User Manual

Introduction

The Custom Virtual File System (CVFS) allows you to create and manipulate virtual disks, directories, and documents using a command-line interface (CLI). You can create new files, delete, rename, search for files based on criteria, save/load the virtual disk, and undo/redo actions. CVFS is an in-memory simulation of a file system, meaning all operations are performed in memory unless saved explicitly to a file.

Commands Description

(A) Disk Management

• **newDisk**

Command: newDisk <diskSize>

Description: Creates a new virtual disk with the specified size (in bytes). This will clear the current working disk and start fresh.

Example:

```
CVFS> newDisk 10000
New virtual disk created with size 10000
```

• **save**

Commmand: save <path>

Description: Saves the current virtual disk and all its contents to a file on the local file system.

Example:

```
CVFS> save diskBackup.dat
Virtual disk saved to diskBackup.dat
```

- **load**

Command: load <path>

Description: Loads a virtual disk from a file and makes it the working disk.

Example:

```
CVFS> load diskBackup.dat
Virtual disk loaded from diskBackup.dat
```

(B) File and Directory Management

- **newDoc**

Command: newDoc <docName> <doctype> <docContent>

Description: Creates a new document with the specified name, type, and content in the current working directory.

➢ docName at most 10 characters long

Example:

```
CVFS> newDoc report txt "This is a report file."
Document report created.
```

- **newDir**

Command: newDir <dirName>

Description: Creates a new directory with the specified name in the current working directory.

Example:

```
CVFS> newDir Documents
Directory Documents created.
```

- **delete**

Command: delete <filename>

Description: Deletes a file or directory with the specified name from the current working directory.

Example:

```
CVFS> delete report
File report deleted.
```

- **rename**

Command: rename <oldFileName> <newFileName>

Description: Renames an existing file or directory in the current working directory.

Example:

```
CVFS> rename report reportv2
File report renamed to reportv2
```

- **changeDir**

Command: changeDir <dirName>

Description: Changes the working directory to the specified directory. If ".." is used, it navigates to the parent directory.

Example:

```
CVFS> changeDir Documents
Changed to directory Documents
```

- **list**

Command: list

Description: Lists all files and directories in the current working directory.

Example:

```
CVFS> list
Document Name: report, Type: txt, Size: 88
Document Name: Hello, Type: txt, Size: 56
Total files: 2, Total size: 144
```

- **rList**

Command: rList

Description: Recursively lists all files and directories in the current working directory and its subdirectories.

(C) Search and Criteria Management

- **newSimpleCri**

Command: newSimpleCri <criName> <attrName> <op> <val>

Description: Creates a new simple criterion based on file attributes (name, type, or size). The criterion can later be used to search for files.

Example:

```
CVFS> newSimpleCri nm name contains "final"
Simple criterion nm created.
```

- **IsDocument**

Command: **IsDocument**

Description: A built-in criterion that evaluates whether a file is a document (e.g., txt, java, etc.).

- **newNegation**

Command: newNegation <criName1> <CriName2>

Description: Creates a new negation criterion based on an existing criterion

Parameters:

criName1: Name for the new negation criterion.

criName2: Existing criterion to negate.

Example:

```
CVFS> newNegation ND CR
Negation criterion ND created.
```

- **newBinaryCri**

Command: newBinaryCri <criname1> <criname3> <logicOp && ||> <criName4>

Description: Combines two criteria using a logical operator (&& or ||) to create a composite criterion.

Example:

Parameters:

criName1: Name for the new composite criterion.

criName3: First existing criterion name.

logicOp: Logical operator (&& for AND, || for OR). C

criName4: Second existing criterion name.

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```
CVFS> newBinaryCri CB CR && ND
Binary criterion CB created.
```

- **printAllCriteria**

Command: printAllCriteria

Description: Prints all currently defined criteria.

Example:

```
CVFS> printAllCriteria
IsDocument: IsDocument
ND: !( attrName: name, op: contains, val: report )
CR: attrName: name, op: contains, val: report
```

- **search**

Command: search <criName>

Description: Searches for files in the current directory based on the specified criterion.

Example:

```
CVFS> search CR
Document Name: report, Type: txt, Size: 104
Total files: 1, Total size: 104
```

- **rSearch**

Command: rSearch <criName>

Description: Recursively searches for files in the current directory and its subdirectories based on the specified criterion.

(D) Undo/Redo Management

- **undo**

Command: undo

Description: Reverses the last command executed in the system.

Example:

```
CVFS> undo
Undo successful.
```

- **redo**

Command: redo

Description: Reapplies the most recently undone command.

Example:

```
CVFS> redo
Redo successful.
```

(E)System Control

- **quit**

Command: quit

Description: Terminates the CVFS system.

Example:

```
CVFS> quit
Terminating the CVFS system.


Process finished with exit code 0
```

Step-by-Step Instructions

To get started with CVFS, this section provides a sample workflow demonstrating common operations.

Example Workflow

Scenario: Create a new virtual disk, add documents and directories, define search criteria, perform searches, and manage files.

① Launch CVFS:

Open the terminal and run java -jar cvfs.jar.

You should see the prompt: CVFS>

```
Welcome to the Custom Virtual File System (CVFS)
CVFS>
```

② **Create a New Disk:**

Command: *newDisk* 10000

Effect: Initializes a new virtual disk with a maximum size of 10,000 units.

```
CVFS> newDisk 10000
New virtual disk created with size 10000
```

③ **Add Documents:**

Command: *newDoc* summary txt *"This is the summary document."*

Effect: Creates a summary document of type txt with specified content.

```
CVFS> newDoc summary txt "This is the summary document."
Document summary created.
```

Command: *newDoc* report java *"public class Report {}"*

Effect: Creates a report document of type java with specified content.

```
CVFS> newDoc report java "public class Report {}"
Document report created.
```

④ **Create a Directory:**

Command: *newDir* Projects

Effect: Creates a Projects directory.

```
CVFS> newDir Projects
Directory Projects created.
```

⑤ **Navigate to the New Directory:**

Command: *changeDir* Projects

Effect: Changes the working directory to Projects.

```
CVFS> changeDir Projects
Changed to directory Projects
```

Ⓐ **Add a Document in the Subdirectory:**

Command: *newDoc* project1 java "public class Project1 {}"

Effect: Creates a project1 document inside Projects.

```
CVFS> newDoc project1 java "public class Project1 {}"
Document project1 created.
```

Ⓑ **Return to Root Directory:**

Command: *changeDir* ..

Effect: Navigates back to the root directory.

```
CVFS> changeDir ..
Changed to parent directory.
```

Ⓒ **List Files in Root Directory:**

Command: *list*

Effect: List out information of the directory.

```
CVFS> list
Document Name: summary, Type: txt, Size: 98
Document Name: report, Type: java, Size: 84
Directory Name: Projects, Size: 128
Total files: 3, Total size: 310
```

Ⓓ **Define a Simple Criterion:**

Command: *newSimpleCri* CR name contains "sum"

Effect: Creates a criterion CR that selects files with names containing "sum".

```
CVFS> newSimpleCri CR name contains "sum"
Simple criterion CR created.
```

Ⓔ **Define Another Simple Criterion:**

Command: *newSimpleCri* AB size >= 50

Effect: Creates a criterion AB that selects files with size greater than or equal to 50.

```
CVFS> newSimpleCri AB size >= 50
Simple criterion AB created.
```

⑪ **Create a Binary Criterion Combining CR and AB with AND:**

Command: *newBinaryCri* BC CR && AB

Effect: Creates a criterion BC that selects files satisfying both CR and AB.

```
CVFS> newBinaryCri BC CR && AB
Binary criterion BC created.
```

⑫ **Print All Criteria:**

Command: *printAllCriteria*

```
CVFS> printAllCriteria
AB: attrName: size, op: >=, val: 50
BC: ( attrName: name, op: contains, val: sum ) && ( attrName: size, op: >=, val: 50 )
IsDocument: IsDocument
CR: attrName: name, op: contains, val: sum
```

⑬ **Search for Files Matching Criterion BC:**

Command: *search* BC

Output:

```
CVFS> search BC
Document Name: summary, Type: txt, Size: 98
Total files: 1, Total size: 98
```

⑭ **Undo the Last Command (Search Does Not Affect State):**

Command: *undo*

Effect: Undoes the creation of criterion BC.

Output:

```
CVFS> undo
Undo successful.
```

⑮ **Redo the Last Undone Command:**

Command: *redo*

Effect: Redoes the creation of criterion BC.

```
CVFS> redo
Redo successful.
```

⑯ Terminate CVFS:

Command: *quit*

Output:

```
CVFS> quit
Terminating the CVFS system.
```

Troubleshooting

Below are common problems and their solutions.

① Invalid Command Format

Symptom: Attempting to execute a command with incorrect syntax.

```
CVFS> newDisk Name 33554432
Error: Usage: newDisk diskSize
```

```
CVFS> newdisk 8192
Unknown command: newdisk
```

Solution:

Ensure that you follow the exact command structure.

Refer to the Commands Overview section for correct usage examples.

Example:

```
CVFS> newDisk 33554432
New virtual disk created with size 33554432
```

```
CVFS> newDisk 8192
New virtual disk created with size 8192
```

Error:

```
CVFS> newDoc
Error: Usage: newDoc docName docType docContent
```

```
CVFS> newDoc abcdefghijk txt "1234567890"
Error: Invalid file name.
CVFS> newDoc abcdefghij docx "1234567890"
Error: Document type not allowed.
```

Solution: Provide all required parameters:

```
CVFS> newDoc abcdefghij txt "1234567890"
Document abcdefghij created.
```

② Invalid File or Directory Name

Symptom: Attempting to create or rename a file/directory with invalid characters or exceeding length limits.

Error:

```
CVFS> newDir あいしている
Error: Invalid file name.
```

Solution:

Use only English letters and digits in names.

```
CVFS> newDir aishiteiru
Directory aishiteiru created.
```

Error:

```
CVFS> newDir Projects_Directory
Error: Invalid file name.
```

Solution:

Ensure names do not exceed 10 characters.

```
CVFS> newDir Projects
Directory Projects created.
```

③ **Duplicate File or Directory Name**

Symptom: Attempting to create or rename a file/directory to a name that already exists in the current directory.

Error:

```
CVFS> newDoc summary txt "Summary."
Document summary created.
CVFS> newDoc summary txt "Another summary."
Error: File with the same name already exists.
```

Solution:

Choose a unique name that does not conflict with existing files or directories.

```
CVFS> rename summary summary1
File summary renamed to summary1
CVFS> newDoc summary txt "Another summary."
Document summary created.
```

④ **Unsupported Document Type**

Symptom: Attempting to create a document with a type other than txt, java, html, or css.

Error:

```
CVFS> newDoc notes pdf "PDF"
Error: Document type not allowed.
```

Solution:

Use one of the supported document types.

```
CVFS> newDoc notes txt "TXT"
Document notes created.
```

⑤ Disk Space Exceeded

Symptom: Adding files or directories that cause the virtual disk's size to exceed its maximum limit.

Example:

```
CVFS> newDisk 9
New virtual disk created with size 9
CVFS> newDoc largeDoc txt "..."
Error: Disk space exceeded.
```

Solution:

Delete unnecessary files or directories to free up space.

Or create a new disk with a larger size.

```
CVFS> newDisk 1000
New virtual disk created with size 1000
CVFS> newDoc largeDoc txt "..."
Document largeDoc created.
```

⑥ Criterion Not Found

Symptom: Attempting to use a criterion name that does not exist.
Error:

```
CVFS> search YuenIsBest
Error: Criterion not found.
```

Solution:

Ensure the criterion is created before use.

Verify the criterion name is correct.

```
CVFS> search Yu
Document Name: Test, Type: txt, Size: 148
Total files: 1, Total size: 148
```

⑦ File Not Found

Symptom: Attempting to delete or rename a file/directory that does not exist.

Error:

```
CVFS> delete unknownFile
Error: File not found.
```

Solution:

Verify the file or directory name.

Use the list or rList command to view existing files.

```
CVFS> list
Document Name: largeDoc, Type: txt, Size: 46
Document Name: Test, Type: txt, Size: 148
Total files: 2, Total size: 194
```