Shell, vi, gdb, Eclipse

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bash and Unix commands

```
^C (ctrl-C) : kill the running program
^Z (ctrl-Z) : suspend the running program
fg : resume the suspended program (foreground)
bg : run the suspended program in background
jobs : list of suspended programs
ps [-ef] : list all processes
kill <pid> : kill the process with <pid>

ls : list files
pwd : shows the current path
cd <dir> : change directory
cp <src> <dst> : copy a file
rm <files> : remove file(s)
mkdir <dir> : make a directory
rmdir <dir> : remove an empty directory
find <dir> -name '<name_expr>' : find files that matches <name_expr>
         find . -name '*.cpp'
cat <text_file> : dump the file content
more <text_file> : show the file content page by page
```

vim key commands

```
i,I : start insert at the current position / at the beginning of line
a,A : start insert at the next position / at the end of line
o,O : start insert below/above the current line
x,r,s : delete/replace the character with a character/string
S : replace the entire line
                     h,j,k,l : move cursor left, down, up, right
d : delete           w,^,e : word
c : change       +   0,$ : beginning/end of the line
y : copy (yank)      G : end of the file
dd, cc, yy : delete/change/copy the current line
<number><command> : repeat <command> by <number> times
    10dd : delete 10 lines
p,P : paste the copied/cut item after/before the current position
. : repeat the most recent edit

<number>G : go to the <number> line; 'G' goes to the end of file
/,?<pattern> : search <pattern> after/before the current position
n,N : next/previous pattern
m<key> : memory the current position to <key>
`<key> : go to the memorized position - combines with d,c,y
```

vim key commands

```
:q,:q! : quit vi if all edits are saved / and discard the edits
:e,:e! [dir/filename] : edit the file / and discard the edits
:r <filename> : read the content of <filename> and paste it after
:w,:w! [filename] : write/overwrite <filename> with the buffer

:sp,:vs [filename] : vertical/horizontal split
:qa : quit all splits
^w-,^w+ : decrease/increase split window height
^w_,^w= : maximize/equalize the current split window vertically
^w h,j,k,l : go to left,down,up,right split window
```

gdb - GNU debugger

- Debug hard-to-find bugs.
- Compile with `-g` option to include debug information.

```
$ g++ -g -o test main.cpp my_class.cpp
$ ./test
Segmentation fault: 11
$ gdb ./test
GNU gdb 6.3.50-20050815 (Apple version gdb-1820) (Sat Jun 16 02:40:11 UTC 2012)
.....

(gdb) run
Starting program: /Users/jwlim/lectures/csd12/test
Reading symbols for shared libraries ++......................... done

Program received signal EXC_BAD_ACCESS, Could not access memory.
Reason: KERN_INVALID_ADDRESS at address: 0x0000000000000010
0x00007fff855c2398 in feof ()
(gdb)
```

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Program received signal EXC_BAD_ACCESS, Could not access memory.
Reason: KERN_INVALID_ADDRESS at address: 0x0000000000000010
0x00007fff855c2398 in feof ()
(gdb) backtrace                         bt
#0  0x00007fff855c2398 in feof ()
#1  0x0000000100000d08 in main () at test.cc:13
(gdb) up 1
#1  0x0000000100000d08 in main () at test.cc:13
13          while (!feof(fp_read)) {
(gdb) print fp_read                     p fp_read
$1 = (FILE *) 0x0
(gdb) quit                                        q
The program is running.  Exit anyway? (y or n) y
$
```

Eclipse

- www.eclipse.org
- Free, open-source, and easy-to-use IDE (integrated development environment).
    - Very similar to Microsoft Visual Studio.
    - Make projects, build in debug/release mode.
    - Set breakpoints and trace execution step-by-step.
    - Monitor variables in run-time.

Q&A