



# CS 108 - Bash Grader

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# 1 Objective

The objective of this CS108 Project was to create a csv file manager and interpreter with a command line interface.

## 2 Introduction

Bash Grader is a command line interface for instructors to grade students and manage their marks. It is an incredibly useful tool with its many functionalities and features.

## 3 List of Functionalities

### 3.1 Basic functionalities

- Upload a marklist in the form of a csv file.
- Total the marks of each student over all exams
- Combine the marks of all exams into a single csv file
- Update the marks of a student in a particular exam
- Implement a working git system with init,add,commit and checkout functionalities

### 3.2 Customisations

- A staging area with add and remove functionalities.
- A diff patch system for the checkout functionality
- Commit history log
- Graphs for a particular exam or all exams
- Stats for a particular exam or all exams
- Report card generation for all students with grade calculation for all students, based on manual rubrics from the instructor/user
- Ranked marklists for a particular exam or all exams

## 4 Usage

### 4.1 Upload

Run the following command to upload a csv file in your current directory.

```
bash submission.sh upload <filename>
```

### 4.2 Total

Run the following command to total the marks of each student over all exams into a total column in `main.csv`.

```
bash submission.sh total
```

### 4.3 Combine

The following command combines all the csv files in the current directory into `main.csv`.

```
bash submission.sh combine
```

### 4.4 Update

Run the following command to update the marks of a particular student

```
bash submission.sh update
```

### 4.5 Rank

Run the following command to get the ranked marklist for a particular exam or `main.csv`.

```
bash submission.sh rank <exam-name>
```

### 4.6 Git Init

Run the following command to initialize a remote git repository.

```
bash submission.sh git_init <remote-repo-path>
```

### 4.7 Git Add

Run the following command to add files from the current directory to the staging area.

```
bash submission.sh git_add
```

### 4.8 Git Remove

Run the following command to remove files from the staging area.

```
bash submission.sh git_remove
```

### 4.9 Git Commit

Run the following command to commit the files in the staging area to the remote repository.

```
bash submission.sh git_commit -m "commit message"
```

### 4.10 Git Checkout

Run the following command to checkout a particular commit from the remote repository.

```
bash submission.sh git_checkout <commit-id>  
bash submission.sh git_checkout -m <commit-message>
```

## 5 Working

### 5.1 Upload

```
siddhant@siddhant:~/Desktop/bash-grader-test$ ls
bash_scripts main.csv quiz1.csv quiz2.csv submission.sh test
siddhant@siddhant:~/Desktop/bash-grader-test$ bash submission.sh upload test/midsem.csv
siddhant@siddhant:~/Desktop/bash-grader-test$ ls
bash_scripts main.csv midsem.csv quiz1.csv quiz2.csv submission.sh test
siddhant@siddhant:~/Desktop/bash-grader-test$
```

In the above example, the file `quiz1.csv` is uploaded i.e. copied into the current directory from the filepath given as argument by the user. The script checks if the file exists and if it is a csv file. If it is, only then is the file copied into the current directory.

Script files : `upload.sh`

### 5.2 Total

```
siddhant@siddhant:~/Desktop/bash-grader-test$ cat main.csv
Roll_Number,Name,quiz1,midsem
22B1003,Saksham Rathhi,6,16
22B009,Mayank Kumar,7,07
23B0069,Sunny,4,14
23B0108,Ramesh,a,24siddhant@siddhant:~/Desktop/bash-grader-test$ bash submission
.sh total
siddhant@siddhant:~/Desktop/bash-grader-test$ cat main.csv
Roll_Number,Name,quiz1,midsem>Total
22B1003,Saksham Rathhi,6,16,22
22B009,Mayank Kumar,7,07,14
23B0069,Sunny,4,14,18
23B0108,Ramesh,a,24,24
siddhant@siddhant:~/Desktop/bash-grader-test$
```

In the above example, the script totals the marks of each student over all exams and adds a new column `Total` to the `main.csv` file. If the marks column has `a` as its entry, the script skips that row while totaling.

Script files : `total.awk`

### 5.3 Combine

main.csv > data	main.csv > data
1 Roll_Number,Name,midsem,quiz1	1 Roll_Number,Name,endsem,midsem,quiz1,quiz2
2 23B0901,Kaushal Vijayvergiya,a,11.38	2 23B0901,Kaushal Vijayvergiya,a,a,11.38,14.47
3 23B0902,Arya Suwalka,4.91,20	3 23B0902,Arya Suwalka,4.57,4.91,20,a
4 23B0903,Abhi Jain,6.4,9.28	4 23B0903,Abhi Jain,0.91,6.4,9.28,9.7
5 23B0904,Prakhar Jain,7.39,a	5 23B0904,Prakhar Jain,8.72,7.39,a,14.03
6 23B0905,Sagnik Nandi,7.23,8.92	6 23B0905,Sagnik Nandi,6.31,7.23,8.92,11.74
7 23B0906,Velagala Deeraj Sathvik Reddy,6.44,14.46	7 23B0906,Velagala Deeraj Sathvik Reddy,5.63,6.44,14.46,7.88
8 23B0907,Hari Shankar Karthik,a,13.3	8 23B0907,Hari Shankar Karthik,6.4,a,13.3,10.26
9 23B0908,Raghav Goyal,8.37,7.53	9 23B0908,Raghav Goyal,6.08,8.37,7.53,4.31
10 23B0909,Varri Shyam Sri Vardhan,6.05,a	10 23B0909,Varri Shyam Sri Vardhan,8.15,6.05,a,11.72
11 23B0910,Sonal Kumari,4.41,9.7	11 23B0910,Sonal Kumari,4.78,4.41,9.7,a

(a) Before combine

(b) After combine

In the above example, the script combines all the csv files in the current directory into a single `main.csv` file. The script checks if the file is a csv file and if it is not the `main.csv` file.

`main.csv` is constructed from scratch in the following steps:

1. First, an array of all unique roll numbers and names is created.
2. Then, based on the exam files, a header is created with the roll numbers and names.
3. A mesh of `a`'s is created with the dimensions of the header.
4. Then the script iterates over all exam files and fills in the marks of each student in the mesh, whenever they are found. This ensures that anyone who is not present in a particular exam file is marked as `a`(absent) in `main.csv` for that particular exam.

Script files : `combine.sh` `combine.awk`

## 5.4 Update

```
quiz1.csv > data
```

1	Roll Number,Name,Marks
57	23B0956,Siddhant Mulkikar,5.85
58	23B0957,Kunumalla Gautam Siddharth,14.14
59	23B0958,Satyam Sinoliya,17.14
60	23B0960,J Adarsh,14.82
61	23B0961,Arijit Mandal,12.47
62	23B0962,Banothu Sonusree,7.1
63	23B0963,Komrelly Snigdha Reddy,12.79
64	23B0964,Seemala Varsha,6.33
65	23B0965,Nakka Mahathi,12.62

(a) quiz1.csv before update

```
quiz1.csv > data
```

1	Roll Number,Name,Marks
57	23B0956,Siddhant Mulkikar,10.85
58	23B0957,Kunumalla Gautam Siddharth,14.14
59	23B0958,Satyam Sinoliya,17.14
60	23B0960,J Adarsh,14.82
61	23B0961,Arijit Mandal,12.47
62	23B0962,Banothu Sonusree,7.1
63	23B0963,Komrelly Snigdha Reddy,12.79
64	23B0964,Seemala Varsha,6.33
65	23B0965,Nakka Mahathi,12.62

(b) quiz2.csv after update

```
main.csv > data
```

1	Roll Number,Name,endsem,midsem,quiz1,quiz2>Total
57	23B0956,Siddhant Mulkikar,6.61,4.56,5.85,33.01,50.03
58	23B0957,Kunumalla Gautam Siddharth,9.98,7.76,14.14,15.84,47.72
59	23B0958,Satyam Sinoliya,7.62,6.38,17.14,9.93,41.07
60	23B0960,J Adarsh,4.88,5.48,14.82,7.79,32.97
61	23B0961,Arijit Mandal,6.23,10.12,47.10,73.39,43
62	23B0962,Banothu Sonusree,7.0,7.25,7.1,a,21.35
63	23B0963,Komrelly Snigdha Reddy,1.54,3.34,12.79,8.4,26.07
64	23B0964,Seemala Varsha,6.05,6.33,6.33,a,18.71
65	23B0965,Nakka Mahathi,5.53,1.62,12.62,12.04,31.81

(a) main.csv before update

```
main.csv > data
```

1	Roll Number,Name,endsem,midsem,quiz1,quiz2>Total
57	23B0956,Siddhant Mulkikar,6.61,4.56,10.85,33.01,55.03
58	23B0957,Kunumalla Gautam Siddharth,9.98,7.76,14.14,15.84,47.72
59	23B0958,Satyam Sinoliya,7.62,6.38,17.14,9.93,41.07
60	23B0960,J Adarsh,4.88,5.48,14.82,7.79,32.97
61	23B0961,Arijit Mandal,6.23,10.12,47.10,73.39,43
62	23B0962,Banothu Sonusree,7.0,7.25,7.1,a,21.35
63	23B0963,Komrelly Snigdha Reddy,1.54,3.34,12.79,8.4,26.07
64	23B0964,Seemala Varsha,6.05,6.33,6.33,a,18.71
65	23B0965,Nakka Mahathi,5.53,1.62,12.62,12.04,31.81

(b) main.csv after update

In the above example, the script updates the marks of **23B0956** in `quiz1.csv` and `main.csv`. The script first asks the user for the roll number and name of the student whose marks are to be updated. It then checks if the student's name matches with the name paired up with the roll number given by the user. If the names do not match, the script confirms with the user with a prompt for the correct name. It then checks if the student is present in the `main.csv` file and if the exam file exists. If the student is present in the `main.csv` file, the script updates the marks of the student in `main.csv` by calling `update_main.awk` and the exam file by calling `update_exam.awk`. It also asks the user if they want to update the marks of the student in some other exam and repeats the same process. If the user does not want to update the marks of the student in any other exam, the script checks if `main.csv` had been totaled before. If it was, then the script calls `total.awk` to correct the total, as the marks in `main.csv` have been updated.

**Script files :** `update.sh` `update_exam.awk` `update_main.awk` `total.awk`

## 5.5 Rank

This command takes the examname as a command line argument and ranks the students based on the marks in that exam. If the user enters `main` as the examname, the script ranks the students based on the total marks in `main.csv`. The ranked marklists are sorted according to rank and are stored in the folder `ranked_marklists` in the current directory.

**Script files :** `rank.sh`

## 5.6 Git Init

This command initializes a remote git repository at the path given by the user as a command line argument. It also checks if the path given is a valid path. If a remote repository is already initialized for the current directory, the script prompts the user to confirm if they want to reinitialize the repository. If the user confirms, the script reinitializes a fresh remote repository at the path provided by the user.

It also creates a hidden folder `.gitrepo` in the current directory. This folder contains a hidden file `.gitreponame` which stores the name of the remote repository and `.git_log` which records the commit history.

Apart from initialization, the script also copies all the csv files in the current directory at the time of initialization to a hidden folder `.ogfiles` in the remote repository. The `.ogfiles` folder contains the first version of every file which was ever committed. This serves as a reference point for all files, for my **diff patch** system for `git_checkout` to work.

**Script files :** `git_init.sh`

## 5.7 Git Add

This command first checks if a remote repository has been initialized for the current directory. If it has not, the script prompts the user to initialize a remote repository first.

This command then prompts the user to enter all the files, which they want to add to the staging area, separated by spaces. It then copies all the files to the staging area in the remote repository. If any particular file doesn't exist in the current directory, it gives an error message.

**Script files :** `git_add.sh`

## 5.8 Git Remove

This command first checks if a remote repository has been initialized for the current directory. If it has not, the script prompts the user to initialize a remote repository first.

It then prompts the user to enter all the files, which they want to remove from the staging area, separated by spaces. It then deletes all the files from the staging area in the remote repository. If any particular file doesn't exist in the staging area, it gives an error message.

**Script files :** `git_remove.sh`

## 5.9 Git Commit

The command first checks if a remote repository has been initialized for the current directory. If it has not, the script prompts the user to initialize a remote repository first.

It then checks what all files are modified or added to the staging area with respect to the first version of the file in the `.ogfiles` folder. It updates the `.git_log` file with the commit message and the files which were modified or added in this commit, which is uniquely identified by the commit message, given by the user and the 16 character hash commit id, generated randomly using the `uuidgen` command. A folder with the commit-id as its name is created in the commits folder of the remote repository.

If any file in the staging area is not present in the `.ogfiles` folder, it adds it to the `.ogfiles` folder. It then copies the diff of the file from the `.ogfiles` folder and the file in the staging area into the commit-id folder.

It also gets the list of all csv files in the current repository at the time of the commit and stores their name in a hidden `.files` file in the commit-id folder. This provides a snapshot of all the files in the current repository at the time of the commit, which is useful at the time of `git_checkout`. The stage is deleted after the commit is made.

**Script files :** `git_commit.sh`

## 5.10 Git Checkout

The command first checks if a remote repository has been initialized for the current directory. If it has not, the script prompts the user to initialize a remote repository first.

The user can checkout a particular commit by entering the commit-id or the commit message. The script then checks for matches to the commit-id or the commit message in the `.git_log` file. If it finds a match, it goes to the commit-id folder. // There, it gets the snapshot of the current repository at the time of the commit from the `.files` file. It also gets the list of patch files in the commit-id folder.

It deletes all the `.csv` files from the current directory and then iterates over all files in the snapshot. If the patch file exists for a particular file, it applies `patch -b` command to this patch file and the corresponding file in the `.ogfiles` folder, which gives back the version of the file at that commit as `<filename>.csv` and also the original file in the `.ogfiles` as `<filename>.csv.orig`. The `.csv` file is then copied from the `.ogfiles` folder to the current directory and the `.csv.orig` file is renamed to `.csv` file, hence restoring the original file in the `.ogfiles` folder.

**Script files :** `git_checkout.sh`