# High Performance Computing

Exercise 1. Ping-pong test

Write a MPI program that measures the performance of the communication network.

Two processes, a Sender and an Echo process, communicate with each other by the first one sending a message and the other receiving the message and immediately sending it back. The sending process measures how long time it takes to send a message of a certain length. Message sizes vary with a fixed increment from a minimum of one byte to a maximum of 100 Kbytes.

The task and channel structure of the program looks like this:
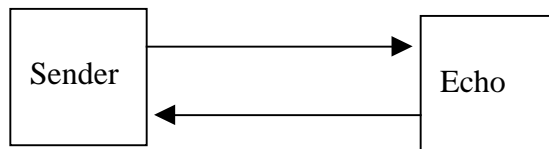
Use MPI timers to measure the round-trip time for messages. The message transfer time is of course half of the round-trip time. To get reliable timing measurements you should repeat the sending/receiving in a loop of 1000.

The program should get its input parameters from the command line. The parameters of the program should be the minimum size of the messages (in bytes), the increment with which message size is increased (in bytes) and the maximum message size.

The output of the program should consist of a table of two columns. The first column is the message size and the second is the average time in milliseconds to send a message of that size. The output should also include information about the input parameters and on which two computers the test was executed.

The output may look like this: (where the x:es of course are the measured timing values)

```
Ping pong test, 1000 iterations (neumann - turing)
min=8, incr=4, max=32

 Msg size       msec
      8         x1
      12        x2
      16        x3
      20        x4
      24        x5
      28        x6
      32        x7
```