

**Parallel Programming Exercise**

27-Nov-17

note: you should be able to do the exponentiation required below with the `pow()` function by including `math.h` and compiling with the `-lm` flag.

**Exercise 1:** Use nested parallel regions to parallelize the following calculation for vectors  $a$  and  $b$  of length  $N$  using four cores:

```
for (i = 2; i < N; i++) {
    a[i] = a[i]^0.6 + a[i-2]^0.6;
    b[i] = b[i]^0.6 + b[i-2]^0.6;
}
```

**Exercise 2:** Parallelize the following calculation for vectors  $a$  and  $b$  of length  $N$  using four cores:

```
for (i = 6; i < N; i++) {
    a[i] = a[i]^0.6 + a[i-2]^0.6;
    b[i] = b[i]^0.6 + b[i-6]^0.6;
}
```

What if  $b$  is of length  $3N$ ?

**Exercise 3:** Parallelize the following calculation for  $a$  of length  $2N$  and  $b$  of length  $3N$  using four cores:

```
for (i = 3; i < N; i++) {
    a[i] = a[i]^0.6 + a[i-2]^0.6;
    b[i] = b[i]^0.6 + b[i-3]^0.6;
}
```

Hint: This one is tricky – think about how you might break up the problem to make sure that there's parallel work left to do until the very end.