CPSC424 Assign4

Bo Song

**Modules**:

Base/yale\_hpc

Langs/Intel/14

MPI/OpenMPI/1.6.5

**Compile&link**:

make

**Run:**

qsub run.sh

**Key features:**

Collective operations are used extensively.

Reduce operation is used to collect and sum body data in intermediate steps.

**Task1 & 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data number | 1 | 2 | 3 | 4 |
| Serial | 5.6060s | 23.1325s | 95.1826s | 367.4772s |
| Parallel | 1.6654s | 6.7959s | 37.4414s | 137.8109s |

Parallel program is 3 times faster than serial one.

Load balance

Cell: number of bodies in each octant

Data1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| octant\#step | 128 | 256 | 384 | 512 | 640 | 768 | 896 |
| 0 | 109 | 73 | 44 | 36 | 38 | 32 | 30 |
| 1 | 106 | 51 | 42 | 37 | 29 | 23 | 22 |
| 2 | 99 | 135 | 151 | 155 | 152 | 169 | 160 |
| 3 | 85 | 148 | 170 | 180 | 192 | 189 | 201 |
| 4 | 83 | 123 | 135 | 137 | 144 | 150 | 150 |
| 5 | 93 | 142 | 157 | 176 | 173 | 179 | 187 |
| 6 | 109 | 64 | 52 | 38 | 33 | 25 | 23 |
| 7 | 116 | 64 | 49 | 41 | 39 | 33 | 27 |

Data2

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| octant\#step | 128 | 256 | 384 | 512 | 640 | 768 | 896 |
| 0 | 238 | 110 | 90 | 64 | 53 | 57 | 58 |
| 1 | 202 | 111 | 73 | 60 | 51 | 46 | 52 |
| 2 | 155 | 267 | 288 | 298 | 315 | 315 | 321 |
| 3 | 210 | 302 | 347 | 377 | 375 | 368 | 356 |
| 4 | 223 | 306 | 332 | 336 | 340 | 349 | 337 |
| 5 | 226 | 277 | 294 | 317 | 329 | 334 | 327 |
| 6 | 162 | 114 | 73 | 71 | 64 | 63 | 73 |
| 7 | 184 | 113 | 103 | 77 | 73 | 68 | 76 |

Data3

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| octant\#step | 128 | 256 | 384 | 512 | 640 | 768 | 896 |
| 0 | 426 | 179 | 148 | 104 | 83 | 79 | 105 |
| 1 | 400 | 196 | 163 | 122 | 94 | 98 | 117 |
| 2 | 401 | 620 | 629 | 691 | 694 | 666 | 668 |
| 3 | 360 | 615 | 698 | 731 | 781 | 809 | 781 |
| 4 | 434 | 602 | 673 | 706 | 748 | 764 | 734 |
| 5 | 399 | 584 | 595 | 630 | 607 | 596 | 580 |
| 6 | 407 | 216 | 148 | 104 | 93 | 95 | 113 |
| 7 | 373 | 188 | 146 | 112 | 100 | 93 | 102 |

Data4

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| octant\#step | 128 | 256 | 384 | 512 | 640 | 768 | 896 |
| 0 | 840 | 399 | 296 | 224 | 195 | 171 | 173 |
| 1 | 786 | 405 | 277 | 189 | 158 | 159 | 154 |
| 2 | 789 | 1220 | 1296 | 1362 | 1327 | 1296 | 1283 |
| 3 | 754 | 1163 | 1301 | 1386 | 1477 | 1532 | 1524 |
| 4 | 879 | 1218 | 1301 | 1337 | 1370 | 1373 | 1416 |
| 5 | 779 | 1168 | 1337 | 1450 | 1507 | 1531 | 1505 |
| 6 | 758 | 400 | 277 | 203 | 175 | 167 | 156 |
| 7 | 815 | 427 | 315 | 249 | 191 | 171 | 189 |

The program is balanced at the beginning while become less balance at the end, since the number of body in each octant is not evenly distributed.

Output:

Actualdata1\_c.out

Initial Conditions (time = 0.0):

Center of Mass: (2.153875e-08, 1.148862e-09, 4.334575e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288737e-10)

Conditions after timestep 128 (time = 4.000000):

Center of Mass: (-4.088525e-08, -2.401514e-08, 5.250070e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288737e-10)

Conditions after timestep 256 (time = 8.000000):

Center of Mass: (-1.033092e-07, -4.917914e-08, 6.165565e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288737e-10)

Conditions after timestep 384 (time = 12.000000):

Center of Mass: (-1.657332e-07, -7.434314e-08, 7.081059e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288737e-10)

Conditions after timestep 512 (time = 16.000000):

Center of Mass: (-2.281572e-07, -9.950714e-08, 7.996555e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288737e-10)

Conditions after timestep 640 (time = 20.000000):

Center of Mass: (-2.905812e-07, -1.246711e-07, 8.912050e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288737e-10)

Conditions after timestep 768 (time = 24.000000):

Center of Mass: (-3.530052e-07, -1.498351e-07, 9.827544e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288737e-10)

Conditions after timestep 896 (time = 28.000000):

Center of Mass: (-4.154292e-07, -1.749991e-07, 1.074304e-08)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288737e-10)

Conditions after timestep 1024 (time = 32.000000):

Center of Mass: (-4.778533e-07, -2.001631e-07, 1.165854e-08)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288737e-10)

Time for 1024 timesteps with 800 bodies: 5.6060 seconds

Actualdata2\_c.out

Initial Conditions (time = 0.0):

Center of Mass: (-4.128126e-09, -1.835931e-10, -1.653466e-08)

Average Velocity: (-6.789231e-10, -3.510627e-09, 2.741372e-09)

Conditions after timestep 128 (time = 4.000000):

Center of Mass: (-6.843818e-09, -1.422610e-08, -5.569169e-09)

Average Velocity: (-6.789233e-10, -3.510628e-09, 2.741372e-09)

Conditions after timestep 256 (time = 8.000000):

Center of Mass: (-9.559511e-09, -2.826861e-08, 5.396319e-09)

Average Velocity: (-6.789232e-10, -3.510628e-09, 2.741372e-09)

Conditions after timestep 384 (time = 12.000000):

Center of Mass: (-1.227520e-08, -4.231112e-08, 1.636181e-08)

Average Velocity: (-6.789232e-10, -3.510627e-09, 2.741372e-09)

Conditions after timestep 512 (time = 16.000000):

Center of Mass: (-1.499090e-08, -5.635363e-08, 2.732729e-08)

Average Velocity: (-6.789231e-10, -3.510628e-09, 2.741372e-09)

Conditions after timestep 640 (time = 20.000000):

Center of Mass: (-1.770659e-08, -7.039614e-08, 3.829278e-08)

Average Velocity: (-6.789231e-10, -3.510628e-09, 2.741372e-09)

Conditions after timestep 768 (time = 24.000000):

Center of Mass: (-2.042228e-08, -8.443865e-08, 4.925827e-08)

Average Velocity: (-6.789231e-10, -3.510628e-09, 2.741372e-09)

Conditions after timestep 896 (time = 28.000000):

Center of Mass: (-2.313798e-08, -9.848116e-08, 6.022375e-08)

Average Velocity: (-6.789231e-10, -3.510627e-09, 2.741372e-09)

Conditions after timestep 1024 (time = 32.000000):

Center of Mass: (-2.585367e-08, -1.125237e-07, 7.118924e-08)

Average Velocity: (-6.789231e-10, -3.510628e-09, 2.741372e-09)

Time for 1024 timesteps with 1600 bodies: 23.1325 seconds

Actualdata3\_c.out

Initial Conditions (time = 0.0):

Center of Mass: (2.738437e-09, -8.980691e-09, -3.708599e-09)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Conditions after timestep 128 (time = 4.000000):

Center of Mass: (4.180687e-09, 6.828971e-08, 1.087360e-08)

Average Velocity: (3.605620e-10, 1.931760e-08, 3.645550e-09)

Conditions after timestep 256 (time = 8.000000):

Center of Mass: (5.622937e-09, 1.455601e-07, 2.545580e-08)

Average Velocity: (3.605622e-10, 1.931760e-08, 3.645550e-09)

Conditions after timestep 384 (time = 12.000000):

Center of Mass: (7.065187e-09, 2.228305e-07, 4.003800e-08)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Conditions after timestep 512 (time = 16.000000):

Center of Mass: (8.507434e-09, 3.001009e-07, 5.462021e-08)

Average Velocity: (3.605622e-10, 1.931760e-08, 3.645550e-09)

Conditions after timestep 640 (time = 20.000000):

Center of Mass: (9.949683e-09, 3.773713e-07, 6.920241e-08)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Conditions after timestep 768 (time = 24.000000):

Center of Mass: (1.139193e-08, 4.546417e-07, 8.378461e-08)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Conditions after timestep 896 (time = 28.000000):

Center of Mass: (1.283418e-08, 5.319121e-07, 9.836681e-08)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Conditions after timestep 1024 (time = 32.000000):

Center of Mass: (1.427643e-08, 6.091825e-07, 1.129490e-07)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Time for 1024 timesteps with 3200 bodies: 95.1826 seconds

Actualdata4\_c.out

Initial Conditions (time = 0.0):

Center of Mass: (-2.018758e-08, 1.012155e-08, -3.957608e-09)

Average Velocity: (-5.540198e-09, 3.578887e-09, 7.436020e-09)

Conditions after timestep 128 (time = 4.000000):

Center of Mass: (-4.234837e-08, 2.443709e-08, 2.578647e-08)

Average Velocity: (-5.540198e-09, 3.578887e-09, 7.436020e-09)

Conditions after timestep 256 (time = 8.000000):

Center of Mass: (-6.450916e-08, 3.875264e-08, 5.553055e-08)

Average Velocity: (-5.540197e-09, 3.578887e-09, 7.436020e-09)

Conditions after timestep 384 (time = 12.000000):

Center of Mass: (-8.666995e-08, 5.306819e-08, 8.527463e-08)

Average Velocity: (-5.540198e-09, 3.578887e-09, 7.436020e-09)

Conditions after timestep 512 (time = 16.000000):

Center of Mass: (-1.088307e-07, 6.738374e-08, 1.150187e-07)

Average Velocity: (-5.540198e-09, 3.578887e-09, 7.436020e-09)

Conditions after timestep 640 (time = 20.000000):

Center of Mass: (-1.309915e-07, 8.169929e-08, 1.447628e-07)

Average Velocity: (-5.540198e-09, 3.578887e-09, 7.436020e-09)

Conditions after timestep 768 (time = 24.000000):

Center of Mass: (-1.531523e-07, 9.601483e-08, 1.745069e-07)

Average Velocity: (-5.540197e-09, 3.578887e-09, 7.436020e-09)

Conditions after timestep 896 (time = 28.000000):

Center of Mass: (-1.753131e-07, 1.103304e-07, 2.042509e-07)

Average Velocity: (-5.540198e-09, 3.578887e-09, 7.436020e-09)

Conditions after timestep 1024 (time = 32.000000):

Center of Mass: (-1.974739e-07, 1.246459e-07, 2.339950e-07)

Average Velocity: (-5.540197e-09, 3.578887e-09, 7.436020e-09)

Time for 1024 timesteps with 6400 bodies: 367.4772 seconds

Actualdata1\_c\_parallel.out

Initial Conditions (time = 0.0):

Center of Mass: (2.153875e-08, 1.148863e-09, 4.334575e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288737e-10)

Load balance:800 0 0 0 0 0 0 0

Conditions after timestep 128 (time = 4.000000):

Center of Mass: (-4.088525e-08, -2.401514e-08, 5.250070e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288738e-10)

Load balance:109 106 99 85 83 93 109 116

Conditions after timestep 256 (time = 8.000000):

Center of Mass: (-1.033092e-07, -4.917914e-08, 6.165565e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288738e-10)

Load balance:73 51 135 148 123 142 64 64

Conditions after timestep 384 (time = 12.000000):

Center of Mass: (-1.657333e-07, -7.434314e-08, 7.081061e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288738e-10)

Load balance:44 42 151 170 135 157 52 49

Conditions after timestep 512 (time = 16.000000):

Center of Mass: (-2.281573e-07, -9.950714e-08, 7.996556e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288738e-10)

Load balance:36 37 155 180 137 176 38 41

Conditions after timestep 640 (time = 20.000000):

Center of Mass: (-2.905812e-07, -1.246711e-07, 8.912052e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288738e-10)

Load balance:38 29 152 192 144 173 33 39

Conditions after timestep 768 (time = 24.000000):

Center of Mass: (-3.530052e-07, -1.498351e-07, 9.827547e-09)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288738e-10)

Load balance:32 23 169 189 150 179 25 33

Conditions after timestep 896 (time = 28.000000):

Center of Mass: (-4.154292e-07, -1.749991e-07, 1.074304e-08)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288738e-10)

Load balance:30 22 160 201 150 187 23 27

Conditions after timestep 1024 (time = 32.000000):

Center of Mass: (-4.778532e-07, -2.001631e-07, 1.165854e-08)

Average Velocity: (-1.560600e-08, -6.291000e-09, 2.288738e-10)

Time for 1024 timesteps with 800 bodies: 1.6654 seconds

Actualdata2\_c\_parallel.out

Initial Conditions (time = 0.0):

Center of Mass: (-4.128124e-09, -1.835931e-10, -1.653466e-08)

Average Velocity: (-6.789229e-10, -3.510628e-09, 2.741372e-09)

Load balance:1600 0 0 0 0 0 0 0

Conditions after timestep 128 (time = 4.000000):

Center of Mass: (-6.843818e-09, -1.422610e-08, -5.569169e-09)

Average Velocity: (-6.789231e-10, -3.510627e-09, 2.741372e-09)

Load balance:238 202 155 210 223 226 162 184

Conditions after timestep 256 (time = 8.000000):

Center of Mass: (-9.559511e-09, -2.826861e-08, 5.396319e-09)

Average Velocity: (-6.789231e-10, -3.510627e-09, 2.741372e-09)

Load balance:110 111 267 302 306 277 114 113

Conditions after timestep 384 (time = 12.000000):

Center of Mass: (-1.227520e-08, -4.231112e-08, 1.636181e-08)

Average Velocity: (-6.789231e-10, -3.510627e-09, 2.741372e-09)

Load balance:90 73 288 347 332 294 73 103

Conditions after timestep 512 (time = 16.000000):

Center of Mass: (-1.499089e-08, -5.635363e-08, 2.732729e-08)

Average Velocity: (-6.789231e-10, -3.510628e-09, 2.741372e-09)

Load balance:64 60 298 377 336 317 71 77

Conditions after timestep 640 (time = 20.000000):

Center of Mass: (-1.770659e-08, -7.039614e-08, 3.829278e-08)

Average Velocity: (-6.789231e-10, -3.510627e-09, 2.741372e-09)

Load balance:53 51 315 375 340 329 64 73

Conditions after timestep 768 (time = 24.000000):

Center of Mass: (-2.042228e-08, -8.443865e-08, 4.925827e-08)

Average Velocity: (-6.789231e-10, -3.510627e-09, 2.741372e-09)

Load balance:57 46 315 368 349 334 63 68

Conditions after timestep 896 (time = 28.000000):

Center of Mass: (-2.313797e-08, -9.848116e-08, 6.022376e-08)

Average Velocity: (-6.789231e-10, -3.510628e-09, 2.741372e-09)

Load balance:58 52 321 356 337 327 73 76

Conditions after timestep 1024 (time = 32.000000):

Center of Mass: (-2.585367e-08, -1.125237e-07, 7.118925e-08)

Average Velocity: (-6.789231e-10, -3.510627e-09, 2.741372e-09)

Time for 1024 timesteps with 1600 bodies: 6.7959 seconds

Actualdata3\_c\_parallel.out

Initial Conditions (time = 0.0):

Center of Mass: (2.738440e-09, -8.980691e-09, -3.708599e-09)

Average Velocity: (3.605630e-10, 1.931760e-08, 3.645550e-09)

Load balance:3200 0 0 0 0 0 0 0

Conditions after timestep 128 (time = 4.000000):

Center of Mass: (4.180686e-09, 6.828971e-08, 1.087360e-08)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Load balance:426 400 401 360 434 399 407 373

Conditions after timestep 256 (time = 8.000000):

Center of Mass: (5.622936e-09, 1.455601e-07, 2.545580e-08)

Average Velocity: (3.605621e-10, 1.931760e-08, 3.645550e-09)

Load balance:179 196 620 615 602 584 216 188

Conditions after timestep 384 (time = 12.000000):

Center of Mass: (7.065185e-09, 2.228305e-07, 4.003800e-08)

Average Velocity: (3.605622e-10, 1.931760e-08, 3.645550e-09)

Load balance:148 163 629 698 673 595 148 146

Conditions after timestep 512 (time = 16.000000):

Center of Mass: (8.507433e-09, 3.001009e-07, 5.462021e-08)

Average Velocity: (3.605624e-10, 1.931760e-08, 3.645550e-09)

Load balance:104 122 691 731 706 630 104 112

Conditions after timestep 640 (time = 20.000000):

Center of Mass: (9.949682e-09, 3.773713e-07, 6.920241e-08)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Load balance:83 94 694 781 748 607 93 100

Conditions after timestep 768 (time = 24.000000):

Center of Mass: (1.139193e-08, 4.546417e-07, 8.378461e-08)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Load balance:79 98 666 809 764 596 95 93

Conditions after timestep 896 (time = 28.000000):

Center of Mass: (1.283418e-08, 5.319121e-07, 9.836681e-08)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Load balance:105 117 668 781 734 580 113 102

Conditions after timestep 1024 (time = 32.000000):

Center of Mass: (1.427643e-08, 6.091825e-07, 1.129490e-07)

Average Velocity: (3.605623e-10, 1.931760e-08, 3.645550e-09)

Time for 1024 timesteps with 3200 bodies: 37.4414 seconds

Actualdata4\_c\_parallel.out

Initial Conditions (time = 0.0):

Center of Mass: (-2.018758e-08, 1.012155e-08, -3.957608e-09)

Average Velocity: (-5.540198e-09, 3.578887e-09, 7.436020e-09)

Load balance:6400 0 0 0 0 0 0 0

Conditions after timestep 128 (time = 4.000000):

Center of Mass: (-4.234837e-08, 2.443709e-08, 2.578647e-08)

Average Velocity: (-5.540198e-09, 3.578887e-09, 7.436020e-09)

Load balance:840 786 789 754 879 779 758 815

Conditions after timestep 256 (time = 8.000000):

Center of Mass: (-6.450916e-08, 3.875264e-08, 5.553055e-08)

Average Velocity: (-5.540197e-09, 3.578887e-09, 7.436020e-09)

Load balance:399 405 1220 1163 1218 1168 400 427

Conditions after timestep 384 (time = 12.000000):

Center of Mass: (-8.666995e-08, 5.306819e-08, 8.527463e-08)

Average Velocity: (-5.540197e-09, 3.578887e-09, 7.436020e-09)

Load balance:296 277 1296 1301 1301 1337 277 315

Conditions after timestep 512 (time = 16.000000):

Center of Mass: (-1.088307e-07, 6.738374e-08, 1.150187e-07)

Average Velocity: (-5.540197e-09, 3.578887e-09, 7.436020e-09)

Load balance:224 189 1362 1386 1337 1450 203 249

Conditions after timestep 640 (time = 20.000000):

Center of Mass: (-1.309915e-07, 8.169928e-08, 1.447628e-07)

Average Velocity: (-5.540197e-09, 3.578887e-09, 7.436020e-09)

Load balance:195 158 1327 1477 1370 1507 175 191

Conditions after timestep 768 (time = 24.000000):

Center of Mass: (-1.531523e-07, 9.601484e-08, 1.745069e-07)

Average Velocity: (-5.540197e-09, 3.578887e-09, 7.436020e-09)

Load balance:171 159 1296 1532 1373 1531 167 171

Conditions after timestep 896 (time = 28.000000):

Center of Mass: (-1.753131e-07, 1.103304e-07, 2.042509e-07)

Average Velocity: (-5.540198e-09, 3.578887e-09, 7.436020e-09)

Load balance:173 154 1283 1524 1416 1505 156 189

Conditions after timestep 1024 (time = 32.000000):

Center of Mass: (-1.974739e-07, 1.246459e-07, 2.339950e-07)

Average Velocity: (-5.540197e-09, 3.578887e-09, 7.436020e-09)

Time for 1024 timesteps with 6400 bodies: 137.8109 seconds

Env:

MKLROOT=/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl

MANPATH=/home/apps/fas/MPI/OpenMPI/1.6.5-intel/share/man:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/man/en\_US:/usr/share/man:/opt/moab/share/man:

MKL\_LINK=-L/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/lib/intel64 -Wl,--start-group -lmkl\_intel\_lp64 -lmkl\_intel\_thread -lmkl\_core -Wl,--end-group -lpthread -lm

HOSTNAME=compute-14-1.local

IPPROOT=/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/ipp

INTEL\_LICENSE\_FILE=/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/licenses:/opt/intel/licenses:/home/apps/fas/Licenses/intel\_site.lic

TERM=xterm

SHELL=/bin/bash

HISTSIZE=1000

SSH\_CLIENT=10.191.63.253 45156 22

LIBRARY\_PATH=/home/apps/fas/MPI/OpenMPI/1.6.5-intel/lib:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/ipp/../compiler/lib/intel64:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/ipp/lib/intel64:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/compiler/lib/intel64:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/lib/intel64:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/tbb/lib/intel64/gcc4.4

PERL5LIB=/opt/moab/lib/perl5

FPATH=/home/apps/fas/MPI/OpenMPI/1.6.5-intel/include:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/include:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/include/intel64/lp64

QTDIR=/usr/lib64/qt-3.3

OLDPWD=/home/fas/cpsc424/bs744/cs424

QTINC=/usr/lib64/qt-3.3/include

MIC\_LD\_LIBRARY\_PATH=/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mpirt/lib/mic:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/compiler/lib/mic:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/lib/mic:/opt/intel/mic/coi/device-linux-release/lib:/opt/intel/mic/myo/lib:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/tbb/lib/mic

SSH\_TTY=/dev/pts/1

ANT\_HOME=/opt/rocks

USER=bs744

LD\_LIBRARY\_PATH=/home/apps/fas/MPI/OpenMPI/1.6.5-intel/lib:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mpirt/lib/intel64:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/ipp/../compiler/lib/intel64:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/ipp/lib/intel64:/opt/intel/mic/coi/host-linux-release/lib:/opt/intel/mic/myo/lib:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/compiler/lib/intel64:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/lib/intel64:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/tbb/lib/intel64/gcc4.4

MIC\_LIBRARY\_PATH=/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/tbb/lib/mic

ROCKS\_ROOT=/opt/rocks

CPATH=/home/apps/fas/MPI/OpenMPI/1.6.5-intel/include:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/ipp/include:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/include:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/tbb/include

YHPC\_COMPILER=Intel

OMPI\_MCA\_orte\_precondition\_transports=f20cd2d28f432704-15e3f8c3bb8e89d6

NLSPATH=/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/compiler/lib/intel64/locale/%l\_%t/%N:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/ipp/lib/intel64/locale/%l\_%t/%N:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/lib/intel64/locale/%l\_%t/%N:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/debugger/gdb/intel64\_mic/py26/share/locale/%l\_%t/%N:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/debugger/gdb/intel64/py26/share/locale/%l\_%t/%N:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/debugger/intel64/locale/%l\_%t/%N

MAIL=/var/spool/mail/bs744

PATH=/home/apps/fas/MPI/OpenMPI/1.6.5-intel/bin:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mpirt/bin/intel64:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/debugger/gdb/intel64\_mic/py26/bin:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/debugger/gdb/intel64/py26/bin:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/bin/intel64:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/bin/intel64\_mic:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/debugger/gui/intel64:/home/apps/fas/Modules:/usr/lib64/qt-3.3/bin:/opt/moab/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/sbin:/usr/java/latest/bin:/opt/rocks/bin:/opt/rocks/sbin:/home/apps/bin:/home/fas/cpsc424/bs744/bin

YHPC\_COMPILER\_MINOR=2

TBBROOT=/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/tbb

F90=ifort

PWD=/home/fas/cpsc424/bs744/cs424/BoSong\_PS4\_CPSC424

\_LMFILES\_=/home/apps/fas/Modules/Base/yale\_hpc:/home/apps/fas/Modules/Langs/Intel/14:/home/apps/fas/Modules/MPI/OpenMPI/1.6.5

YHPC\_COMPILER\_MAJOR=0

JAVA\_HOME=/usr/java/latest

IDB\_HOME=/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/bin/intel64

GDB\_CROSS=/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/debugger/gdb/intel64\_mic/py26/bin/gdb-mic

DOMAIN=omega

LANG=en\_US.iso885915

MODULEPATH=/home/apps/fas/Modules

MOABHOMEDIR=/opt/moab

YHPC\_COMPILER\_RELEASE=14

LOADEDMODULES=Base/yale\_hpc:Langs/Intel/14:MPI/OpenMPI/1.6.5

KDEDIRS=/usr

F77=ifort

CXX=icpc

SSH\_ASKPASS=/usr/libexec/openssh/gnome-ssh-askpass

HISTCONTROL=ignoredups

SHLVL=1

HOME=/home/fas/cpsc424/bs744

MKL\_LINK\_SEQUENTIAL=-L/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/lib/intel64 -Wl,--start-group -lmkl\_intel\_lp64 -lmkl\_sequential -lmkl\_core -Wl,--end-group -lpthread

FC=ifort

LOGNAME=bs744

QTLIB=/usr/lib64/qt-3.3/lib

CVS\_RSH=ssh

SSH\_CONNECTION=10.191.63.253 45156 10.191.10.209 22

MODULESHOME=/usr/share/Modules

LESSOPEN=||/usr/bin/lesspipe.sh %s

arch=intel64

CC=icc

DISPLAY=localhost:10.0

INCLUDE=/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/include:/home/apps/fas/Langs/Intel/icsxe/2013.1.046/composer\_xe\_2013\_sp1.2.144/mkl/include/intel64/lp64

MPI\_PATH=/home/apps/fas/MPI/OpenMPI/1.6.5-intel

G\_BROKEN\_FILENAMES=1

BASH\_FUNC\_module()=() { eval `/usr/bin/modulecmd bash $\*`

}

\_=/bin/env