

# Chapter 1

## A program

This program computes the mainum of all prefixes of given sequence. It is assumed that sequence is read from *stdin*.

The program is implemented using the *MPI* protocol. The following libraries are used by the program: *stdio*, *stdlib*, *mpi*.

```
#include <stdio.h>
#include <stdlib.h>
#include <mpi.h>
```

A macro is defined to select the greatest of two numbers.

```
#define (x,y) (x<y?y:x)
```

The main program is

```
int
main(int argc, char *argv[])
{
    int rank, size;
    int v, oldv, j, *vec;
    MPI_Status st;

    MPI_Init(&argc, &argv);
    oldv=v = rand();
    MPI_Comm_rank(MPLCOMM_WORLD,&rank);
    MPI_Comm_size(MPLCOMM_WORLD,&size);
    vec=(int *) malloc(size*sizeof(int));
```

A set of  $n$  numbers (where  $n$  is the number of available processors) is read

by process 0 and scattered through all processes.

```

if (rank==0)
    for (j=0;j<size;j++) vec[j]=rand()%size;
MPI_Scatter(vec,1,MPI_INT,
            &v,1,MPI_INT,0,MPLCOMM_WORLD);

oldv=v;
printf("start:%d:%d\n",rank,v);
if (rank<size-1){
    MPI_Send(&v,1,MPI_INT,
             rank+1,1,MPLCOMM_WORLD);
}

for (j=1;j<size;j*=2){
    int l;
    printf("%d:%d:%d\n",rank,j,v);
    if (rank-j>=0){
        MPI_Recv(&l,1,MPI_INT,rank-j,1,MPLCOMM_WORLD,&st);
        v=max(v,l);
    }
    if (j+rank<size)
        MPI_Send(&v,1,MPI_INT,rank+j,1,MPLCOMM_WORLD);
}
printf("rank_%d:oldv_%d:max_%d\n",rank,oldv,v);

MPI_Finalize();
}

```

## Identifiers

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max, 1