?” should appear.   **Restore Selected Items**  The user must be able to select items on the trash bin and restores them. The items must be transferred back to their respective origins.  **Restore All Items**  The user must be able to restore all items in the trash bin. The text “This folder is empty.” should appear after the restoration of files. |
| FR-T3 | Home Tools | Home tools are the toolbar in the file manager. The difference is only Open, Properties, Select All, and Unselect All are enabled.  **Open and Properties**   * The user shall be able to open an item by selecting it and clicking the open option on the home tools, or just by double-clicking it. Opening an item or clicking the properties option will prompt the user to the properties window (FR-T7) of a selected item. * When the user selects multiple items, the open and properties option must be disabled.   **Trash Bin Properties**   * When the user clicks properties when there is no selected item, the trash bin properties window should appear. * It must have a title bar named Trash Bin Properties, control button close ([FR-F9](#_4.6.3_Functional_Requirement)), and display information such as trash bin location (storage device), and the available space on it. |
| FR-T4 | Search Box | The user must be able to search for an item in the trash bin using the search box. All the files or folders that match the word/s entered should be displayed. When there is no match found, the message "No items match your search." should appear. |
| FR-T5 | Shortcut Keys | Shortcut Keys are applicable only within this feature and will not work outside or if the application is not active.  The following shortcut keys must function with the corresponding actions:   * Delete Ctrl + D * Select All Ctrl + A |
| FR-T6 | Item Selection | The user should be able to select (highlight) and unselect (unhighlight) items. It applies the same requirement specified in File Manager functional requirements ([FR-F](#_4.6.3_Functional_Requirement)3). |
| FR-T7 | Properties Window | The properties window must:   * Have a title bar named Properties: (followed by the name of the item). * Have control button close ([FR-F9](#_4.6.3_Functional_Requirement)) * Display information about the item such as file name, type, origin, size, date deleted, and date created. * Have a restore button option. When the user restored an item, the window is closed, and the item must be back to its origin. |

## 4.8 Task Manager

### 4.8.1 Description and Priority

The task manager is also one of the built-in applications of BiT OS. This feature allows the user to create or end tasks or processes and gives useful information, such as the system’s overall resource usages. It has a high priority because one of the primary functions of BiT OS is to provide users a computer activity monitoring.

### 4.8.2 Stimulus / Response Sequences

|  |  |  |
| --- | --- | --- |
| Stimulus: | The user clicks on the Task Manager from the application list. |  |
| Response: | The program window of the task manager appeared. The window displayed the list of all processes/programs running on the computer with their corresponding name, status, CPU usage, memory usage, disk usage. |  |
|  |  |  |
| Stimulus: | The user clicks one of the running programs on the list. |  |
| Response: | The process is selected (highlighted), and the end task button is enabled. |  |
|  |  |  |
| Stimulus: | The user clicks the **end task** button. |  |
| Response: | If there are no pending activities (ex. warning dialog from unsaved file) that interrupt the closing process, then the program window of the selected program is closed. Otherwise, a program status (ex. Not Responding) must appear. |  |
|  |  |  |
| Stimulus: | The user clicks the **new task** button. |  |
| Response: | The run program window, where the user can type the name of an application, file or folder to open, prompted to the user. |  |
|  |  |  |
| Stimulus: | The user types the name of an application. |  |
| Response: | If the user typed a valid application, file or folder name, then its program window is opened. |  |

### 4.8.3 Functional Requirement

Feature Requirements: Task Manager (FR-TM)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-TM1 | Program Window | The user is allowed to open only one program window of the task manager.  The program window of task manager must:   * Have a title bar named Task Manager * Have control buttons that allow the user to minimize, maximize/restore down, or close the program ([FR-F9](#_4.6.3_Functional_Requirement)) * Have the main screen where the list of running processes and their resource usage are displayed * Be resizable |
| FR-TM2 | Run New Task | The user must be able to run a new task.   * When the user clicks the run new task button, the program window of Run application (see [chapter 9](#_4.9_Run)) appears. All the inputs to the task manager must be blocked while the run application is open. |
| FR-TM3 | End Task | The user must be able to end a task.   * When the application blocked the end task process, a status update must appear. |
| FR-TM4 | Processes/Programs Resource Usage | The list with all the running programs/ applications or processes in BiT OS must be displayed. It must include the following information:   |  |  | | --- | --- | | Process ID | The process identifier number. | | Process Name | The file name of the process. | | Status | The current state of a process either running, not responding, or suspended. | | CPU Usage | The CPU usage/utilization of the process computed in percentage from the total available resources. | | Memory Usage | The amount of physical memory the process is currently using by in MB or GB. | | Disk Usage | The disk utilization or activity of a process in MB/s | |
| FR-TM5 | Tasks | When a program is opened, it must be added to the list of running programs. There must be an allocation of resources to that application.  When a program is closed, it must be removed from the list of running programs.  The system must be able to handle multiple programs running at the same time and must be able to prioritize tasks. |

## 4.9 Run

### 4.9.1 Description and Priority

Run is also one of the built-in applications of the BiT operating system. Although it appears in the task manager application, it can also run as a program independently. This feature, by the name itself, allows the user to run a process, either a program, file, or folder. It functions just like the search from the menu feature, and the main purpose of it is to serve task manager for the creation of a new task, that's why it has a medium priority.

### 4.9.2 Stimulus / Response Sequences

|  |  |  |
| --- | --- | --- |
| Stimulus: | The user clicks run from the application list. |  |
| Response: | The small program window of run with a search box and buttons run, cancel, and browse appeared. |  |
|  |  |  |
| Stimulus: | The user types a name on the search box and clicks the run button. |  |
| Response: | If the user typed a valid application, file, or folder name, then its program window is opened. |  |
|  |  |  |
| Stimulus: | The user clicks the browse button. |  |
| Response: | A file browser where the user can select a file or program to open appeared. |  |
|  |  |  |
| Stimulus: | The user selects a file and clicks open. |  |
| Response: | The path location of the selected file appeared on the search box. |  |
|  |  |  |
| Stimulus: | The user clicks on the run button. |  |
| Response: | The file, through its corresponding application, is opened. |  |

### 4.9.3 Functional Requirement

Feature Requirements: Run (FR-R)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-R1 | Program Window | The user is allowed to open only one program window of Run application.  The program window of Run must:   * Have a title bar named Run * Have a control button close ([FR-F9](#_4.6.3_Functional_Requirement)) * Have the main screen with a search box, and buttons run, cancel, and browse * Not be resizable |
| FR-R2 | Search & Run | The user must be able to search for and run a program, file, or folder at the same time using the run application.   * The run button is enabled only when the search box has at least one character. * The user must enter a valid name of application, files, or folder, for the system to open or run it. If the system failed to find the specified name, an error dialog with the message “(Entered Name) not found. Make sure you typed the name correctly and then try again.” should appear. * If the search and run are successful, then the program window of the searched item appears, while the run program window closes. * If the search and run are unsuccessful, the user can search and run again, after the error dialog is closed. |
| FR-R3 | Browse | The user also must be able to browse for a program, folder, or file name to run using the run application.   * When the user clicks on the browse button, a file browser must appear where the user could select the file name to open. File browser applies the same requirement specified in Text Editor feature ([FR-TE3](#_4.11.3_Functional_Requirement)). * When the user triggered the open button from the file chooser, the path of the file appears on the search box. |

## 4.10 Command Prompt

### 4.10.1 Description and Priority

Command Prompt is also one of the built-in applications of the BiT operating system. This feature provides a text-based user interface where the user can enter commands to execute and perform advanced administrative functions.

### 4.10.2 Stimulus / Response Sequences

|  |  |  |
| --- | --- | --- |
| Stimulus: | The user clicks the Command Prompt from the application list. |  |
| Response: | The console program window of Command Prompt appeared. By default, the screen **prompted** "**C:\BiTOS\Accounts\***Username***>**" where the Username is the user’s directory. |  |
|  |  |  |
| Stimulus: | The userenters the command " cd .. " in the command line. |  |
| Response: | The current directory moved backward to its parent directory.  **C:\BiTOS\Accounts>** |  |
|  |  |  |
| Stimulus: | The userenters the command " cd <Path> " in the command line, where the <Path> is a path location within the current drive user wants to go. |  |
| Response: | The current directory moved forward to the specified path.  **C:\BiTOS\Accounts\**Path**>** |  |
|  |  |  |
| Stimulus: | The userenters the command " cd <DriveLetter:> " in the command line, where the DriveLetter is the drive's letter the user wants to go. |  |
| Response: | The drive is changed if the user entered a different drive letter.  DriveLetter**:\>** |  |
|  |  |  |
| Stimulus: | The userenters the command " cd /d <Drive:\DirectoryPath> " in the command line to change the drive and the directory at the same time. |  |
| Response: | The current location changed to the specified drive and directory path.  DriveLetter**:\** DirectoryPath **>** |  |
|  |  |  |
| Stimulus: | The userenters the command " cls " in the command line. |  |
| Response: | All the text on the screen is cleared, and only left the current location or directory. |  |
|  |  |  |
| Stimulus: | The userenters the command " dir " in the command line. |  |
| Response: | A list of all the contents (files and directories) of the current location is displayed. |  |
|  |  |  |
| Stimulus: | The userenters the command " copy <Source> <Destination> " in the command line, where <Source> is a name of the file being copied, and <Destination> is the path where to paste the source file. |  |
| Response: | The source file is copied to the specified destination path. |  |
|  |  |  |
| Stimulus: | The userenters the command " move <Source> <Destination> " in the command line, where <Source> is a name of the file being moved, and <Destination> is the path where to transfer the source file. |  |
| Response: | The source file is moved to the specified destination path. |  |
|  |  |  |
| Stimulus: | The userenters the command " del <Name> " in the command line, where <Name> is the file name to delete on the current directory. |  |
| Response: | The file is deleted. |  |
|  |  |  |
| Stimulus: | The userenters the command " ren <FilePath> <NewName> " in the command line, where <FilePath> is the path of the file to rename, and <NewName> is the replacement filename. |  |
| Response: | The file is renamed. |  |
|  |  |  |
| Stimulus: | The userenters the command " start <Program> " in the command line. |  |
| Response: | The specified program is opened and run. |  |
|  |  |  |
| Stimulus: | The userenters the command " tasklist " in the command line. |  |
| Response: | A list of all running programs is displayed. |  |
|  |  |  |
| Stimulus: | The userenters the command " taskkill /pid <processID> " in the command line, where the <processID> is the Process ID of a program to end. |  |
| Response: | The process/program with the given ID is ended and closed. |  |
|  |  |  |
| Stimulus: | The userenters the command " echo <*String*>" in the command line, where the string is any text that the wants to print on the screen. |  |
| Response: | The text is displayed. |  |
|  |  |  |
| Stimulus: | The userenters the command " exit " in the command line. |  |
| Response: | The command prompt program window is closed. |  |
|  |  |  |
| Stimulus: | The userenters the command " shutdown /r " in the command line. |  |
| Response: | The BiT OS restarted. |  |
|  |  |  |
| Stimulus: | The userenters the command " shutdown /s " in the command line. |  |
| Response: | The BiT OS closed. |  |

### 4.10.3 Functional Requirement

Feature Requirements: Command Prompt (FR-CP)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-CP1 | Program Window | The user must be allowed to open multiple program windows of Command Prompt at the same time.  The program window of Command Prompt must:   * Have a title bar named Command Prompt * Have control buttons that allow the user to minimize, maximize/restore down, or close the program window ([FR-F9](#_4.6.3_Functional_Requirement)) * Have console screen where the inputs, such as commands, are typed/entered and, the corresponding output is displayed. * Be resizable |
| FR-CP2 | CD Command | The user must be able to traverse the computer file system using command prompt through CD command.  **Command: cd ..**  When the user types "cd" and two consecutive dots ".." and press enter regardless if they have space between them or not, the system must change the current directory back to its parent directory.  **Command: cd [<Path>]**  When the user types "cd" space Path and press enter, the system must change the current location to the path specified. The **path** refers to two things, a full path or a directory path.   * A **full path** specifies the drive, directory, and subdirectories (if needed), so the format should look like this:   current\_drive:\directory\subdirectory  In this command, it does not allow to change the current location to a different drive. The user must enter a path that is within the current drive, or else the system disregards it. To change the drive, the user must follow the next cd command.   * A **directory path** specifies the directory from the current location and its subdirectories (if needed), so the format should look like this: directory\subdirectory   **Command: cd [<DriverLetter>:]**  When the user types "cd" space DriveLetter followed by a colon ":" and press enter, the system must change the current location to the specified new drive.  **Command: cd /d [<DriverLetter>:][\<Path>]**  When the user types "cd" space "/d" space DriveLetter colon":" backslash"\" followed by DirectoryPath and press enter, the system must change the current location to the specified location. |
| FR-CP3 | CLS Command | The user must be able to clear the screen of command prompt using CLS command.  **Command: cls**  When the user types "cls" and press enter, the system must clear all the text on the command prompt window. If the echo is on, then the current location should appear after it is cleared. |
| FR-CP4 | DIR Command | The user must be able to see all the contents, such as files and directories, of a directory using DIR command.  The screen should display a list with the following information:   * Current location/directory * Date and Time of creation * Files' types (File or Directory) * Files' name * Files' size * Total number of files and their size * Total number of directories * Total free space of the drive   **Command: dir**  When the user types "dir" and press enter, the system must display the contents of the current directory.  **Command: dir <Path>**  When the user types "dir" space Path and press enter, the system must display the contents of the specified path. Path refers to the same things as specified in CD Command (FR-CP2) but allows full path from other drives. |
| FR-CP5 | COPY Command | The user must be able to copy a file located in the current directory to another location.  **Command: copy <Source> <Destination>**  When the user types "copy" space Source space Destination and press enter, the system must copy the specified source file to the specified destination path.    **Source** refers to two things, a filename or a file path.   * A **filename** is the name of the file (including the file extension) in the current location. * A **file path** specifies the drive, directory, and optional filename if the user wants to create a new filename. * Filename or File path with space(s) must be enclosed with double-quotes.   **Destination** is a path (FR-CP2) or a **file path** (FR-CP5) where to place the source file. Path location with space(s) must be enclosed with double-quotes.  **Duplicate Copies**  If destination file path matches an existing file name, then the file will be overwritten and displays the message “(?) file(s) overwritten.”, where (?) specifies the total number of files overwritten.  After the process, regardless if copied or not, the system must display the message “(?) file(s) copied.”, where (?) specifies the total number of files copied. |
| FR-CP6 | MOVE Command | The user must be able to move a file to another location.  **Command: move <Source> <Destination>**  When the user types "move" space Source space Destination and press enter, the system must move the specified source file to the specified destination path.  **source** and **destination** refer to the same things as specified in COPY Command (FR-CP5).  **Duplicate Copies**  If destination file path matches an existing file name, the existing file will be overwritten and displays the message “(?) file(s) overwritten.”, where (?) specifies the total number of files overwritten.  After the process, regardless if moved or not, the system must display the message “(?) file(s) moved.”, where (?) specifies the number of files moved. |
| FR-CP7 | DEL Command | The user must be able to delete a file or a directory. Once the process is successful, the system must display the message “deleted successfully.”  **Command: del <Name>**  When the user types "del" space Name and press enter, the system must permanently delete the specified file or directory. **The name refers to the same thing as the source or destination specified in COPY Command (FR-CP5).** |
| FR-CP8 | REN Command | The user must be able to rename a file from the current directory or from a specified path. Once the process is successful, the system must display the message “renamed successfully.”  **Command: ren <FileName1> <FileName2>**  When the user types "ren" space FileName1 space FileName2 and press enter, the system must rename the filename of the specified file, **FileName1** with **FileName2** in the current directory.  **Command: ren <*FilePath*> <NewName>**  When the user types "ren" space FilePath space NewName and press enter, the system must rename the file specified in the file path with the new name. The **file path, just like path (FR-CP2), can be full or directory but must specify the filename.**  **Duplicate Copies**  If the file path matches an existing file name, then the system displays the message " A duplicate file name exists, or the file cannot be found."  **File Not Fount**  If there is no match with specified the file path, then the system displays the message " A duplicate file name exists, or the file cannot be found." |
| FR-CP9 | START Command | The user must be able to start a program, a folder, or a file using command prompt through START commands.  **Command: start**  When the user types "start" and press enter, the system must open a new program window of command prompt.  **Command: start <*Program*>**  When the user types "start" space Program and press enter, the system must open the specified program. The **program** can be a file, folder, or application located in the current directory or with the specified **file path**. |
| FR-CP10 | TASKLIST Command | The user must be able to see a list of all running programs or processes using command prompt through the TASKLIST command.  When the user types "tasklist" and press enter, the system must display all the running programs with the following information: Process ID, Process name, Memory usage, CPU usage, Disk usage ([FR-TM4](#_4.8.3_Functional_Requirement)) and Session Name.   * **Session Name** - identifies what type of session is a process. Session names could be: * Console - Application that runs with the user interface. * Services - Application that runs in the system background without user interface. |
| FR-CP11 | TASKKILL Command | The user must be able to end a running program using command prompt through the TASKKILL command.  **Command: taskkill /pid <*Pr*ocessID>**  When the user types "taskkill" space "/pid" space ProcessID and press enter, the system must end or terminate the program of the specified process ID. The user must enter a valid existing process ID, or else the system displays the message "ERROR: The process (ProcessID) not found."  **Command: taskkill /pn <*Pr*ocessName>**  When the user types "taskkill" space "/pn" space ProcessName and press enter, the system must end or terminate the program of the specified process Name. The user must enter a valid existing process name, or else the system displays the message "ERROR: The process (ProcessName) not found." |
| FR-CP12 | ECHO Command | The user must be able to use echo commands.  **Command: echo <*String*>**  When the user types "echo" space "String" and press enter, the system displays the specified string. |
| FR-CP13 | EXIT Command | The user must be able to close the command prompt program window using the EXIT command. |
| FR-CP14 | SHUTDOWN Command | The user must be able to shut down or restart BiT OS. These commands apply the same requirement specified in Log in functional requirements ([FR-L7](#_4.2.3_Functional_Requirement)).  **Command: shutdown /s**  When the user types "shutdown" space "/s" and press enter, the BiT OS shuts down and closes.  **Command: shutdown /r**  When the user types "shutdown" space "/r" and press enter, the BiT OS restarts. |
| FR-CP15 | Error Handling | When the user commits a mistake either with the syntax or parameter, the system must be able to handle and respond those mistakes.  **General**   * The user must enter a valid existing path, or else the system displays the message "**The system cannot find the path specified."** * The user must enter a valid existing drive, or else the system displays the message "**The system cannot find the drive specified**." * The user must enter a path with access permission, or else the system displays the message "**Access denied.**"   **Applied in DIR, COPY, MOVE, DEL, REN, START**   * The user must enclose with double-quotes directories, filename, or file path that contains space(s), or else the system displays the message "**The syntax of the command is incorrect.**"   **Applied in DEL Command**  The user must enter a valid file path, or else the system displays the message "Could not found (File Path)." |
| FR-CP16 | Unknown Syntax | When the user enters an invalid or unknown command, the system must display the message “(Entered Invalid Syntax) is not recognized as an internal or external command operable program or batch file.” |

## 4.11 Text Editor

### 4.11.1 Description and Priority

Text Editor is a pre-installed application of BiT OS. This feature allows the user to create, open, edit, and save plain text files. Files saved using text editor are in .txt file extension format. It has a medium priority.

### 4.11.2 Stimulus / Response Sequences

|  |  |
| --- | --- |
| Stimulus: | The user clicks the Text Editor from the application list. |
| Response: | The program window of the text editor appeared. The window has a text area in the middle where the user can input text. |

**File Tab**

|  |  |
| --- | --- |
| Stimulus: | The user clicks the New command on the File tab. |
| Response: | A new program window of a text editor with a blank text area appeared. |
|  |  |
| Stimulus: | The user clicks the **Open** command on the File tab. |
| Response: | A file chooser that allows the user to browse and select a text file appeared. |
|  |  |
| Stimulus: | The user clicks the **Save** command on the File tab. |
| Response: | The text document is automatically updated or saved if it has an existing file. Otherwise, a file chooser is prompted to the user, where he/she can specify the filename and the location where to save the text document. |
|  |  |
| Stimulus: | The user clicks the **Save as** command on the File tab. |
| Response: | A file chooser is prompted to the user to specify the name and select a location where to save a new instance of the text document. |
|  |  |
| Stimulus: | The user clicks the **Print** command on the File tab. |
| Response: | A print dialog box is prompted to the user to set up printing details and to print the document. |
|  |  |
| Stimulus: | The user clicks the **Exit** command on the File tab. |
| Response: | The program window of the text editor is closed when the last changes made in the text document is saved. Otherwise, the confirmation dialog box with the message "Do you want to save changes to (text filename)?" appeared. |

**Edit Tab**

|  |  |
| --- | --- |
| Stimulus: | The user types something in the text area. The user clicks on the Edit tab. |
| Response: | Edit tab with commands select all, undo, redo, cut, copy, paste, delete, find, and replace is displayed. |
|  |  |
| Stimulus: | The user clicks **Select all** command on the Edit tab. |
| Response: | All the text in the text area is selected (highlighted). |
|  |  |
| Stimulus: | The user clicksthe **Copy** command on the Edit tab. |
| Response: | The selected text is copied to the clipboard. |
|  |  |
| Stimulus: | The user clicks the **Paste** command on the Edit tab. |
| Response: | The text on the clipboard is pasted (inserted) to the text area. |
|  |  |
| Stimulus: | The user clicks the **Cut** command on the Edit tab. |
| Response: | The selected text is copied to the clipboard and removed from the text area. |
|  |  |
| Stimulus: | The user clicks the **Delete** command on the Edit tab. |
| Response: | The selected text is removed from the text area. |
|  |  |
| Stimulus: | The user clicks the **Undo** command on the Edit tab. |
| Response: | The last action or change made or done by the user with the text is undone. |
|  |  |
| Stimulus: | The user clicks the **Redo** command on the Edit tab. |
| Response: | The action or change that has been undone by the user is back or done again. |
|  |  |
| Stimulus: | The user clicks **Find** command on the Edit tab. |
| Response: | A find box where the user can input the text to search appeared. |
|  |  |
| Stimulus: | The user types a word on the search text field and clicks the Next button. |
| Response: | The first or next text that matched the text pattern is selected. |
|  |  |
| Stimulus: | The user clicks on the previous button. |
| Response: | The last or previous text that matched the text pattern is selected. |
|  |  |
| Stimulus: | The user clicks the **Replace** command on the Edit tab. |
| Response: | A replacement box where the user can input the text to search and the replacement text appeared. |
|  |  |
| Stimulus: | The user types a text on the search text field and on the replace text field and clicks on the Replace button. |
| Response: | The first or next text that matched the search text pattern is selected and replaced with the given replacement text pattern. |
|  |  |
| Stimulus: | The user types a text on the search text field and on the replace text field and clicks Replace All button. |
| Response: | All text that matched the search text pattern is selected and replaced with the given replacement text pattern. |
|  |  |
| Stimulus: | The user clicks the Find Next button. |
| Response: | The next text that matched the search text pattern is selected. |

**Format Tab**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the Format tab. |
| Response: | Format tab with commands text wrap, bold, italic, underline, and a drop-down list of font and font size is displayed. |
|  |  |
| Stimulus: | The user clicks **Wrap Text** command on the Format tab. |
| Response: | The text area wrapped the content text within the viewing area. |
|  |  |
| Stimulus: | The user clicks again **Wrap Text** command on the Format tab. |
| Response: | The text area unwrapped the content text within the viewing area. |
|  |  |
| Stimulus: | The user clicks the **Font** drop-down arrow on the Format tab. |
| Response: | A drop-down list of fonts appeared. |
|  |  |
| Stimulus: | The user selects a font from the drop-down list. |
| Response: | The text changed to the newly selected font. |
|  |  |
| Stimulus: | The user clicks the **Font Size** drop-down arrow on the Format tab. |
| Response: | A drop-down list of font sizes appeared. |
|  |  |
| Stimulus: | The user selects a font size from the drop-down list. |
| Response: | The text changed to the newly selected font size. |
|  |  |
| Stimulus: | The user clicks the **Bold** command on the Format tab. |
| Response: | The text is bolded. |
|  |  |
| Stimulus: | The user selects a text and clicks the **Italic** command on the Format tab. |
| Response: | The text is italicized. |
|  |  |
| Stimulus: | The clicks the **Underline** command on the Format tab. |
| Response: | The text is underlined. |

**View Tab**

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the View tab. |
| Response: | View tab, with the zoom tool and status checkbox, is displayed. |
|  |  |
| Stimulus: | The user clicks on the **Zoom In** button. |
| Response: | The text area zoomed in displayed. |
|  |  |
| Stimulus: | The user clicks on the **Zoom Out** button. |
| Response: | The text area zoomed out displayed. |
|  |  |
| Stimulus: | The user clicks (checks) on the **Status** checkbox. |
| Response: | The status bar indicating the current line and column number is displayed. |
|  |  |
| Stimulus: | The user clicks again (unchecks) on the **Status** checkbox. |
| Response: | The status bar indicating the current line and column number disappeared. |

### 4.11.3 Functional Requirement

Feature Requirements: Text Editor (FR-TE)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-TE1 | Program Window | The user must be allowed to open multiple program windows of Text editor at the same time.  The program window of text editor must:   * Have a title bar named Text Editor: (followed by the text file name). If the text document doesn’t have a file name yet, then the default file name “Untitled No.” is displayed. * Have control buttons that allow the user to minimize, maximize/restore down, or close the program window ([FR-F9](#_4.6.3_Functional_Requirement)) * Have toolbar that is switchable between four tabs, file, edit, format, and view tab, placed at the top * Have the status bar indicating the current line and column no. and the zoom percentage at the bottom * Have the text area where the user inputs/ types text in the middle * Be resizable |
| FR-TE2 | File Tab | Through the File tab commands, the user must be able to create new, open existing, save, save as a new file and print the text document, and close the text editor.   * **New** - must prompt a new program window of text editor. * **Save** - must prompt a file chooser to save a file that is not yet stored in a location. Otherwise, it must save changes and disables the save option. * **Save as** - must prompt the user to a file chooser to save a new instance of a file. * **Open** - must prompt the user to a file chooser to open a file of known file type (.txt file). Only one instance of the text editor program window is allowed per text file. * **Print** - must prompt the user to a print dialog. * **Close** - must close only the program window of the text editor where it is invoked. Closing a text document with unsaved changes, a confirmation dialog with the message "Do you want to save changes to (text filename)?” should appear. |
| FR-TE3 | File Chooser | File chooser is like the file manager window that allows the user to traverse the computer file system and to either open a file or save a file.  File chooser dialog contains the following:   * Title bar that displays the application's logo from which the file chooser dialog is invoked and with a specified purpose such as browse, open, or save. * A drop-down menu of all the file manager's tools excluding move to and copy to (FR-F4) * Navigation Bar (FR-F6) * Navigation Pane (FR-F5) * Filename text field where the user can input the name of a file to save or open. * File type selection box that defines the type of a file to save or open. * Open / Save button * Close & Cancel button to close the dialog and prompts back to the screen that invoked the file chooser.   When the user tries to save a file with a filename the same as the existing file's name of the same type, a dialog with the message "(Filename) already exists. Do you want to replace it?" with option yes and no should appear. When the user clicks yes, the file overwrites it. Otherwise, the dialog box is closed and prompts back the user to the file chooser.  When the user types a file name and tries to open it, the file name must be valid and exists otherwise, a dialog with the message "File not found. Check the file name and try again." should appear.  When the user tries to open or save a file on a location that requires administrator permission, a dialog with the message "You don't have permission to save in this location. Contact the administrator to obtain permission." |
| FR-TE4 | Edit Tab | The user must be able to do the following commands, select all, undo, redo, cut copy, paste, delete, find, and replace in the Edit tab.   * Enabled commands from the start are Select all, Find, Replace. * By default, Undo & Redo commands are disabled. When the user starts typing, undo must be enabled as long as there are available undoable actions. When the user clicks undo, redo must be enabled as long as there are redoable actions. * Cut, Copy, and Delete are enabled whenever the user selects (highlights) text. * Paste is enabled when there is copied text on the clipboard. |
| FR-TE5 | Find Box | The user must be able to find a text using the find box. Clicking the find command will prompt a find box. The find box contains a search text field and buttons Next and Previous.   * When the user clicks the search command with selected text, then it is pasted on the search text field. The search must start from the current caret position. * When the user clicks next/previous, then it searches for the matched text and highlights it. If there is no match, a dialog box must prompt the message "Cannot find (Text Pattern)." |
| FR-TE6 | Replacement Box | The user must be able to find a text using the replacement box. Clicking the replace command will prompt a replacement box. The replacement box contains a search text field, replacement text field, and buttons Find Next, Replace, and Replace All.   * When the user clicks the replace command with selected text, then it is pasted on the search text field. The search and replace process must start from the current caret position. * When the user clicks on the find next button, then it searches for the next matched text and highlights it. * When the user clicks on the replace button, then the selected text is replaced with the given replacement text pattern and selects the next matched text. * When the user clicks on the replace all button, then all the texts that matched the given search text pattern are replaced with the given replacement pattern. A dialog box must prompt the message "We've made (number of replaced text) replacements.". * When there is no match, a dialog box must prompt the message "Cannot find (Text Pattern)." |
| FR-TE7 | Format Tab | In the Format tab, the user must be able to wrap text, change font and font size, and make a text bold, italic, and underlined.   * By default, the texts are unwrapped. The user may wrap or unwrap texts by clicking on the Wrap Text command. * When the user changes the font, all the texts are changed, the same as changing the font size. * When the user clicks on the commands, bold, italic, and underline, all texts are changed. |
| FR-TE8 | View Tab | The user must be able to adjust the zoom level and show or hide the status bar in the View tab.   * When the user clicks on the plus button, the screen zooms in. When the user clicks on the minus button, the screen zooms out. * When the user checks the status bar, then the status bar must display the information about the current line and column number and the zoom percentage. When the user unchecks it, then the status bar must be hidden. |
| FR-TE9 | Shortcut Keys | Shortcut Keys are applicable only within this feature and will not work outside or if the application is not active.  The following shortcut keys must function with the corresponding commands:   * New Ctrl + N * Open Ctrl + O * Save Ctrl + S * Save as Ctrl + Shift + S * Select All Ctrl + A * Cut Ctrl + X * Copy Ctrl + C * Paste Ctrl + V * Delete Del * Find Ctrl + F * Replace Ctrl + R |

## 4.12 Camera

### 4.12.1 Description and Priority

Camera is a BiT OS application that captures pictures from the device’s camera. The pictures/photos taken using this app are stored in the Pictures folder of the user. The taken pictures must be saved in a .jpeg file extension format.

### 4.12.2 Stimulus / Response Sequences

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the Camera from the application list. |
| Response: | The program window of the Camera appeared. The window displayed the camera view, capture button, and camera roll. |
|  |  |
| Stimulus: | The user clicks on the **capture** button. |
| Response: | The picture is captured and saved on the Picture folder. |
|  |  |
| Stimulus: | The user clicks on the **camera roll**. |
| Response: | The screen displayed the recent captured picture/s with options delete, open folder, back, and left and right arrow. |
|  |  |
| Stimulus: | The user clicks on the option **delete**. |
| Response: | A dialog box with the message “Delete this picture? “ with delete and cancel button appeared. |
|  |  |
| Stimulus: | The user clicks on the delete button from the dialog box. |
| Response: | The picture is deleted, and the screen displayed the picture next to it. If there is no next available picture, the text "No recent photos." is displayed. |
|  |  |
| Stimulus: | The user clicks on the option **open folder**. |
| Response: | A program window of the file manager prompting the picture’s location appeared. |
|  |  |
| Stimulus: | The user clicks on the left arrow. |
| Response: | The screen displayed the earlier (previous) picture. |
|  |  |
| Stimulus: | The user clicks on the right arrow. |
| Response: | The screen displayed the later (next) picture. |
|  |  |
| Stimulus: | The user clicks on the back button. |
| Response: | The camera screen is displayed back. |

### 4.12.3 Functional Requirement

Feature Requirements: Camera (FR-CM)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-CM1 | Program Window | The user is allowed to open only one program window of Camera.  The program window of Camera must:   * Have a title bar named Camera * Have control buttons that allow the user to minimize, maximize/restore down, or close the program ([FR-F9](#_4.6.3_Functional_Requirement)) * Have the main screen where the camera view, capture button, and camera roll are displayed. * Be resizable |
| FR-CM2 | Capture Button | The user must be able to take a picture by clicking on the capture button. When the user clicks on the capture button, the image on the camera view must be saved in a .jpg file extension format on the Picture folder of the user. |
| FR-CM3 | Camera Roll | The user must be able to view recently captured pictures using the camera roll.   * When the user clicks on the camera roll, the screen displays a view of the recently captured picture with the options back, delete, open folder, and left and right arrows. * The back option allows the user to back to the previous screen, which is the camera screen. * The delete option allows the user to delete the viewed picture. When the user clicks on the delete option, a dialog box prompts the user the delete and cancel buttons. When the user chooses to delete, the viewed picture must be deleted and replaced by the next one. If there is no next available picture, then the screen should display the text "No recent photos." * The open folder option opens a file manager program window and prompts the picture's location. * The left and right arrows allow the user to see either earlier or later captured pictures. The left arrow is enabled if there's previous picture, while the right arrow is if there's next. If there are no recently captured pictures, then the screen should also display the text "No recent photos." |

## 4.13 Calculator

### 4.13.1 Description and Priority

Calculator is a BiT OS application that allows the user to perform basic arithmetic operations for both whole and decimal numbers, such as addition, subtraction, multiplication, and division. This feature has the least priority among all BiT OS features.

### 4.13.2 Stimulus / Response Sequences

|  |  |
| --- | --- |
| Stimulus: | The user clicks on the Calculator from the application list. |
| Response: | The program window of the Calculator appeared. The window displayed a text area, digits (0-9) buttons, arithmetic operator (+ − × ÷) buttons, equals(=) button, dot(⋅) button, backspace button, and clear button. |
|  |  |
| Stimulus: | The user clicks on the digit buttons. |
| Response: | The clicked buttons displayed their corresponding numbers. |
|  |  |
| Stimulus: | The user clicks on an operator button. |
| Response: | The operator of the clicked button appended on the text field. |
|  |  |
| Stimulus: | The user clicks again on the digit buttons. |
| Response: | The clicked buttons appended their corresponding numbers. |
|  |  |
| Stimulus: | The user clicks on the equals button. |
| Response: | The result is displayed. |
|  |  |
| Stimulus: | The user clicks on the backspace button. |
| Response: | The last input digit is removed. |
|  |  |
| Stimulus: | The user clicks on the clear button. |
| Response: | The text area is cleared. |

### 4.13.3 Functional Requirement

Feature Requirements: Calculator (FR-CL)

|  |  |  |
| --- | --- | --- |
| FR ID | FR Name | Description |
| FR-CL1 | Program Window | The user must be allowed to open multiple program windows of calculator at the same time.  The program window of Calculator must:   * Have a title bar named Calculator * Have control buttons that allow the user to minimize, maximize/restore down, or close the program window ([FR-F9](#_4.6.3_Functional_Requirement)) * Have a text area where the inputs and outputs are displayed * Have digit buttons (0,1,2,3,4,5,6,7,8,9) * Have arithmetic operator buttons (+ − × ÷) * Have equals(=), dot(⋅), backspace(Backspace Icon of Glyph style - Available in SVG, PNG, EPS, AI ...), and clear (AC) button |
| FR-CL2 | Calculate | The calculator must be able to perform accurate calculation of the basic arithmetic operations. |
| FR-CL3 | Valid Operations | The user must be able to input only valid syntax of operation. The system must prevent or block the user's invalid input. |
| FR-CL4 | Keyboard | The user must be able to input calculator buttons using the computer keyboard. The user must not be able to input keys that are not part of the calculator buttons. |

# 5. Other Nonfunctional Requirements

## 5.1 Performance Requirement

|  |  |
| --- | --- |
| PR-1: | Initial account set up must only take one minute before the user can start using the system. |
| PR-2: | accounts |
| PR-3: | The system must be able to handle multiple running programs. The system must accommodate to run at least ten (10) programs running at the same time before it starts to slow down or cause system or program failure, such as not responding. |
| PR-4: | The system must respond to every user action with not more than two seconds. |

## 5.2 Compatibility Requirements

|  |  |
| --- | --- |
| CR-1: | The system must be compatible to work only with windows operating systems. |
| CR-2: | The system must be able to function on multiple computer devices. |
| CR-3: | The BiT OS must co-exist and must not interfere with the original operating system. The user shall be able to use BiT operating system and the computer’s installed operating system simultaneously. |

## 5.3 Data Integrity Requirements

|  |  |
| --- | --- |
| DR-1: | BiT OS must protect files and data stored on the computer from illegal deletion, modification, and corruption. Data must be kept in its original format, secured, and backed up. |
| DR-2: | All information stored in computer must remain complete, accurate, and reliable overtime and no matter how often it’s accessed. |

## 5.4 Usability Requirements

|  |  |
| --- | --- |
| UR-1: | BiT OS interface must be easy to learn and easy to use for all kinds of users, particularly the novice user. |
| UR-2: | The user must be able to complete a task with no more than five (5) steps. |
| UR-3: | BiT OS must prevent users from committing an error and makes it easy for the user to get back to work if an error occurs. The error rate of users committing mistake mustn’t exceed 10 percent. |
| UR-4: | BiT OS must offer informative feedback about the user activities, especially when the process takes a longer time. |

## 5.5 Reliability Requirements

|  |  |
| --- | --- |
| RR-1: | BiT OS must keep everything up to date. Every change in every feature must update all concerned data and applications. |