

# **EEL 5764 Computer Architecture Fall 2021**

**Department of Electrical and Computer Engineering**

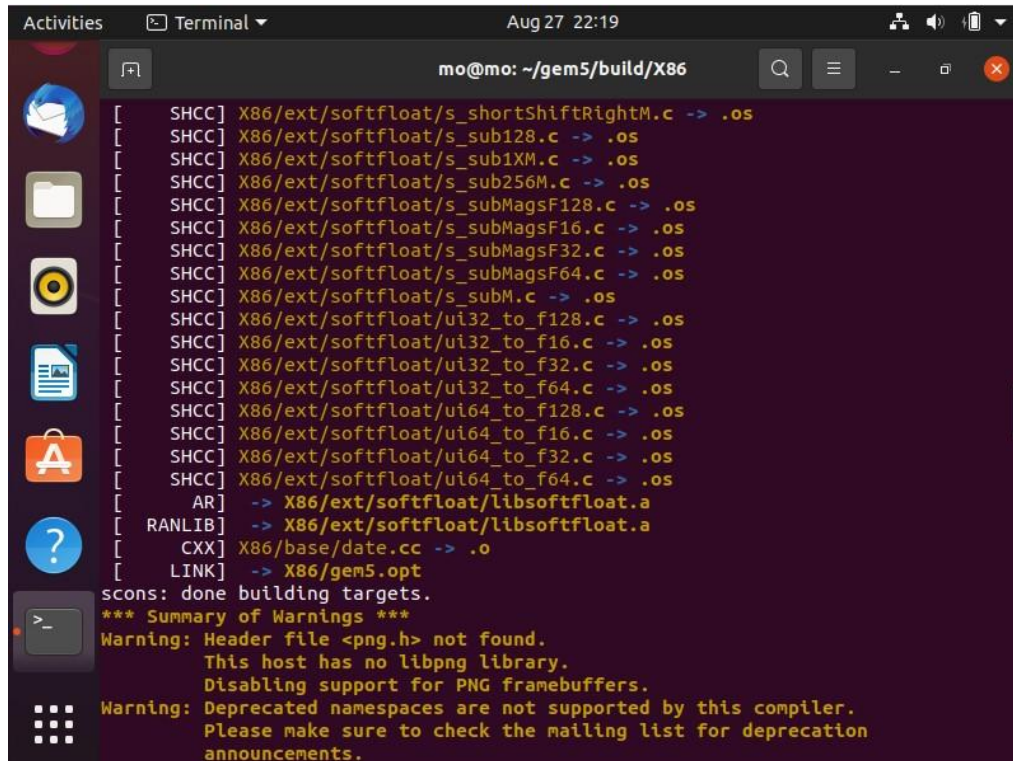
**University of Florida**

**Lab 1**

**Student Name : Mohit Palliyil Sathyaseelan**

1. Scons build/X86/gem5.opt -j9 (using 8 cores)

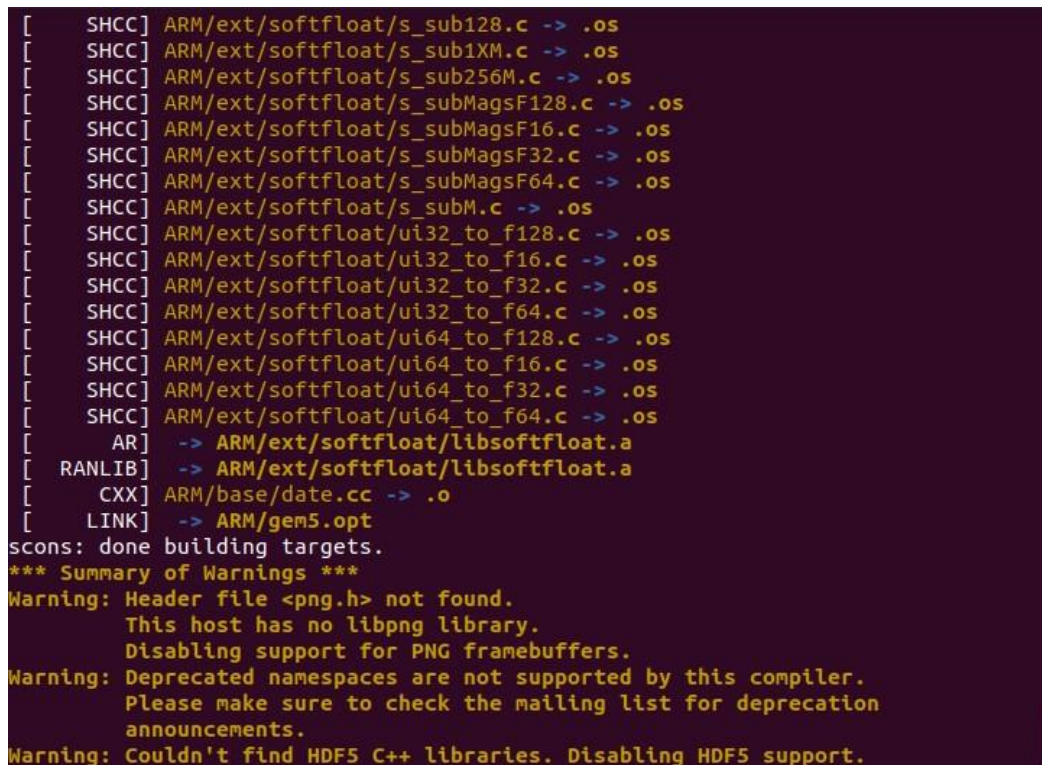
Username is mo



A terminal window titled 'mo@mo: ~/gem5/build/X86' showing the output of a Scons build command. The output lists various source files being compiled by SHCC into object files (.os), followed by an AR command to create a static library (libsoftfloat.a), a CXX command to compile date.cc, and a LINK command to produce the final executable (gem5.opt). The build completes with the message 'scons: done building targets.' and a summary of warnings, including a missing png.h header and deprecated namespaces.

```
[ SHCC] X86/ext/softfloat/s_shortShiftRightM.c -> .os
[ SHCC] X86/ext/softfloat/s_sub128.c -> .os
[ SHCC] X86/ext/softfloat/s_sub1XM.c -> .os
[ SHCC] X86/ext/softfloat/s_sub256M.c -> .os
[ SHCC] X86/ext/softfloat/s_subMagsF128.c -> .os
[ SHCC] X86/ext/softfloat/s_subMagsF16.c -> .os
[ SHCC] X86/ext/softfloat/s_subMagsF32.c -> .os
[ SHCC] X86/ext/softfloat/s_subMagsF64.c -> .os
[ SHCC] X86/ext/softfloat/s_subM.c -> .os
[ SHCC] X86/ext/softfloat/ui32_to_f128.c -> .os
[ SHCC] X86/ext/softfloat/ui32_to_f16.c -> .os
[ SHCC] X86/ext/softfloat/ui32_to_f32.c -> .os
[ SHCC] X86/ext/softfloat/ui32_to_f64.c -> .os
[ SHCC] X86/ext/softfloat/ui64_to_f128.c -> .os
[ SHCC] X86/ext/softfloat/ui64_to_f16.c -> .os
[ SHCC] X86/ext/softfloat/ui64_to_f32.c -> .os
[ SHCC] X86/ext/softfloat/ui64_to_f64.c -> .os
[ AR] -> X86/ext/softfloat/libsoftfloat.a
[ RANLIB] -> X86/ext/softfloat/libsoftfloat.a
[ CXX] X86/base/date.cc -> .o
[ LINK] -> X86/gem5.opt
scons: done building targets.
*** Summary of Warnings ***
Warning: Header file <png.h> not found.
This host has no libpng library.
Disabling support for PNG framebuffers.
Warning: Deprecated namespaces are not supported by this compiler.
Please make sure to check the mailing list for deprecation
announcements.
```

2. Scons build/ARM/gem5.opt -j9 (using 8 cores)



A terminal window showing the output of a Scons build command for ARM architecture. The output is similar to the X86 build, listing source files being compiled by SHCC into object files (.os), followed by an AR command to create a static library (libsoftfloat.a), a CXX command to compile date.cc, and a LINK command to produce the final executable (gem5.opt). The build completes with the message 'scons: done building targets.' and a summary of warnings, including a missing png.h header and deprecated namespaces. Additionally, there is a warning about not finding HDF5 C++ libraries.

```
[ SHCC] ARM/ext/softfloat/s_sub128.c -> .os
[ SHCC] ARM/ext/softfloat/s_sub1XM.c -> .os
[ SHCC] ARM/ext/softfloat/s_sub256M.c -> .os
[ SHCC] ARM/ext/softfloat/s_subMagsF128.c -> .os
[ SHCC] ARM/ext/softfloat/s_subMagsF16.c -> .os
[ SHCC] ARM/ext/softfloat/s_subMagsF32.c -> .os
[ SHCC] ARM/ext/softfloat/s_subMagsF64.c -> .os
[ SHCC] ARM/ext/softfloat/s_subM.c -> .os
[ SHCC] ARM/ext/softfloat/ui32_to_f128.c -> .os
[ SHCC] ARM/ext/softfloat/ui32_to_f16.c -> .os
[ SHCC] ARM/ext/softfloat/ui32_to_f32.c -> .os
[ SHCC] ARM/ext/softfloat/ui32_to_f64.c -> .os
[ SHCC] ARM/ext/softfloat/ui64_to_f128.c -> .os
[ SHCC] ARM/ext/softfloat/ui64_to_f16.c -> .os
[ SHCC] ARM/ext/softfloat/ui64_to_f32.c -> .os
[ SHCC] ARM/ext/softfloat/ui64_to_f64.c -> .os
[ AR] -> ARM/ext/softfloat/libsoftfloat.a
[ RANLIB] -> ARM/ext/softfloat/libsoftfloat.a
[ CXX] ARM/base/date.cc -> .o
[ LINK] -> ARM/gem5.opt
scons: done building targets.
*** Summary of Warnings ***
Warning: Header file <png.h> not found.
This host has no libpng library.
Disabling support for PNG framebuffers.
Warning: Deprecated namespaces are not supported by this compiler.
Please make sure to check the mailing list for deprecation
announcements.
Warning: Couldn't find HDF5 C++ libraries. Disabling HDF5 support.
```

3.

```
mo@mo: ~/gem5/build/X86
Thunderbird Mail d build
mo@mo:~/gem5/build$ cd X86/
mo@mo:~/gem5/build/X86$ ls -l
total 596888
drwxrwxr-x 11 mo mo      4096 Aug 26 15:48 arch
drwxrwxr-x  7 mo mo      4096 Aug 26 16:13 base
drwxrwxr-x  2 mo mo      4096 Aug 26 15:40 config
drwxrwxr-x 10 mo mo      4096 Aug 26 15:48 cpu
drwxrwxr-x  2 mo mo    24576 Aug 26 16:12 debug
drwxrwxr-x 18 mo mo      4096 Aug 26 15:23 dev
drwxrwxr-x  2 mo mo      4096 Aug 26 16:11 enums
drwxrwxr-x 13 mo mo      4096 Aug 26 14:04 ext
drwxrwxr-x  3 mo mo      4096 Aug 26 16:15 gem5.build
-rwxrwxr-x  1 mo mo 607749120 Aug 26 16:15 gem5.opt
-rwxrwxr-x  1 mo mo   595832 Aug 26 14:04 gem5py
-rwxrwxr-x  1 mo mo  2726088 Aug 26 14:15 gem5py_m5
drwxrwxr-x  2 mo mo      4096 Aug 26 14:31 gpu-compute
drwxrwxr-x  4 mo mo      4096 Aug 26 15:39 kern
drwxrwxr-x  3 mo mo      4096 Aug 26 14:04 learning_gem5
drwxrwxr-x  7 mo mo     12288 Aug 26 15:49 mem
drwxrwxr-x  2 mo mo    20480 Aug 26 16:12 params
drwxrwxr-x  2 mo mo      4096 Aug 26 15:42 proto
drwxrwxr-x  6 mo mo      4096 Aug 26 14:57 python
lrwxrwxrwx  1 mo mo        28 Aug 26 14:04 SConscript -> /home/mo/gem5/src/SCon
script
drwxrwxr-x  5 mo mo     12288 Aug 26 16:10 sim
drwxrwxr-x  2 mo mo      4096 Aug 26 14:16 sst
drwxrwxr-x 12 mo mo      4096 Aug 26 15:44 systemc
mo@mo:~/gem5/build/X86$
```

4.

```
mo@mo: ~/gem5/build/ARM
mo@mo:~/gem5/build/X86$ cd
mo@mo:~$ cd gem5//build/ARM/
mo@mo:~/gem5/build/ARM$ ls -l
total 698504
drwxrwxr-x 11 mo mo      4096 Aug 27 15:35 arch
drwxrwxr-x  7 mo mo      4096 Aug 27 15:53 base
drwxrwxr-x  2 mo mo      4096 Aug 27 13:59 config
drwxrwxr-x 10 mo mo      4096 Aug 27 15:35 cpu
drwxrwxr-x  2 mo mo    28672 Aug 27 15:48 debug
drwxrwxr-x 18 mo mo      4096 Aug 27 15:35 dev
drwxrwxr-x  2 mo mo      4096 Aug 27 15:46 enums
drwxrwxr-x 13 mo mo      4096 Aug 27 12:11 ext
drwxrwxr-x  3 mo mo      4096 Aug 27 15:55 gem5.build
-rwxrwxr-x  1 mo mo 711755976 Aug 27 15:54 gem5.opt
-rwxrwxr-x  1 mo mo   595832 Aug 27 12:12 gem5py
-rwxrwxr-x  1 mo mo  2768376 Aug 27 12:22 gem5py_m5
drwxrwxr-x  2 mo mo      4096 Aug 27 15:35 gpu-compute
drwxrwxr-x  4 mo mo      4096 Aug 27 15:35 kern
drwxrwxr-x  3 mo mo      4096 Aug 27 12:11 learning_gem5
drwxrwxr-x  7 mo mo     12288 Aug 27 15:35 mem
drwxrwxr-x  2 mo mo    20480 Aug 27 15:47 params
drwxrwxr-x  2 mo mo      4096 Aug 27 15:35 proto
drwxrwxr-x  6 mo mo      4096 Aug 27 15:35 python
lrwxrwxrwx  1 mo mo        28 Aug 27 15:35 SConscript -> /home/mo/gem5/src/SCon
script
drwxrwxr-x  5 mo mo     12288 Aug 27 15:45 sim
drwxrwxr-x  2 mo mo      4096 Aug 27 15:35 sst
drwxrwxr-x 12 mo mo      4096 Aug 27 15:35 systemc
mo@mo:~/gem5/build/ARM$
```



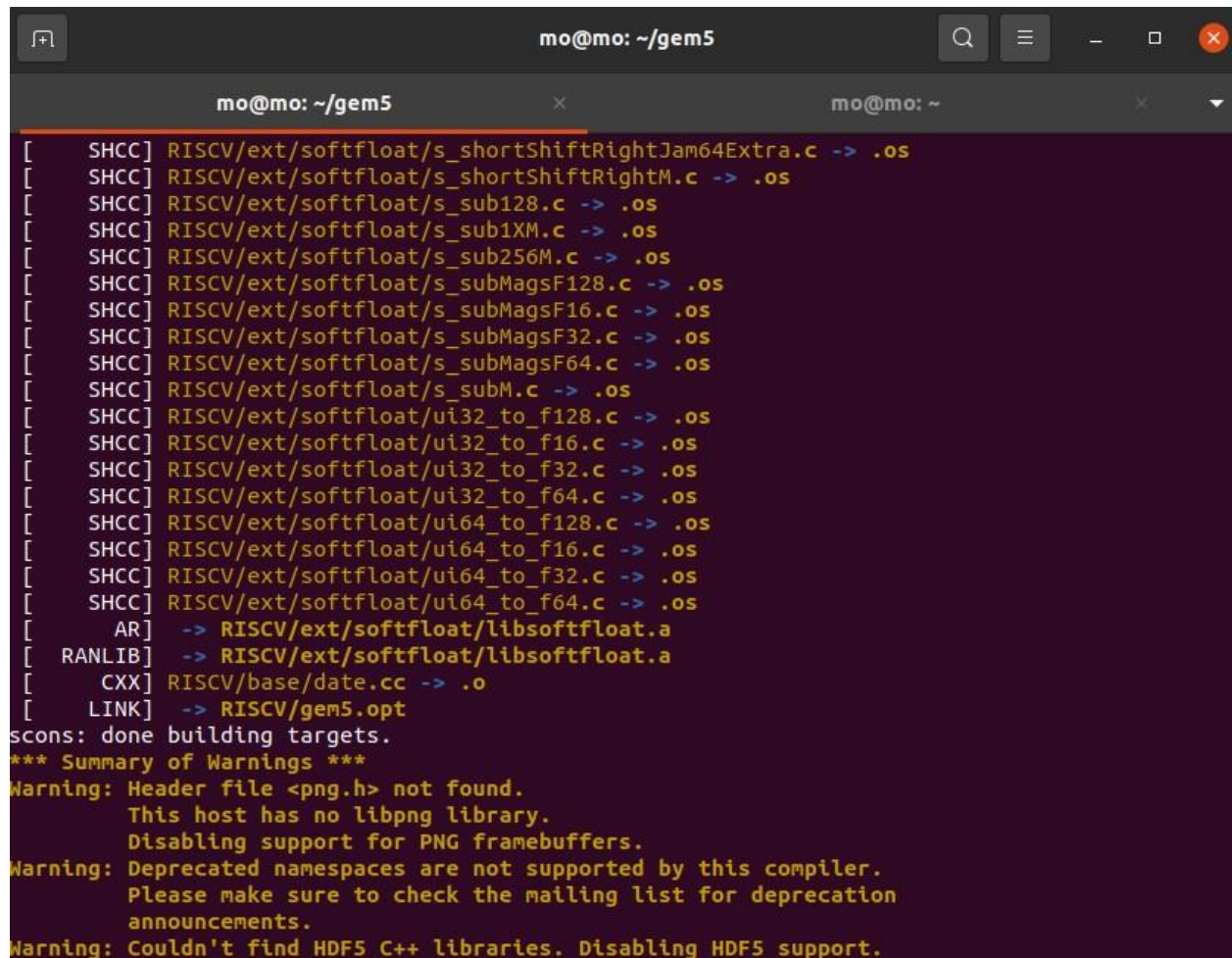
5. Does gem5 support the RISC-V CPU? If yes, then what is the command to build it?

Yes, gem5 supports RISC-V.

<http://resources.gem5.org/resources/riscv-fs> (The last section has steps to build RISC-V)

We can just run this command to build RISC-V

**python3 `which scons` build/RISC-V/gem5.opt -j9**



```
mo@mo: ~/gem5
[ SHCC] RISC-V/ext/softfloat/s_shortShiftRightJam64Extra.c -> .os
[ SHCC] RISC-V/ext/softfloat/s_shortShiftRightM.c -> .os
[ SHCC] RISC-V/ext/softfloat/s_sub128.c -> .os
[ SHCC] RISC-V/ext/softfloat/s_sub1XM.c -> .os
[ SHCC] RISC-V/ext/softfloat/s_sub256M.c -> .os
[ SHCC] RISC-V/ext/softfloat/s_subMagsF128.c -> .os
[ SHCC] RISC-V/ext/softfloat/s_subMagsF16.c -> .os
[ SHCC] RISC-V/ext/softfloat/s_subMagsF32.c -> .os
[ SHCC] RISC-V/ext/softfloat/s_subMagsF64.c -> .os
[ SHCC] RISC-V/ext/softfloat/s_subM.c -> .os
[ SHCC] RISC-V/ext/softfloat/ui32_to_f128.c -> .os
[ SHCC] RISC-V/ext/softfloat/ui32_to_f16.c -> .os
[ SHCC] RISC-V/ext/softfloat/ui32_to_f32.c -> .os
[ SHCC] RISC-V/ext/softfloat/ui32_to_f64.c -> .os
[ SHCC] RISC-V/ext/softfloat/ui64_to_f128.c -> .os
[ SHCC] RISC-V/ext/softfloat/ui64_to_f16.c -> .os
[ SHCC] RISC-V/ext/softfloat/ui64_to_f32.c -> .os
[ SHCC] RISC-V/ext/softfloat/ui64_to_f64.c -> .os
[ AR] -> RISC-V/ext/softfloat/libsoftfloat.a
[ RANLIB] -> RISC-V/ext/softfloat/libsoftfloat.a
[ CXX] RISC-V/base/date.cc -> .o
[ LINK] -> RISC-V/gem5.opt
scons: done building targets.
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Disabling support for PNG framebuffers.
Warning: Deprecated namespaces are not supported by this compiler.
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announcements.
Warning: Couldn't find HDF5 C++ libraries. Disabling HDF5 support.
```