

## HW #1

**Problem 1 (10 points)** Write a program for the following ring-type communication:

- process 0 reads  $x$  from keyboard and sends it to process 1.
- process 1 increments  $x$  by its rank (=1) and sends it to process 2.
- in general process  $i$  receives  $x$  from process  $i - 1$ , increments  $x$  by  $i$ , then sends it to process  $i + 1$ .
- process 0 receives  $x$  from process  $np - 1$
- each process prints on the screen its rank and the value of  $x$  that it holds

**Provide:**

1. A listing of your code.
2. Sample output for input  $x = 1$  when run on 16 processors.

**Problem 2 (15 points)** Implement in parallel the composite Simpson's rule:

$h = (b - a)/n$ ,  $n$  even number

$x_i = a + i * h, i = 0, 1, \dots, n$

$$\int_a^b f(x) dx \approx \frac{h}{3} \left[ f(a) + 2 \sum_{i=1}^{(n/2)-1} f(x_{2i}) + 4 \sum_{i=1}^{n/2} f(x_{2i-1}) + f(b) \right] \quad (1)$$

**Provide:**

1. A listing of your code.
2. Test run: evaluate  $\pi$  using  $n = 10000$  on 10 processors.