**Blue Waters Petascale Semester Curriculum v1.0**

**Unit 4: OpenMP**

**Lesson 9: Sieve of Eratosthenes**

**Sample Assessment**

*Developed by David A. Joiner for the Shodor Education Foundation, Inc.*



*Except where otherwise noted, this work by The Shodor Education Foundation, Inc. is licensed under CC BY-SA 4.0. To view a copy of this license, visit*[*https://creativecommons.org/licenses/by-sa/4.0*](https://creativecommons.org/licenses/by-sa/4.0)

*Browse and search the full curriculum at*[*http://shodor.org/petascale/materials/semester-curriculum*](http://shodor.org/petascale/materials/semester-curriculum)

*We welcome your improvements! You can submit your proposed changes to this material and the rest of the curriculum in our GitHub repository at*[*https://github.com/shodor-education/petascale-semester-curriculum*](https://github.com/shodor-education/petascale-semester-curriculum)

*We want to hear from you! Please let us know your experiences using this material by sending email to* [*petascale@shodor.org*](mailto:petascale@shodor.org)

For the following code, analyze the nested loop, and describe all loop carried dependencies. How would you implement parallelization for this problem?

#define N 100

int main(int argc, char \*\* argv) {

int it;

int ix;

double x[N];

double y[N];

x[0]=0;

x[N-1]=10;

for(it = 0;it<10;it++) {

for(ix=1;ix<N-1;ix++) {

y[ix]=0.5\*(x[ix-1]+x[ix+1]);

}

for(ix=1;ix<N-1;ix++) {

x[ix]=0.5\*(y[ix-1]+y[ix+1]);

}

}

}