

USER MANUAL

GROUP : 16

SLOT : 11

STAGE 2 SUBMISSION

Project – Unix Shell in C++ with some mathematical functions

Project Name – MaSH

Input :

User can input simple *nix commands. User will input command at the prompt. Inputting illegal will result in shell spitting out error in execvp.

Example

```
user@system:~/home/user/Documents/project CS101/mash_test # ls

headers.h  headers.h~  mash  small_shell.cpp  small_shell.cpp~
utility.cpp  utility.cpp~

user@system:~/home/user/Documents/project CS101/mash_test # cd ..

user@system:~/home/user/Documents/project CS101 # ls

bin      mash      mash_22  mash_test  old_mash      small_shell.cpp
SRS.doc      test

headers.h~  mash_21  mash.cpp~  mini-shell  project report.doc
small_shell.cpp~  stage 1  upload  utility.cpp~

user@system:~/home/user/Documents/project CS101 # cal

      October 2014

Su Mo Tu We Th Fr Sa
                1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31

user@system:~/home/user/Documents/project CS101 #
```

This is an example for running MaSH. Complex commands such as piping and I/O redirection has still not been implemented.

For mathematics we are using `fparser v4.4.3` for C++.


NOTE: Function commands are CASE SENSITIVE.

1. `a^b` - `a` raised to the power `b`
2. `-a` - unary minus

3. $a*b$ a/b $a\%b$ – multiplication, division, modulo
4. $a + b$, $a - b$ – addition and subtraction
5. $\text{abs}(A)$, $\text{floor}(a)$ – Absolute value of a , box of a
6. $\cos(a)$, $\sin(a)$, $\tan(a)$, $\cot(a)$, $\csc(a)$, $\sec(a)$ – Trigonometric functions
7. $\text{cbrt}(a)$, $\text{sqrt}(a)$ – Cuberoot and squareroot of a
8. $\exp(a)$, $\log(a)$ – Exponential and logarithm with base e of a
9. $\exp2(a)$, $\log2(a)$ – Exponential and logarithm with base e of a

STEP 1 :

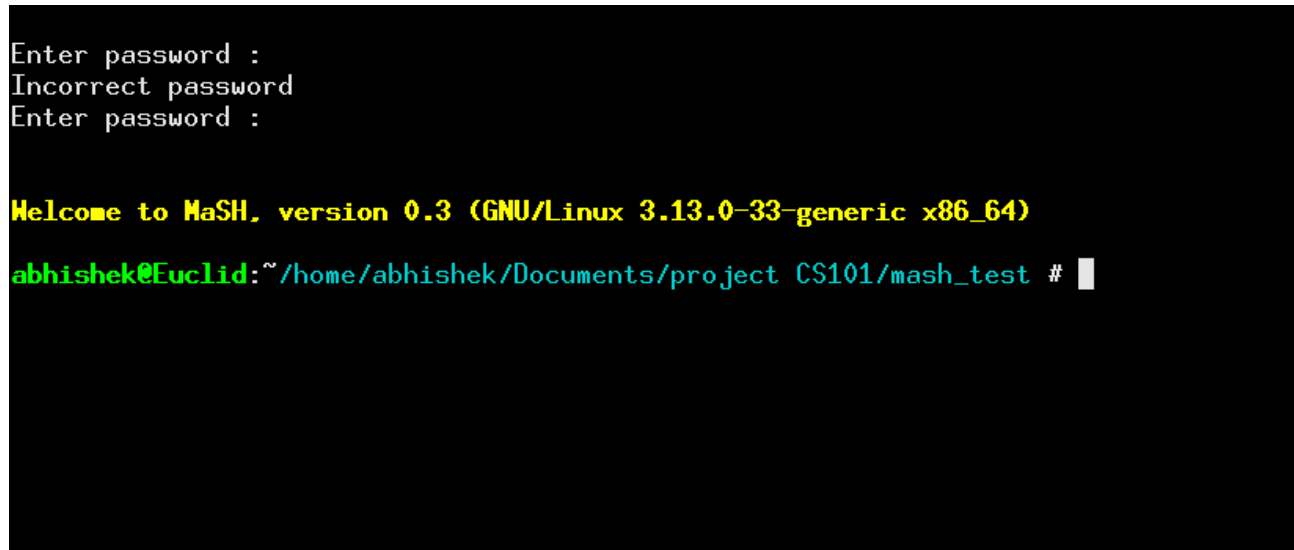
The shell will ask for password. For the first time password will be provided in the package in a file named shadow.txt.



```
Enter password : █
```

STEP 2 :

After entering the password, shell will greet you with a welcome screen. From here on, you can carry on with you daily Shell command working.



```
Enter password :  
Incorrect password  
Enter password :  
  
Welcome to MaSH, version 0.3 (GNU/Linux 3.13.0-33-generic x86_64)  
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test # █
```

MaSh in action :

```
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test # ls
a.out      logs.txt  mashv0.1  matrix2.cpp  matrix.cpp  password.cpp  run.sh~  test_exec.cpp~
bin        main.cpp  mashv0.2  matrix2.cpp~  matrix.cpp~  rdp.o        small_shell.cpp~  utility.cpp~
headers.h  main.cpp~  mashv0.3  matrix3.cpp  matrix.o    recursive_descent_parser.cpp  system3.cpp  utility.cpp~
headers.h~  mash     mashv0.3.o  matrix3.cpp~  matrix.o    recursive_descent_parser.cpp~  test_exec.cpp

abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test # cd ..
abhishek@Euclid:~/home/abhishek/Documents/project CS101 # ls
11_16_MaSH.tar.gz  fparser      Makefile~  mash_22  mash_test  old_mash  SRS.doc  user_manual.doc
bin                headers.h~    mash       mash.cpp~  mash updated  project report.doc  stage 1 upload  utility.cpp~
findroots..cpp     integration.cpp  mash_21  mash_final  mashv1      small_shell.cpp~  test

abhishek@Euclid:~/home/abhishek/Documents/project CS101 # mkdir HELLO
abhishek@Euclid:~/home/abhishek/Documents/project CS101 # cd HELLO
abhishek@Euclid:~/home/abhishek/Documents/project CS101/HELLO # ls $HOME
a.out
b.c
b.cpp
b.cpp~
Beginner Drumming Independence - Free Drum Lessons-t0G-jcQcwmc.mp4
c.c
Desktop
Documents
Downloads
examples.desktop
marks_statement.pdf
Music
peazip_portable-5.3.1.LINUX.Qt.tar.gz
Pictures
Public
Rock Drum Fills - Free Beginner Drum Lessons (Part #1 of 5)-06Yd7XnYcPU.mp4
Templates
Videos
abhishek@Euclid:~/home/abhishek/Documents/project CS101/HELLO # jkshd
Error 'execvp()': : No such file or directory
abhishek@Euclid:~/home/abhishek/Documents/project CS101/HELLO # █
```

MaSh supports environmental variables like \$HOME. As it can be seen in the picture above that `ls $HOME` lists all the file in user home directory.

```
abhishek@Euclid:~/home/abhishek/Documents/project CS101/HELLO # cd ..
abhishek@Euclid:~/home/abhishek/Documents/project CS101 # cd mash_test
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test # cd bin
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # ls
differentiate.cpp  docs      eval.o  findroots.cpp  fparser_gmpint.hh  fpconfig.hh  gcd.cpp  integrate.cpp  matrix.o
differentiate.cpp~  eval.cpp  examples  findroots.cpp~  fparser.hh        fpoptimizer.cc  gcd.cpp~  integrate.cpp~  mpfr
differentiate.o    eval.cpp~  extrasrc  fparser.cc     fparser_mpfr.hh   froot.o       gcd.o    integrate.o

abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # ls | grep cpp
differentiate.cpp
differentiate.cpp~
eval.cpp
eval.cpp~
findroots.cpp
findroots.cpp~
gcd.cpp
gcd.cpp~
integrate.cpp
integrate.cpp~
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # █
```

Here we can see that MaSh supports two process piping. It is demonstrated by the command `ls | gerp cpp` which lists all the files having cpp in their name.

MaSH also supports builtin command history, which prints all the commands previously used in MaSH, even the if MaSH is exited in between.

```
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # history
history
version
fgfhgf
math ghggg
math
math
math eval
math eval
math matrix
clear
ls
cd ..
ls
mkdir HELLO
cd HELLO
ls $HOME
jkshd
clear
cd ..
cd mash_test
cd bin
ls
ls | grep cpp
ls | grep cpp >> a.txt
clear
history
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin #
```

History can be cleared by the command `history -c`

```
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # history -c
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # history
history
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin #
```

General mathematics operations in MaSH. Here math is a builtin command in MaSH.

```
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # math
Error : No command given for Math
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # math hgdh
Error : Command not found
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # math eval
f(x) = sin(x)
Point at which value has to be evaluated : 0
f(0) = 0
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # math integrate
f(x) = x^2
min x: 0
max x: 1
integration of f(x) is 0.333333
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # math froot
f(x) = x^2 - 4
Enter an approximate root : -4
One of the root of f(x) : -2
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # math differentiate
f(x) = x^2 + 1
Enter point : 2
Value of the f'(x) at 2 : 4
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # math gcd
Enter the number of number whose GCD has to be found : 4
Enter the numbers :
8 4 16 24
GCD : 4
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin #
```

Matrix manipulation in MaSH. It must be noted that when rows and columns of A and B are prompted they must be entered as follow a_row >> a_column >> b_row >> b_column

```
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # math matrix
Menu driven Matrix manipulation program :

1. Add or Subtract Matrix
2. Multiply two Matrices
3. Find determinant (upto 3x3)
4. Exit
:1

Enter rows and columns for matrix A and B respectively :
2 2 2 2

Enter matrix A :
1 2
0 1

Enter matrix B :
2 1
3 1

For addition or subtraction press '+' or '-' : +
3 3
3 2

1. Add or Subtract Matrix
2. Multiply two Matrices
3. Find determinant (upto 3x3)
4. Exit
:4
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin #
```

Builtin Command `exit` must be used for logging out, as depicted below.

```
abhishek@Euclid:~/home/abhishek/Documents/project CS101/mash_test/bin # cd /  
abhishek@Euclid:~/ # exit  
Logging out  
abhishek@Euclid:~/Documents/project CS101/mash_test$
```

Thank You