|  |
| --- |
|  |
| CS4218 Milestone 1 |
|  |

|  |
| --- |
|  |

**Team 05**

KOH CHENG GEE A0126199W

MUHAMMAD RAZALI A0133267H

PHOON QIANONN A0126232U

TANG WEI REN A0125531R

Contents

[1. Implementation for Basic Functionality (BF) 3](#_Toc475310854)

[1.1 Implementation for Shell: Calling applications 3](#_Toc475310855)

[1.2 Implementation for Shell: Quoting 3](#_Toc475310856)

[1.3 Implementation for Shell: Semicolon Operator 3](#_Toc475310857)

[1.4 Implementation for Applications: cat 3](#_Toc475310858)

[1.5 Implementation for Applications: cd 3](#_Toc475310859)

[1.6 Implementation for Applications: pwd 3](#_Toc475310860)

[1.7 Implementation for Applications: echo 3](#_Toc475310861)

[1.8 Implementation for Applications: head 3](#_Toc475310862)

[1.9 Implementation for Applications: tail 3](#_Toc475310863)

[2. Implementation for Extended Functionality 1 (EF1) 3](#_Toc475310864)

[2.1 Implementation for Shell: Globbing 3](#_Toc475310865)

[2.2 Implementation for Shell: IO-redirection 3](#_Toc475310866)

[2.3 Implementation for Applications: cal 3](#_Toc475310867)

[2.4 Implementation for Applications: grep 4](#_Toc475310868)

[2.5 Implementation for Applications: sort 4](#_Toc475310869)

[3. Unit Testing for Basic Functionality (BF) 4](#_Toc475310870)

[3.1 Unit Testing for Shell: Calling applications 4](#_Toc475310871)

[3.2 Unit Testing for Shell: Quoting 4](#_Toc475310872)

[3.3 Unit Testing for Shell: Semicolon Operator 4](#_Toc475310873)

[3.4 Unit Testing for Applications: cat 4](#_Toc475310874)

[3.5 Unit Testing for Applications: cd 4](#_Toc475310875)

[3.6 Unit Testing for Applications: pwd 5](#_Toc475310876)

[3.7 Unit Testing for Applications: echo 5](#_Toc475310877)

[3.8 Unit Testing for Applications: head 5](#_Toc475310878)

[3.9 Unit Testing for Applications: tail 5](#_Toc475310879)

[4. Unit Testing of Extended Functionality 1 (EF1) 5](#_Toc475310880)

[4.1 Unit Testing for Shell: Globbing 5](#_Toc475310881)

[4.2 Unit Testing for Shell: IO-redirection 5](#_Toc475310882)

[4.3 Unit Testing for Applications: cal 5](#_Toc475310883)

[4.4 Unit Testing for Applications: grep 6](#_Toc475310884)

[4.5 Unit Testing for Applications: sort 6](#_Toc475310885)

[5. Test Cases for Extended Functionality 2 (EF2) 6](#_Toc475310886)

[5.1 Test Cases for Shell: Pipe Operator 6](#_Toc475310887)

[5.2 Test Cases for Shell: Command Substitution 6](#_Toc475310888)

[5.3 Test Cases for Applications: date 6](#_Toc475310889)

[5.4 Test Cases for Applications: sed 6](#_Toc475310890)

[5.5 Test Cases for Applications: wc 7](#_Toc475310891)

# Implementation for Basic Functionality (BF)

## Implementation for Shell: Calling applications

* Shell splits call command into arguments and redirection operators.
* Filenames are expanded.
* Application name is resolved.
* Specified application is executed.

## Implementation for Shell: Quoting

* Our shell supports three kinds of quotes:
  + Single quote (‘)
  + Double quotes (“)
  + Backquotes (`)
* The ‘ and “ are used to disable interpretation of all or some special characters
* The ` used to make command substitution
* Special characters are: \t (tab), \* (globbing), ‘ (single quote), “ (double quote), ` (backquote), | (pipe), < (input redirection), > (output redirection), ; (semicolon), space
* Using regex and pattern matching to search the quote
* If quote found then run the corresponding method

## Implementation for Shell: Semicolon Operator

* The semicolon operator split a command into 2 command.
* Run the first command; when the first command terminates, run the second command.
* If an exception is thrown during the execution of the first command, the execution of the whole command must be terminated.
* Using regex and split to split the command

## Implementation for Applications: cat

* Plans for implementation

## Implementation for Applications: cd

* The cd command changes the current working directory
* “*cd*” with no path or arg will change to home directory
* “*cd ~*” will also change to home directory
* “*cd /*” (mac or linux)
  + Linux uses “/” for its “file separator”
  + However, for Linux, if a user entered “\” as the “file separator” instead of “/” there will be no auto correction as “\” is a valid folder & file name in the Linux. An appropriate error message will be display if the “path” entered does not exist in the shell system.
* “*cd /*” or “cd \”(for Windows) will change to the root directory
  + Windows uses “\” for its “file separator”.
  + If “/” is mistakenly used as the “file separator” in the “path” entered, the shell system will auto correct “/” to “\”.
  + The following observation was made in the “command prompt” on Windows, hence this correction was implemented to help ease the user as their intention is clear.
  + As “/” is an invalid folder & file name in Windows, the auto-correction will not cause any issues
* “cd .” will remain at the current working directory, no change in directory
* “cd ..” will return to the parent directory
* “cd PATH” will change the directory to the “PATH”. If the “PATH” does not exist it will return an error message
  + Windows uses “\” for its “file separator”.
  + If the shell system is run on Windows, auto correction of the “file separator” from “/” to “\” will take if “/” is mistakenly used as the “file separator” in the “PATH” entered.
  + The following observation was made in the “command prompt” on Windows, hence this correction was implemented to help ease the user as their intention is clear.
  + As “/” is an invalid folder & file name in Windows, the auto-correction will not cause any issues
  + “PATH” is a “relative path directory” e.g. “folder1/folder2”
  + “PATH” as specific in the project document cannot be an “absolute path directory” e.g. /user/home/directory”. A “/” (for mac & Linux) and “\” (for Windows) indicates that the “PATH” is an “absolute path directory” hence the “shell system” will return an error message if “/” or “\” is detected as the first char of the “PATH”

## Implementation for Applications: pwd

* The pwd command prints the current working directory followed by a newline
* Use “*Environment.currentDirectory*” to get the current working directory
* Add “*System.lineSeparator*” to insert a newline after displaying the results

## Implementation for Applications: echo

* Plans for implementation

## Implementation for Applications: head

* Plans for implementation

## Implementation for Applications: tail

* Plans for implementation

# Implementation for Extended Functionality 1 (EF1)

## Implementation for Shell: Globbing

* For each argument ARG in a shell command check if it contains unquoted \* (asterisk)
* Find the deepest path which does not contain \*
* Create path regex to search correct file
* Find all the file from that path by using pattern matching
* Store all the correct file into arraylist and pass it to next function as argument

## Implementation for Shell: IO-redirection

* Open InputStream from the file for input redirection (the one following “<” symbol).
* Open the OutputStream to the file for output redirection (the one following “>” symbol).
* If several files are specified for input redirection or output redirection, throw an exception.
* If no files are given, use the NULL value.
* If the file specified for input redirection does not exist, throw an exception.
* If the file specified for output redirection does not exist, create it.

## Implementation for Applications: cal

* Plans for implementation

## Implementation for Applications: grep

* Plans for implementation

## Implementation for Applications: sort

* The “sort” commands sort a specific file or input in a sorted order
* The sorted order is defined in the order of “special character”, “numbers”, “capital letters” and “simple letters”
* If “-n” is specific after the “sort” command (e.g. sort [-n] [FILE]), the first word of a line will be treated as a number. The first word will be treated as number only if it contains all numeric characters (e.g 8 days later, so “8” is the first word). If the first word will be treated as a normal word if it contains other types of characters(e.g. 8days later, “8days” is the first word)
* If 2 or more “FILES” are provided, the lines in the “FILES” will be combined and sorted together

# Unit Testing for Basic Functionality (BF)

## Unit Testing for Shell: Calling applications

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Unit Testing for Shell: Quoting

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Test Case | Input | Expected Output |
| 1 | echoNoQuotes | echo lala | lala\n |
| 2 | echoSingleQuotes | echo 'lala' | lala\n |
| 3 | echoDoubleQuotes | echo \"lala\" | lala\n |
| 4 | echoBackQuotes | echo `lala` | shell: lala: Invalid app. |
| 5 | echoDoubleWithBackQuotes | echo \"This is space:`echo \" \"`.\" | This is space: .\n |
| 6 | echoSingleWithBackQuotes | echo 'This is space:`echo \" \"`.' | This is space:`echo \" \"`.\n |

## Unit Testing for Shell: Semicolon Operator

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Test Case | Input | Expected Output |
| 1 | echoSemicolon | echo lala; echo lolo | lala\nlolo\n |
| 2 | echoSemicolonWithException | eo lala; echo lele | shell: eo: Invalid app. |
| 3 | echoSemicolonWithQuotes | echo 'lala'; echo \"lolo `echo lele`\" | lala\nlolo lele\n |

## Unit Testing for Applications: cat

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Unit Testing for Applications: cd

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Unit Testing for Applications: pwd

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Unit Testing for Applications: echo

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Unit Testing for Applications: head

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Unit Testing for Applications: tail

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

# Unit Testing of Extended Functionality 1 (EF1)

## Unit Testing for Shell: Globbing

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Test Case | Input | Expected Output |
| 1 | catGlobNoPath | cat asds\*d.txt |  |
| 2 | catGlobOneFile | cat ef1\_test\_cases\\glob\\glob\*Source1.txt | hello world\n |
| 3 | catGlobDirectories | cat ef1\_test\_c\*s\\g\*b\\globTestSource1.txt | hello world\n |
| 4 | catGlobFilesDirectories | cat ef1\_test\_c\*s\\g\*b\\glob\*Sou\*e1.txt | hello world\n |
| 5 | catGlobMultipleFilesDirectories | cat ef1\_test\_c\*s\\g\*b\\glob\*Sou\*e1.txt ef1\_test\_c\*s\\g\*b\\glob\*e2.txt | hello world\nhello world 2\n |

## Unit Testing for Shell: IO-redirection

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Unit Testing for Applications: cal

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Unit Testing for Applications: grep

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Unit Testing for Applications: sort

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

# Test Cases for Extended Functionality 2 (EF2)

## Test Cases for Shell: Pipe Operator

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Test Cases for Shell: Command Substitution

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Test Cases for Applications: date

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Test Cases for Applications: sed

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests

## Test Cases for Applications: wc

* Summary of Test cases provided
* What have you covered during testing
* Did you have any plans for generation tests