

# **HOMEWORK FOR INTRODUCTION TO MPI**

Use MPICH

Make sure MPI bin directory is in your path

To compile an MPI program, simply type:

```
>mpicc program.c
```

```
>mpiCC program.C
```

```
>mpif77 program.f
```

```
>mpif90 program.f
```

To run an MPI program, simply type:

```
>mpirun -np # a.out
```

## Homework assignment #1 ping-pong

Write an MPI program that has 2 processes continually send a message back and forth

?? Have message sizes vary from 0 to 1 million bytes (0, 10, 100, etc)

?? Time the exchange and calculate bandwidth (use MPI\_Wtime() )

## Homework assignment #2 PI

Write an MPI program which will estimate the value of PI and which can run on an arbitrary number of processors

?? You should get the same value no matter the number of processors

## Homework assignment #3

### Safe communication

Rewrite the following unsafe program using 3 separate strategies for ensuring safeness.

```
#include mpi.h
#define SIZE 1000
int main()
{
    float data1[SIZE], data2[SIZE];
    MPI_Status status;
    int myrank, other, i;
    MPI_Comm_rank (MPI_COMM_WORLD, &myrank);
    for (i = 0; i < SIZE; i++) data1[i] = myrank;
    if (myrank == 0) other = 1;
    else other = 0;
    MPI_Send (data1, SIZE, MPI_FLOAT, other, 111, MPI_COMM_WORLD);
    MPI_Recv (data2, SIZE, MPI_FLOAT, other, 111, MP_COMM_WORLD, &status);
}
```