# Setting up the Environment

## Build the tool chain

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ cd cs161-binutils-1.5
Meghnas-MacBook-Pro-2:cs161-binutils-1.5 meghna$ ./toolbuild.sh
```

## Build the cross compiler

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ cd cs161-gcc-1.5
Meghnas-MacBook-Pro-2:cs161-gcc-1.5 meghna$ ./toolbuild.sh
```

```
/Users/meghna/desktop/cs161/cs161-gcc-1.5/./gcc-4.1.2+cs161/gcc/toplev.c
:524:1: error:
      redefinition of a 'extern inline' function 'floor_log2' is not
      supported in C99 mode
floor_log2 (unsigned HOST_WIDE_INT x)
^
/Users/meghna/desktop/cs161/cs161-gcc-1.5/./gcc-4.1.2+cs161/gcc/toplev.h
:175:1:
      previous definition is here
floor_log2 (unsigned HOST_WIDE_INT x)
^
/Users/meghna/desktop/cs161/cs161-gcc-1.5/./gcc-4.1.2+cs161/gcc/toplev.c
:559:1: error:
      redefinition of a 'extern inline' function 'exact_log2' is not
      supported in C99 mode
exact_log2 (unsigned HOST_WIDE_INT x)
^
/Users/meghna/desktop/cs161/cs161-gcc-1.5/./gcc-4.1.2+cs161/gcc/toplev.h
:181:1:
      previous definition is here
exact_log2 (unsigned HOST_WIDE_INT x)
^
5 warnings and 2 errors generated.
make[2]: *** [toplev.o] Error 1
make[1]: *** [all-gcc] Error 2
make: *** [all] Error 2
```

## Build the special gdb

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ cd cs161-gdb-1.5
Meghnas-MacBook-Pro-2:cs161-gdb-1.5 meghna$ ./toolbuild.sh
```

Build the sys161 emulator

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ cd sys161-1.14
Meghnas-MacBook-Pro-2:sys161-1.14 meghna$ ./configure mipseb
```

```
2 warnings generated.
gcc  array.o nethub.o  -lm -o hub161
(cd build-doc && /Library/Developer/CommandLineTools/usr/bin/make all)
make[1]: `all' is up to date.
Meghnas-MacBook-Pro-2:sys161-1.14 meghna$ make install
```

Unpack the OS/161 distribution

```
Meghnas-MacBook-Pro-2:cs161 meghna$ tar xvfz os161-1.10.tar.gz
```

Rename OS/161 source tree to just os161

```
Meghnas-MacBook-Pro-2:cs161 meghna$ mv os161-1.10 os161
```

# Getting Started

2.1 Setup $PATH

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ export PATH=~/cs161/bin:$PATH
```

2.2 Create a New Git Repository

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ export PATH=~/cs161/bin:$PATH
[Meghnas-MacBook-Pro-2:cs161 meghna$ git init
 Initialized empty Git repository in /Users/meghna/Desktop/cs161/.git/
```

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ git add .
```

```
Meghnas-MacBook-Pro-2:cs161 meghna$ git push -u origin master

Enumerating objects: 17011, done.
Counting objects: 100% (17011/17011), done.
Delta compression using up to 4 threads
Compressing objects: 100% (16461/16461), done.
Writing objects: 100% (17011/17011), 136.26 MiB | 5.36 MiB/s, done.
Total 17011 (delta 3317), reused 0 (delta 0)
remote: Resolving deltas: 100% (3317/3317), done.
To https://github.com/meghna-dash/project3.git
 * [new branch]      master -> master
Branch 'master' set up to track remote branch 'master' from 'origin'.
Meghnas-MacBook-Pro-2:cs161 meghna$
Meghnas-MacBook-Pro-2:cs161 meghna$
```

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ git tag asst1a-start
```

Github: https://github.com/meghna-dash/project3

🖥 meghna-dash / **project3**

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| 📁 sys161-1.14 | first commit | 1 minute ago |
| 📄 cs161-binutils-1.5.tgz | first commit | 1 minute ago |
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| 📄 sys161.conf | first commit | 1 minute ago |

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## 2.3 Project Configuration

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ cd os161
[Meghnas-MacBook-Pro-2:os161 meghna$ ./configure
 -n Checking for ranlib...
yes
 -n Checking for <err.h>...
yes
Generating defs.mk.
Meghnas-MacBook-Pro-2:os161 meghna$ ▎
```

```
[Meghnas-MacBook-Pro-2:os161 meghna$ cd kern/conf
[Meghnas-MacBook-Pro-2:conf meghna$ ./config ASST1
Configuration ASST1
 -n Generating files...
 -n  opt-*.h
 -n  files.mk
 -n  defs.mk
 -n  Makefile
 -n  autoconf.h
 -n  autoconf.c

Configuration in ../compile/ASST1 done
Remember to make depend
Meghnas-MacBook-Pro-2:conf meghna$ ▎
```

```
[Meghnas-MacBook-Pro-2:kern meghna$ cd compile/
[Meghnas-MacBook-Pro-2:compile meghna$ ls
ASST1
Meghnas-MacBook-Pro-2:compile meghna$ ▎
```
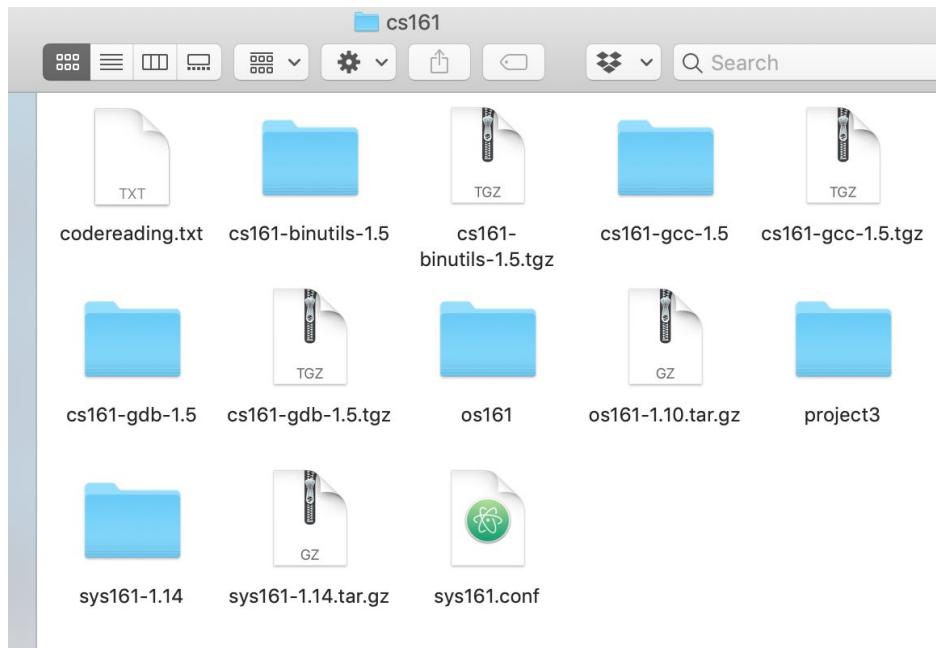
## 2.4 Building for ASST1

```
[Meghnas-MacBook-Pro-2:compile meghna$ cd ASST1/
[Meghnas-MacBook-Pro-2:ASST1 meghna$ make depend
cs161-gcc   -mno-abicalls -fno-pic -Wall -W -Wwrite-strings -g -nostdinc -I../..
/include -I../../dev -I.  -ffreestanding -D_KERNEL -G 0 -M ../../dev/generic/rtc
lock.c ../../dev/lamebus/lrandom.c ../../dev/lamebus/ltrace.c ../../dev/lamebus/
emu.c ../../dev/generic/random.c ../../dev/lamebus/lhd.c ../../dev/generic/beep.
c ../../dev/lamebus/lamebus.c ../../dev/generic/pseudorand.c ../../dev/lamebus/l
ser.c ../../dev/generic/console.c ../../dev/lamebus/ltimer.c ../../dev/lamebus/e
mu_att.c ../../dev/lamebus/lhd_att.c ../../dev/lamebus/random_lrandom.c ../../de
v/lamebus/ltrace_att.c ../../dev/lamebus/con_lser.c ../../dev/generic/pseudorand
_att.c ../../dev/lamebus/rtclock_ltimer.c ../../dev/lamebus/lser_att.c ../../dev
/lamebus/beep_ltimer.c ../../dev/lamebus/ltimer_att.c ../../dev/lamebus/lrandom_
att.c ../../fs/sfs/sfs_fs.c ../../arch/mips/mips/dumbvm.c ../../asst1/catsem.c .
./../asst1/stoplight.c ../../asst1/catlock.c ../../fs/sfs/sfs_io.c ../../fs/sfs/
sfs_vnode.c ../../arch/mips/mips/cache_mips1.S ../../arch/mips/mips/exception.S
../../arch/mips/mips/lamebus_mips.c ../../arch/mips/mips/interrupt.c ../../arch/
mips/mips/pcb.c ../../arch/mips/mips/ram.c ../../arch/mips/mips/spl.c ../../arch
/mips/mips/start.S ../../arch/mips/mips/switch.S ../../arch/mips/mips/syscall.c
../../arch/mips/mips/threadstart.S ../../arch/mips/mips/trap.c ../../arch/mips/m
ips/tlb_mips1.S ../../../lib/libc/mips-setjmp.S ../../lib/copyinout.c ../../lib/
array.c ../../lib/bitmap.c ../../lib/queue.c ../../lib/kheap.c ../../lib/kprintf
.c ../../lib/kgets.c ../../lib/misc.c ../../lib/ntoh.c ../../../lib/libc/__print
f.c ../../../lib/libc/snprintf.c ../../../lib/libc/atoi.c ../../../lib/libc/bzer
o.c ../../../lib/libc/memcpy.c ../../../lib/libc/memmove.c ../../../lib/libc/str
cat.c ../../../lib/libc/strchr.c ../../../lib/libc/strcmp.c ../../../lib/libc/st
rcpy.c ../../../lib/libc/strlen.c ../../../lib/libc/strrchr.c ../../../lib/libc/
strtok_r.c ../../dev/init.c ../../fs/vfs/device.c ../../fs/vfs/vfscwd.c ../../fs
/vfs/vfslist.c ../../fs/vfs/vfslookup.c ../../fs/vfs/vfspath.c ../../fs/vfs/vnod
e.c ../../fs/vfs/devnull.c ../../thread/hardclock.c ../../thread/synch.c ../../t
hread/scheduler.c ../../thread/thread.c ../../main/main.c ../../main/menu.c ../.
./userprog/loadelf.c ../../userprog/runprogram.c ../../userprog/uio.c ../../test
/arraytest.c ../../test/bitmaptest.c ../../test/queuetest.c ../../test/threadtes
t.c ../../test/tt3.c ../../test/synchtest.c ../../test/malloctest.c ../../test/f
stest.c ../../compile/ASST1/autoconf.c > depend.mk
/bin/sh: cs161-gcc: command not found
make: *** [depend] Error 127
Meghnas-MacBook-Pro-2:ASST1 meghna$
```

I am getting the following error:

```
/bin/sh: cs161-gcc: command not found
make: *** [depend] Error 127
```

Please note that I looked at the FAQ for this project for guidance. I did complete the four steps described in Sections 4.2.1-4.2.4. That is, I did build the tool chain, cross compiler, special gdb, and the sys161 emulator first before trying to compile os161.



## 2.6 Physical Memory

```
121   31   busctl   ramsize=2097152
```

## 3.2 Debugging Concurrent Programs

```
118   28   random   seed=1
```

## Code-Reading Exercises

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ mkdir project3
[Meghnas-MacBook-Pro-2:cs161 meghna$ touch codereading.txt
Meghnas-MacBook-Pro-2:cs161 meghna$
```

# Deliverables

## Git

```
[Meghnas-MacBook-Pro-2:cs161 meghna$ git status
On branch master
Your branch is up to date with 'origin/master'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   os161/kern/thread/synch.c

no changes added to commit (use "git add" and/or "git commit -a")
[Meghnas-MacBook-Pro-2:cs161 meghna$ git add .
[Meghnas-MacBook-Pro-2:cs161 meghna$ git commit -m "implementing locks"
[master 2e29dd1c] implementing locks
 1 file changed, 30 insertions(+), 9 deletions(-)
[Meghnas-MacBook-Pro-2:cs161 meghna$ git push
Enumerating objects: 11, done.
Counting objects: 100% (11/11), done.
Delta compression using up to 4 threads
Compressing objects: 100% (6/6), done.
Writing objects: 100% (6/6), 756 bytes | 756.00 KiB/s, done.
Total 6 (delta 5), reused 0 (delta 0)
remote: Resolving deltas: 100% (5/5), completed with 5 local objects.
To https://github.com/meghna-dash/project3.git
   aac452f0..2e29dd1c  master -> master
Meghnas-MacBook-Pro-2:cs161 meghna$
```

```
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   os161/kern/thread/synch.c

no changes added to commit (use "git add" and/or "git commit -a")
[Meghnas-MacBook-Pro-2:cs161 meghna$ git add .
[Meghnas-MacBook-Pro-2:cs161 meghna$ git commit -m "implementing cv"
[master 5b0fb490] implementing cv
 1 file changed, 15 insertions(+)
[Meghnas-MacBook-Pro-2:cs161 meghna$ git push
Enumerating objects: 11, done.
Counting objects: 100% (11/11), done.
Delta compression using up to 4 threads
Compressing objects: 100% (6/6), done.
Writing objects: 100% (6/6), 725 bytes | 725.00 KiB/s, done.
Total 6 (delta 5), reused 0 (delta 0)
remote: Resolving deltas: 100% (5/5), completed with 5 local objects.
To https://github.com/meghna-dash/project3.git
   2e29dd1c..5b0fb490  master -> master
Meghnas-MacBook-Pro-2:cs161 meghna$
```