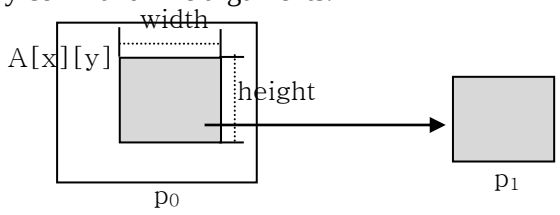
Homework Assignment 8 – due on Saturday, November 25 (Midnight)

Description of Assignment:

Complete an MPI program(matsub.c) that sends the sub-matrix assigned by parameters in P_0 to P_1. Use **MPI_Type_vector** or **MPI_Type_indexed** for the send data type. Parameters(x, y, hight,width) are given by command-line arguments.




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

#define N 10

float **malloc_2d(int row, int col)
{
    float **A, *ptr;
    int len, i;

    len = sizeof(float *)*row + sizeof(float)*col*row;
    A = (float **)malloc(len);
    ptr = (float *)(A + row);
    for(i = 0; i < row; i++)
        A[i] = (ptr + col*i);
    return A;
}

main(int argc, char* argv[])
{
    float A[N][N], **local_A;
    int x, y, width, height, i, j, pid, tag = 0;
    MPI_Datatype vector_t;
    MPI_Status status;

    if (argc != 5) {
        printf("usage %s x y height width\n", argv[0]);
        exit(1);
    }
    x = atoi(argv[1]); y = atoi(argv[2]);
    if (!(((x >= 0)&( x < N))&((y >= 0)&( y < N)))) {
        fprintf(stderr, "x y value not correct\n");
        exit(2);
    }
    height = atoi(argv[3]); height = (x+height)<N?height:N-x;
    width = atoi(argv[4]); width = (y+width)<N?width:N-y;

    MPI_Init(&argc, &argv);
    MPI_Comm_rank(MPI_COMM_WORLD, &pid);

    (1) COMMIT A VECTOR TYPE

    // initializaton of A
    if (pid == 0) {
        for (i=0 i<N; i++) {
            for (j=0; j<N; j++) {
                A[i][j] = i*N+j;
                printf("%5.1f ", A[i][j]);
            }
            printf("\n");
        }

    (2) SEND THE SUB-MATRIX

    }
    if (pid == 1) {
        local_A = malloc_2d(height, width);

    (3) RECEIVE

        for (i=0; i<height; i++) {
            for (j=0; j<width; j++)
                printf("%5.1f ", local_A[i][j]);
            printf("\n");
        }
        free(local_A);
    }

    MPI_Finalize();
}
```

How to proceed:

Run only 2(-n 2) processors for tests.

Turnin the assignment:

After done your assignment, type **turnin** in your current working directory. You can retype the command at any time before the due date.