

CPSC 424 I HW2

kd538 - Keyang Dong

README

Environment

The following line is included in my `~/.bashrc` for initializing the development environment:

```
module load Langs/Intel/15 MPI/OpenMPI/1.8.6-intel15
```

And here is my output of `env` command:

```
MKLROOT=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/mkl
MANPATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15/share/man:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/man/en_US:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/gdb/intel64/share/man:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/gdb/intel64_mic/share/man:/usr/share/man:/opt/moab/share/man:
GDB_HOST=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/gdb/intel64_mic/bin/gdb-ia-mic
HOSTNAME=compute-33-1.local
IPPROOT=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/ipp
INTEL_LICENSE_FILE=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/licenses:/opt/intel/licenses:/home/apps/fas/Licenses/intel_site.lic
TERM=xterm-256color
SHELL=/bin/bash
HISTSIZE=1000
GDBSERVER_MIC=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/gdb/target/mic/bin/gdbserver
SSH_CLIENT=10.191.63.252 35673 22
LIBRARY_PATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15/lib:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/ipp/./compiler/lib/intel64:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/ipp/lib/intel64:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/compiler/lib/intel64:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/mkl/lib/intel64:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/tbb/lib/intel64/gcc4.4
PERL5LIB=/opt/moab/lib/perl5
FPATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15/include:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/mkl/include
QTDIR=/usr/lib64/qt-3.3
```

```
OLDPWD=/home/fas/cpsc424/kd538/hw2-2
QTINC=/usr/lib64/qt-3.3/include
MIC_LD_LIBRARY_PATH=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164
/mpirt/lib/mic:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/ipp/
lib/mic:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/compiler/li
b/mic:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/mkl/lib/mic:/
opt/intel/mic/coi/device-linux-release/lib:/opt/intel/mic/myo/lib:/home/apps/fas/L
angs/Intel/2015_update2/composer_xe_2015.2.164/tbb/lib/mic
SSH_TTY=/dev/pts/2
ANT_HOME=/opt/rocks
USER=kd538
LD_LIBRARY_PATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15/lib:/home/apps/fa
s/Langs/Intel/2015_update2/composer_xe_2015.2.164/mpirt/lib/intel64:/home/apps/fas
/Langs/Intel/2015_update2/composer_xe_2015.2.164/ipp/./compiler/lib/intel64:/home
/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/ipp/lib/intel64:/home/ap
ps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/ipp/tools/intel64/perfsys:/
opt/intel/mic/coi/host-linux-release/lib:/opt/intel/mic/myo/lib:/home/apps/fas/Lan
gs/Intel/2015_update2/composer_xe_2015.2.164/compiler/lib/intel64:/home/apps/fas/L
angs/Intel/2015_update2/composer_xe_2015.2.164/mkl/lib/intel64:/home/apps/fas/Lan
gs/Intel/2015_update2/composer_xe_2015.2.164/tbb/lib/intel64/gcc4.4:/home/apps/fas/
Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/ipt/intel64/lib
MIC_LIBRARY_PATH=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/co
mpiler/lib/mic:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/mpir
t/lib/mic:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/tbb/lib/m
ic
ROCKS_ROOT=/opt/rocks
CPATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15/include:/home/apps/fas/Lan
gs/Intel/2015_update2/composer_xe_2015.2.164/ipp/include:/home/apps/fas/Langs/Intel
/2015_update2/composer_xe_2015.2.164/mkl/include:/home/apps/fas/Langs/Intel/2015_u
pdate2/composer_xe_2015.2.164/tbb/include
YHPC_COMPILER=Intel
OMPI_MCA_orte_precondition_transports=f20cd2d28f432704-15e3f8c3bb8e89d6
NLSPATH=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/compiler/li
b/intel64/locale/%l_%t/%N:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015
.2.164/ipp/lib/intel64/locale/%l_%t/%N:/home/apps/fas/Langs/Intel/2015_update2/com
poser_xe_2015.2.164/mkl/lib/intel64/locale/%l_%t/%N:/home/apps/fas/Langs/Intel/201
5_update2/composer_xe_2015.2.164/debugger/gdb/intel64_mic/share/locale/%l_%t/%N:/h
ome/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/gdb/intel64/
share/locale/%l_%t/%N
MAIL=/var/spool/mail/kd538
PATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15/bin:/home/apps/fas/Langs/Int
el/2015_update2/composer_xe_2015.2.164/bin/intel64:/home/apps/fas/Langs/Intel/2015
_update2/composer_xe_2015.2.164/mpirt/bin/intel64:/home/apps/fas/Langs/Intel/2015_
update2/composer_xe_2015.2.164/debugger/gdb/intel64_mic/bin:/home/apps/fas/Langs/I
ntel/2015_update2/composer_xe_2015.2.164/debugger/gdb/intel64/bin:/home/apps/fas/M
odules:/usr/lib64/qt-3.3/bin:/opt/rocks/bin:/usr/local/bin:/bin:/usr/bin:/usr/local
/sbin:/usr/sbin:/sbin:/usr/java/latest/bin:/opt/rocks/bin:/opt/rocks/sbin:/home/ap
ps/bin:/home/fas/cpsc424/kd538/bin
```

```
YHPC_COMPILER_MINOR=164
TBBROOT=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/tbb
C_INCLUDE_PATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15/include
F90=ifort
PWD=/home/fas/cpsc424/kd538/hw2-1
_LMFILES_=/home/apps/fas/Modules/Base/yale_hpc:/home/apps/fas/Modules/Langs/Intel/15:/home/apps/fas/Modules/MPI/OpenMPI/1.8.6-intel15
YHPC_COMPILER_MAJOR=2
JAVA_HOME=/usr/java/latest
GDB_CROSS=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/gdb/intel64_mic/bin/gdb-mic
DOMAIN=omega
LANG=en_US.iso885915
MODULEPATH=/home/apps/fas/Modules
MOABHOMEDIR=/opt/moab
YHPC_COMPILER_RELEASE=2015
LOADEDMODULES=Base/yale_hpc:Langs/Intel/15:MPI/OpenMPI/1.8.6-intel15
KDEDIRS=/usr
F77=ifort
MPM_LAUNCHER=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/mpm/bin/start_mpm.sh
CXX=icpc
SSH_ASKPASS=/usr/libexec/openssh/gnome-ssh-askpass
HISTCONTROL=ignoredups
INTEL_PYTHONHOME=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/python/intel64/
SHLVL=1
HOME=/home/fas/cpsc424/kd538
FC=ifort
LOGNAME=kd538
QTLIB=/usr/lib64/qt-3.3/lib
CVS_RSH=ssh
SSH_CONNECTION=10.191.63.252 35673 10.191.12.33 22
MODULESHOME=/usr/share/Modules
LESSOPEN=||/usr/bin/lesspipe.sh %s
arch=intel64
INFOPATH=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/gdb/intel64/share/info:/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/debugger/gdb/intel64_mic/share/info/
CC=icc
INCLUDE=/home/apps/fas/Langs/Intel/2015_update2/composer_xe_2015.2.164/mkl/include
MPI_PATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15
G_BROKEN_FILENAMES=1
BASH_FUNC_module()=() { eval ` /usr/bin/modulecmd bash $* `
}
_=/bin/env
```

Steps for execution

1. Log on to development node compute-33-1;
2. Enter either directory among `hw2-1` , `hw2-2` , `hw2-3` , execute `make clean` if you'd like to do so, and `make` to generate the executable file;
3. After the above compiling step was done, use `qsub runtask2.sh` (or `runtask3.sh`) to submit the task to queue;
4. Wait for about 45-60s to get a file `Task1.o***` under the same directory you are in, which includes the output as well as the probable stderr information.

Task 1

As task-1 is simply execution of commands with no modification to code, I only provide output here:

```
/lustre/home/client/fas/cpsc424/kd538
/lustre/home/client/fas/cpsc424/kd538/hw2-1
compute-32-14
compute-32-14
compute-32-13
compute-32-13
Message printed by master: Total elapsed time is 0.000352 seconds.
From process 2: I worked for 4 seconds after receiving the following message:
    Hello, from process 0.
From process 3: I worked for 8 seconds after receiving the following message:
    Hello, from process 0.
From process 1: I worked for 12 seconds after receiving the following message:
    Hello, from process 0.

real    0m16.435s
user    0m2.155s
sys 0m0.219s
Message printed by master: Total elapsed time is 0.000056 seconds.
From process 3: I worked for 4 seconds after receiving the following message:
    Hello, from process 0.
From process 2: I worked for 8 seconds after receiving the following message:
    Hello, from process 0.
From process 1: I worked for 12 seconds after receiving the following message:
    Hello, from process 0.

real    0m13.424s
user    0m2.143s
sys 0m0.197s
Message printed by master: Total elapsed time is 0.000053 seconds.
From process 1: I worked for 4 seconds after receiving the following message:
    Hello, from process 0.
From process 3: I worked for 8 seconds after receiving the following message:
    Hello, from process 0.
From process 2: I worked for 12 seconds after receiving the following message:
    Hello, from process 0.

real    0m13.467s
user    0m2.258s
sys 0m0.179s
```

Task 2

I mainly changed code line from 50-54 & 72-75 from task1.c to form task2.c. Here is the output:

```
/lustre/home/client/fas/cpsc424/kd538
/lustre/home/client/fas/cpsc424/kd538/hw2-2
compute-32-14
compute-32-14
compute-32-13
compute-32-13
Message from process 1: Hello master, from process 1 after working 4 seconds
Message from process 2: Hello master, from process 2 after working 8 seconds
Message from process 3: Hello master, from process 3 after working 12 seconds
Message printed by master: Total elapsed time is 15.003554 seconds.

real    0m18.375s
user    0m8.109s
sys 0m0.251s
Message from process 1: Hello master, from process 1 after working 12 seconds
Message from process 2: Hello master, from process 2 after working 4 seconds
Message from process 3: Hello master, from process 3 after working 8 seconds
Message printed by master: Total elapsed time is 21.000481 seconds.

real    0m22.434s
user    0m14.185s
sys 0m0.164s
Message from process 1: Hello master, from process 1 after working 4 seconds
Message from process 2: Hello master, from process 2 after working 8 seconds
Message from process 3: Hello master, from process 3 after working 12 seconds
Message printed by master: Total elapsed time is 15.000278 seconds.

real    0m16.424s
user    0m8.130s
sys 0m0.223s
```

Task 3

I mainly changed code line from 53-62 & 81-84 from task1.c to form task2.c. I also added line 33 for record:

```
char cache[size][100]; .
```

Here is the output:

```
/lustre/home/client/fas/cpsc424/kd538
/lustre/home/client/fas/cpsc424/kd538/hw2-3
compute-32-14
compute-32-14
compute-32-13
compute-32-13
Message from process 1: Hello master, from process 1 after working 8 seconds
Message from process 2: Hello master, from process 2 after working 12 seconds
Message from process 3: Hello master, from process 3 after working 4 seconds
Message printed by master: Total elapsed time is 15.003539 seconds.

real    0m18.373s
user    0m8.104s
sys 0m0.232s
Message from process 1: Hello master, from process 1 after working 4 seconds
Message from process 2: Hello master, from process 2 after working 8 seconds
Message from process 3: Hello master, from process 3 after working 12 seconds
Message printed by master: Total elapsed time is 15.000360 seconds.

real    0m16.424s
user    0m8.174s
sys 0m0.167s
Message from process 1: Hello master, from process 1 after working 4 seconds
Message from process 2: Hello master, from process 2 after working 8 seconds
Message from process 3: Hello master, from process 3 after working 12 seconds
Message printed by master: Total elapsed time is 15.000324 seconds.

real    0m16.416s
user    0m8.121s
sys 0m0.224s
```

You can see now it is steady to around 15.0s, because I designed message receiving to be non-blocked.