

- **Running a program**

`sim-outorder` [sim opts] `program` [program opts]

- **e.g.**

`$SIMPLESIM/simplesim-3.0/sim-outorder`

`-config cfg_file bzip2_base.i386-m32-gcc42-nn
dryer.jpg`

Benchmark

- SPEC 2006
 - Six benchmarks (4 integer, 2 floating point)
bzip2(INT)
equake(FP)
hmmer(INT)
mcf(INT)
milc(FP)
sjeng(INT)

Installation of simplescalar

- Simplescalar 3.0 is already installed in CSE lab 204
- Path setup
 - 1) log on into one of the linux machines
 - 2) Go to your home directory: `cd`
 - 3) `> vim .cshrc` (or `gedit .cshrc`)
`setenv SIMPLESIM /home/software/simplesim`
`> source .cshrc`
 - 4) to verify, run
`> echo $SIMPLESIM`
the return should be `/home/software/simplesim`

Installation of simplescalar

- create a local directory
 - > **mkdir** simplescalar
 - > **cd** simplescalar
 - > **cp** -r **\$SIMPLESIM/ss-benchmark** .
 - > **cd** **ss-benchmark**
- Download tmp.cfg from CANVAS
 - Save it in **/ss-benchmark**

Running Benchmarks

- Run benchmark (bzip2)

```
>cd bzip2
```

```
>$SIMPLESIM/simplesim-3.0/sim-outorder
```

```
–config ../tmp.cfg bzip2_base.i386-m32-gcc42-nn  
dryer.jpg
```

Running Benchmarks

- Run benchmark (bzip2)

```
>cd bzip2
```

```
>$SIMPLESIM/simplesim-3.0/sim-outorder
```

```
–config ../tmp.cfg bzip2_base.i386-m32-gcc42-nn  
dryer.jpg
```

Check results

- Check simulation results
 - vim sim1.out (or gedit sim1.out)

```
sim: ** fast forwarding 300000 insts **
sim: ** starting performance simulation **

sim: ** simulation statistics **
sim_num_insn          2000000 # total number of instructions committed
sim_num_refs          711143 # total number of loads and stores committed
sim_num_loads         306852 # total number of loads committed
sim_num_stores        404291.0000 # total number of stores committed
sim_num_branches      212047 # total number of branches committed
sim_elapsed_time      4 # total simulation time in seconds
sim_inst_rate         500000.0000 # simulation speed (in insts/sec)
sim_total_insn        2000000 # total number of instructions executed
sim_total_refs        711143 # total number of loads and stores executed
sim_total_loads       306852 # total number of loads executed
sim_total_stores      404291.0000 # total number of stores executed
sim_total_branches    212047 # total number of branches executed
sim_cycle            7787523 # total simulation time in cycles
sim_IPC              0.2568 # instructions per cycle
sim_CPI              3.8938 # cycles per instruction
sim_exec_BW          0.2568 # total instructions (mis-spec + committed) per cycle
sim_IPB              9.4319 # instruction per branch
```

Modify config

- Modify a parameter in the config file
 - > `cd ..`
 - > `vim tmp.cfg` (or `gedit tmp.cfg`)
 - Increase L2 Data Cache Latency from 4 to 10
 - `cache:dl2lat 10`
 - Change output file name (`-redir:sim sim2.out`)
 - Save and close `tmp.cfg`

Re-run Benchmark

- Run benchmark (bzip2)

```
>cd bzip2
```

```
>$SIMPLESIM/simplesim-3.0/sim-outorder
```

```
–config ../tmp.cfg
```

```
bzip2_base.i386-m32-gcc42-nn dryer.jpg
```

Check result

- Check simulation results
 - `vim sim2.out` (or `gedit sim2.out`)

```
sim: ** fast forwarding 300000 insts **
sim: ** starting performance simulation **

sim: ** simulation statistics **
sim_num_insn          2000000 # total number of instructions committed
sim_num_refs          711143 # total number of loads and stores committed
sim_num_loads         306852 # total number of loads committed
sim_num_stores        404291.0000 # total number of stores committed
sim_num_branches      212047 # total number of branches committed
sim_elapsed_time      5 # total simulation time in seconds
sim_inst_rate         400000.0000 # simulation speed (in insts/sec)
sim_total_insn        2000000 # total number of instructions executed
sim_total_refs        711143 # total number of loads and stores executed
sim_total_loads       306852 # total number of loads executed
sim_total_stores      404291.0000 # total number of stores executed
sim_total_branches    212047 # total number of branches executed
sim_cycle             8683285 # total simulation time in cycles
sim_IPC               0.2303 # instructions per cycle
sim_CPI               4.3416 # cycles per instruction
sim_exec_BW           0.2303 # total instructions (mis-spec + committed) per cycle
sim_IPB               9.4319 # instruction per branch
```

Get tmp.cfg

- How to generate the input file ?

>\$SIMPLESIM/simplesim-3.0/sim-outorder

-dumpconfig tmp1.cfg

vim tmp1.cfg

i

//start editing

Esc

:wq

```
-issue:inorder                false

# issue instructions down wrong execution paths
-issue:wrongpath              true

# instruction commit B/W (insts/cycle)
-commit:width                  4

# register update unit (RUU) size
-ruu:size                      16

# load/store queue (LSQ) size
-lsq:size                      8

# l1 data cache config, i.e., {<config>|none}
-cache:dll                    dll:128:32:4:1

# l1 data cache hit latency (in cycles)
-cache:dlllat                  1

# l2 data cache config, i.e., {<config>|none}
-cache:dl2                     ul2:1024:64:4:1
                                103,1
                                58%
```

Log into Lab 218 using SSH

- Visit [2FA.psu.edu](https://2fa.psu.edu) and configure a device to receive your second factor codes, or alternatively enable “push” verification.
- Visit <https://vpn.cse.psu.edu> to install VPN client. This step requires 2 factor authentication.
 - This website requires a CSE login and password, you will need to be on the CSE network
 - Machine names are in the following format:
p218instXX.cse.psu.edu, where XX is a number for the machine ID

Use MobaXterm to access the machines in lab 204

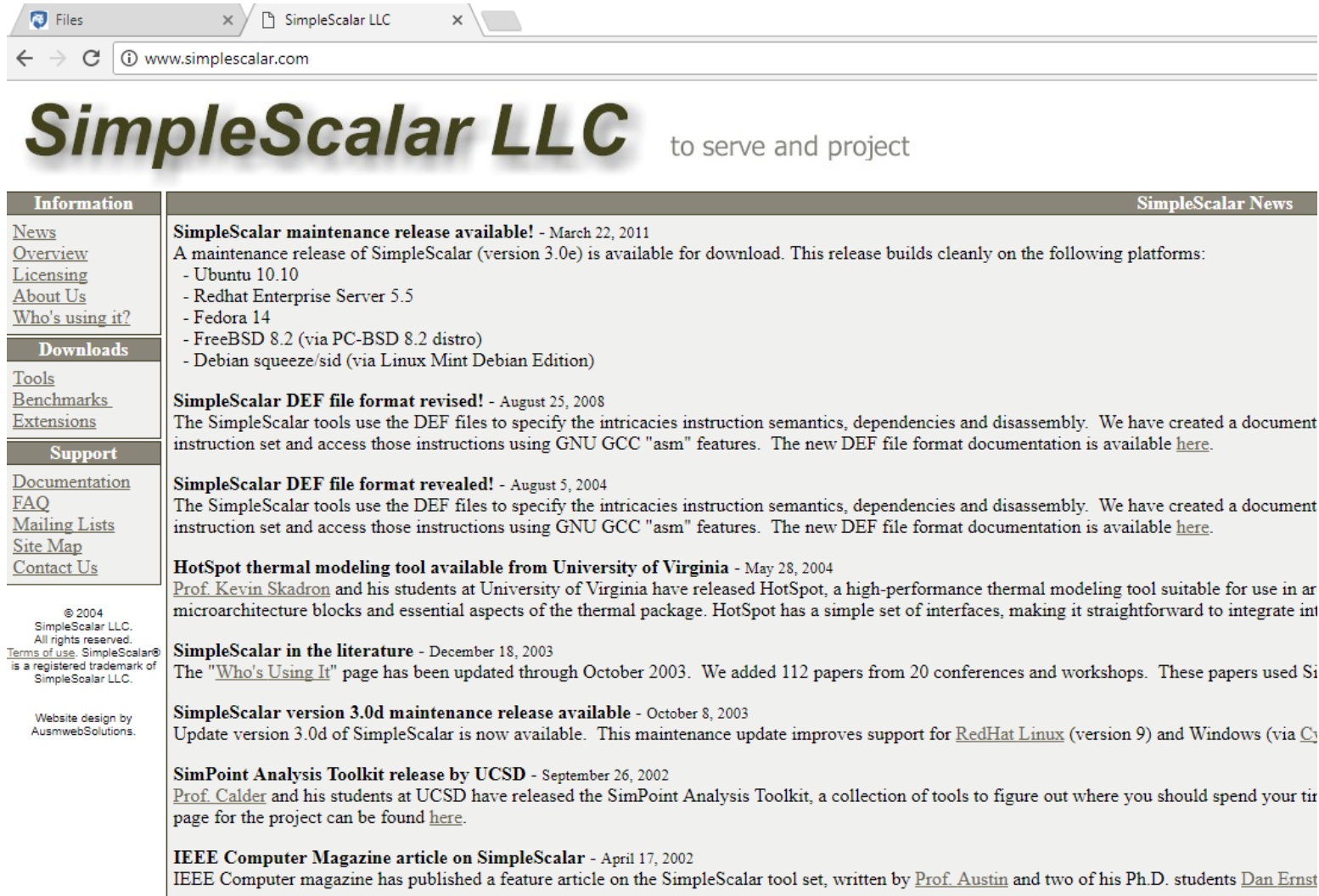
ssh abc1234@cse-p204instXX.cse.psu.edu

abc1234 is your psu ID

XX is the machine which you want to login in westgate 204. (e.g. 01, 06, 18)

Install SimpleScalar on your own machine

1. Go to www.simplescalar.com



The screenshot shows a web browser window with two tabs: 'Files' and 'SimpleScalar LLC'. The address bar displays 'www.simplescalar.com'. The website header features the 'SimpleScalar LLC' logo in a large, bold, green font, followed by the tagline 'to serve and project' in a smaller, grey font. The main content area is divided into two columns. The left column contains a navigation menu with sections: 'Information' (including links for News, Overview, Licensing, About Us, and Who's using it?), 'Downloads' (including Tools, Benchmarks, and Extensions), and 'Support' (including Documentation, FAQ, Mailing Lists, Site Map, and Contact Us). The right column is titled 'SimpleScalar News' and contains several news items: 'SimpleScalar maintenance release available!' (March 22, 2011), 'SimpleScalar DEF file format revised!' (August 25, 2008), 'SimpleScalar DEF file format revealed!' (August 5, 2004), 'HotSpot thermal modeling tool available from University of Virginia' (May 28, 2004), 'SimpleScalar in the literature' (December 18, 2003), 'SimpleScalar version 3.0d maintenance release available' (October 8, 2003), 'SimPoint Analysis Toolkit release by UCSD' (September 26, 2002), and 'IEEE Computer Magazine article on SimpleScalar' (April 17, 2002). The footer of the page includes copyright information for 2004, a disclaimer about the SimpleScalar logo being a registered trademark, and a credit to 'Website design by AusmwebSolutions.'

Files x SimpleScalar LLC x

← → ↻ ⓘ www.simplescalar.com

SimpleScalar LLC

to serve and project

Information	SimpleScalar News
News Overview Licensing About Us Who's using it?	SimpleScalar maintenance release available! - March 22, 2011 A maintenance release of SimpleScalar (version 3.0e) is available for download. This release builds cleanly on the following platforms: <ul style="list-style-type: none">- Ubuntu 10.10- Redhat Enterprise Server 5.5- Fedora 14- FreeBSD 8.2 (via PC-BSD 8.2 distro)- Debian squeeze/sid (via Linux Mint Debian Edition)
Downloads Tools Benchmarks Extensions	SimpleScalar DEF file format revised! - August 25, 2008 The SimpleScalar tools use the DEF files to specify the intricacies instruction semantics, dependencies and disassembly. We have created a document instruction set and access those instructions using GNU GCC "asm" features. The new DEF file format documentation is available here .
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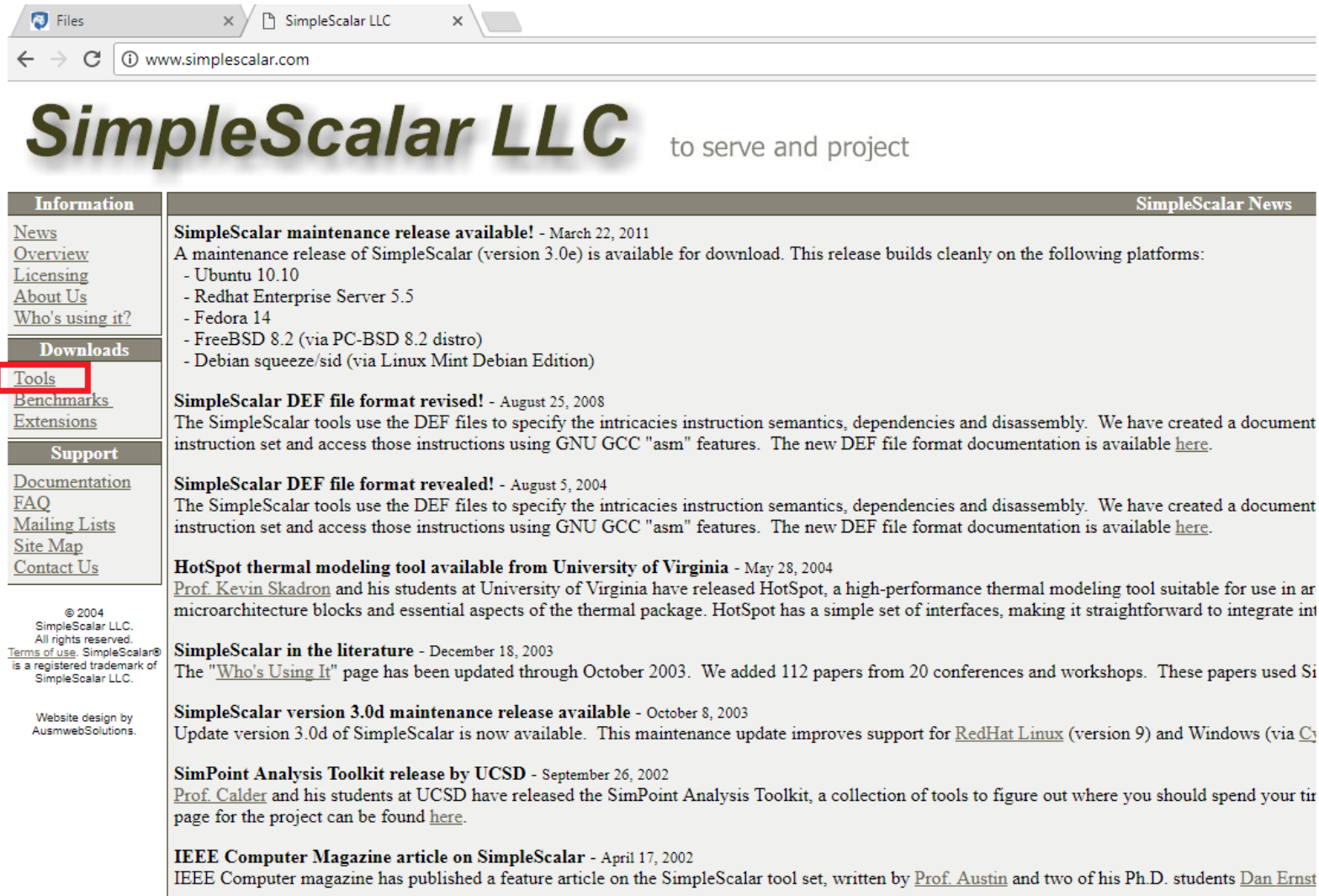
SimpleScalar version 3.0d maintenance release available - October 8, 2003
Update version 3.0d of SimpleScalar is now available. This maintenance update improves support for [RedHat Linux](#) (version 9) and Windows (via C)

SimPoint Analysis Toolkit release by UCSD - September 26, 2002
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Install SimpleScalar on your own machine

2. Click tools



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SimpleScalar LLC to serve and project

Information

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SimpleScalar News

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Install SimpleScalar on your own machine

3. Choose simplesim-3v0e.tgz



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Information	Downloads	Support
News Overview Licensing About Us Who's using it?	<p>This page contains links to all SimpleScalar™ simulator software and related documentation. Please refer to the SimpleScalar website for more information.</p> <p>COPYRIGHT</p> <p>UNPACKING</p> <p>simplesim-3v0e.tgz</p> <p>simpletools-2v0.tgz</p> <p>simpleutils-2v0.tgz</p>	<p>Documentation</p> <p>FAQ</p> <p>Mailing Lists</p> <p>Site Map</p> <p>Contact Us</p>

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4. Agree



Install SimpleScalar on your own machine

5. Compile simplescalar

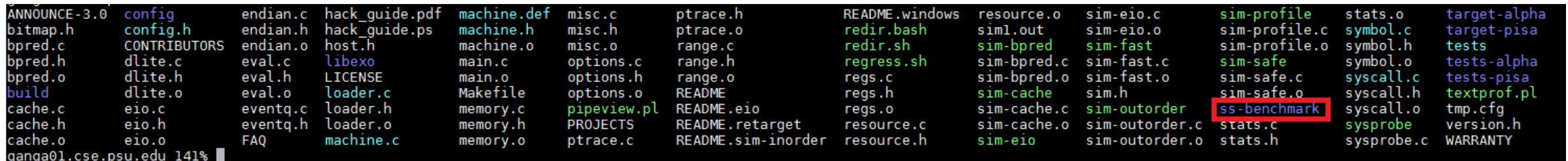
```
tar -zxf simplesim-3v0e.tgz
cd simplesim-3.0
make config-pisa
make
```

ANNOUNCE-3.0	config	endian.c	hack_guide.pdf	machine.def	misc.c	ptrace.h	README.windows	resource.o	sim-eio.c	sim-profile	symbol.c	target-pisa
bitmap.h	config.h	endian.h	hack_guide.ps	machine.h	misc.h	ptrace.o	redir.bash	siml.out	sim-eio.o	sim-profile.c	symbol.h	tests
bpred.c	CONTRIBUTORS	endian.o	host.h	machine.o	misc.o	range.c	redir.sh	sim-bpred	sim-fast	sim-profile.o	symbol.o	tests-alpha
bpred.h	dlite.c	eval.c	libexo	main.c	options.c	range.h	regress.sh	sim-bpred.c	sim-fast.c	sim-safe	syscall.c	tests-pisa
bpred.o	dlite.h	eval.h	LICENSE	main.o	options.h	range.o	regs.c	sim-bpred.o	sim-fast.o	sim-safe.c	syscall.h	textprof.pl
build	dlite.o	eval.o	loader.c	Makefile	options.o	README	regs.h	sim-cache	sim.h	sim-safe.o	syscall.o	tmp.cfg
cache.c	eio.c	eventq.c	loader.h	memory.c	pipeview.pl	README.eio	regs.o	sim-cache.c	sim-outorder	stats.c	sysprobe	version.h
cache.h	eio.h	eventq.h	loader.o	memory.h	PROJECTS	README.retarg	resource.c	sim-cache.o	sim-outorder.c	stats.h	sysprobe.c	WARRANTY
cache.o	eio.o	FAQ	machine.c	memory.o	ptrace.c	README.sim-inorder	resource.h	sim-eio	sim-outorder.o	stats.o	target-alpha	

Install SimpleScalar on your own machine

6. Copy the benchmarks to the current folder

```
cp -r /home/software/simplesim/ss-benchmark/ .
```

A terminal window showing a directory listing of files and subdirectories. The files are listed in a grid-like fashion. The file 'ss-benchmark' is highlighted with a red rectangular box. The terminal output is as follows:

```
ANNOUNCE-3.0  config      endian.c  hack_guide.pdf  machine.def  misc.c     ptrace.h    README.windows  resource.o  sim-eio.c  sim-profile  stats.o     target-alpha
bitmap.h      config.h    endian.h  hack_guide.ps   machine.h    misc.h     ptrace.o     redir.bash     siml.out   sim-eio.o  sim-profile.c  symbol.c     target-pisa
bpred.c      CONTRIBUTORS  endian.o  host.h          machine.o    misc.o     range.c      redir.sh       sim-bpred  sim-fast   sim-profile.o  symbol.h     tests
bpred.h      dlite.c     eval.c    libexo          main.c       options.c  range.h      regress.sh     sim-bpred.c  sim-fast.c  sim-safe       symbol.o     tests-alpha
bpred.o      dlite.h     eval.h    LICENSE         main.o       options.h  range.o      regs.c         sim-bpred.o  sim-fast.o  sim-safe.c     syscall.c    tests-pisa
build        dlite.o     eval.o    loader.c        Makefile     options.o  README       regs.h         sim-cache   sim.h       sim-safe.o     syscall.h    textprof.pl
cache.c      eio.c       eventq.c  loader.h        memory.c     pipeview.pl  README.eio    regs.o         sim-cache.c  sim-outorder  ss-benchmark  syscall.o    tmp.cfg
cache.h      eio.h       eventq.h  loader.o        memory.h     PROJECTS   README.retarget  resource.c   sim-cache.o  sim-outorder.c  stats.c       sysprobe    version.h
cache.o      eio.o       FAQ       machine.c       memory.o     ptrace.c   README.sim-inorder  resource.h   sim-eio     sim-outorder.o  stats.h       sysprobe.c  WARRANTY
ganga01.cse.psu.edu 141%
```

Then you can run the benchmarks on your own machine.