Assignment 2
CPSC424

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February 16, 2017

1 Software and Development Environment

All the programming for this assignment was done in vim. This document, including the figures, were made using emacs (and gnuplot). The only modules used in this assignment were Langs/Intel/15 and MPI/OpenMPI/1.8.6-intel15.

1.1 How to run the code

```
ls
```

2 Questions

For task 2, the time reported by the master is much more indicative of the actual total time the program ran as compared to task 1. This is because, in task 1, the worker processes are doing their own printing,so all that we are actually timing is how long it takes for the master to send its initial message. Obviously this operation is only a fraction of the total runtime. conversely, in task 2, the master collates all the messages from the workers so, in effect, we time how long it takes all the workers to complete their work.

3 env

MKLROOT=/home/apps/fas/Langs/Intel/$2015_{update2}$/composer$_{xe2015.2.164}$/mkl
MANPATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15/share/man:/home/apps/fas/Langs/
GDB$_{HOST}$=/home/apps/fas/Langs/Intel/$2015_{update2}$/composer$_{xe2015.2.164}$/debugger/gdb/intel64$_{mic}$/bi
ia-mic HOSTNAME=compute-33-1.local IPPROOT=/home/apps/fas/Langs/Intel/$2015_{update2}$/compos

$INTEL_{LICENSEFILE}$=/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.164}$/licenses:/opt/intel/
TERM=xterm SHELL=/bin/bash HISTSIZE=1000 $GDBSERVER_{MIC}$=/home/apps/fas/Langs/Intel/2
SSH_{CLIENT}=10.191.63.252 34879 22 $LIBRARY_{PATH}$=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-
intel15/lib:/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.164}$/ipp/../compiler/lib/intel64:/
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$_{xe2015.2.164}$/mkl/include
QTDIR=/usr/lib64/qt-3.3 QTINC=/usr/lib64/qt-3.3/include $MIC_{LDLIBRARYPATH}$=/home/apps/fas/L
linux-release/lib:/opt/intel/mic/myo/lib:/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.164}$
SSH_{TTY}=/dev/pts/5 ANT_{HOME}=/opt/rocks USER=jnb37 $LD_{LIBRARYPATH}$=/usr/local/cluster/hpc/M
intel15/lib:/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.164}$/mpirt/lib/intel64:/home/app
linux-release/lib:/opt/intel/mic/myo/lib:/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.164}$
$MIC_{LIBRARYPATH}$=/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.164}$/compiler/lib/mic:/ho
$ROCKS_{ROOT}$=/opt/rocks CPATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-
intel15/include:/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.164}$/ipp/include:/home/apps
$YHPC_{COMPILER}$=Intel $OMPI_{MCA ortepreconditiontransports}$=f20cd2d28f432704-
15e3f8c3bb8e89d6 NLSPATH=/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.164}$/compiler/
MAIL=/var/spool/mail/jnb37 PATH=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-
intel15/bin:/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.164}$/bin/intel64:/home/apps/fas/
3.3/bin:/opt/moab/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/sbin:/usr/java/latest/b
$YHPC_{COMPILERMINOR}$=164 TBBROOT=/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.16}$
$C_{INCLUDEPATH}$=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15/include
F90=ifort PWD=/home/fas/cpsc424/jnb37 _LMFILES_=/home/apps/fas/Modules/Base/yale$_{hpc}$:/ho
intel15 $YHPC_{COMPILERMAJOR}$=2 $JAVA_{HOME}$=/usr/java/latest GDB_{CROSS}=/home/apps/fas/Langs/Ir
mic DOMAIN=omega LANG=en$_{US.iso885915}$ MODULEPATH=/home/apps/fas/Modules
MOABHOMEDIR=/opt/moab $YHPC_{COMPILERRELEASE}$=2015 LOADEDMODULES=Base/yale$_{hpc}$:La
intel15 KDEDIRS=/usr F77=ifort $MPM_{LAUNCHER}$=/home/apps/fas/Langs/Intel/2015$_{update2}$/compose
CXX=icpc $SSH_{ASKPASS}$=/usr/libexec/openssh/gnome-ssh-askpass HISTCON-
TROL=ignoredups $INTEL_{PYTHONHOME}$=/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.16}$
SHLVL=1 HOME=/home/fas/cpsc424/jnb37 FC=ifort LOGNAME=jnb37
QTLIB=/usr/lib64/qt-3.3/lib CVS_{RSH}=ssh $SSH_{CONNECTION}$=10.191.63.252
34879 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$_{xe2015.2.164}$/debugger/
CC=icc INCLUDE=/home/apps/fas/Langs/Intel/2015$_{update2}$/composer$_{xe2015.2.164}$/mkl/include
MPI_{PATH}=/usr/local/cluster/hpc/MPI/OpenMPI/1.8.6-intel15 $G_{BROKENFILENAMES}$=1
$BASH_{FUNCmodule}$()=() { eval '/usr/bin/modulecmd bash $*' } _=/bin/env