UPC Homework
Tips

1. Make a copy of array.c -> array_upc.c , common.c-> common_upc.c, common.h-> common_upc.h (That way we can change things to shared memory without any problems)
2. Have the particle array a shrared upc array. Use a blocking of n/THREAD
3. You will have to go into the common_upc.h and common_upc.c to change the function declaration/definition to use upc shared types.
4. Note that only 1 thread/proc can initialize the particles. So make sure you only let thread with id == 0 do the init. (Ideally you will want to put them in the location closest to the location in the 1D breakup)
5. The next step is that largest, you will have to make the Array structure with all this part shared. This will take some time to figure out. I recommend that you experiment with the blocking for the data element in the future. Just to get it working at first just use block size 1. You can always come back and change this if the execution time is extremely high later.
6. After you will need to go through and modify the loops
    a. The step loop needs to stay a standard for (all proc must do it)
    b. Array clear loop --- use a upc_forall (think about the affinity )
    c. Particle bin placement – use a upc_forall (think about the affinity)
    d. Calculate per particle – use upc_forall (think about affinity)
    e. Local bin double for – use standard for
    f. Loop over particles in bin – use standard for
7. For now do nothing different for the move particle (if we were to really try to optimize this code in the future, we would try to reload balance the particles in the shared array relative position, but for now it is fine!)
8. Add upc reduction for the averages / time etc (look at the omp code for a good framing of this)