**MARKS AWARDED: 100**

Well done ☺

/\* CS1010 AY2011/2 Semester 2 Lab4 Ex3

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\* pairs.c

\* Find out the maximum number of pairs of the same value

\*

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\* B02

\*/

#include <stdio.h>

#include <math.h>

#define MAX\_ROW 10

#define MAX\_COL 10

/\* function prototype \*/

void read\_matrix(int [][MAX\_COL],int \*, int \*);

void print\_matrix(int [][MAX\_COL], int, int);

int max\_pairs(int [][MAX\_COL], int, int);

int main(void)

{

int val; // value with maximum number of pairs

int numRows, numCols, matrix[MAX\_ROW][MAX\_COL];

read\_matrix(matrix, &numRows, &numCols);

// for testing

// print\_matrix(matrix, numRows, numCols);

val = max\_pairs(matrix, numRows, numCols);

printf("Value with maximum number of pairs is: %d\n", val);

return 0;

}

// Read in user's input of matrix

void read\_matrix(int matrix[][MAX\_COL], int \*numRows\_p, int \*numCols\_p)

{

int i,j;

printf("Enter number of rows: ");

scanf("%d", &\*numRows\_p);

printf("Enter number of columns: ");

scanf("%d", &\*numCols\_p);

printf("Enter values:\n");

for(i=0;i<\*numRows\_p;i++)

for(j=0;j<\*numCols\_p;j++)

scanf("%d", &matrix[i][j]);

}

// Compute and return a value in the matrix

// that has the maximum number of pairs

int max\_pairs(int matrix[][MAX\_COL], int rows, int cols)

{

int i,j,value[10]={0},

m,val,max=0;

for (i=0;i<rows;i++)

{

for (j=0;j<cols;j++)

{

if ( j<cols-1 && matrix[i][j]==matrix[i][j+1])

value[matrix[i][j]]++;

if ( i<rows-1 && matrix[i][j]==matrix[i+1][j])

value[matrix[i][j]]++;

}

}

/\* for testing

for (m=0;m<10;m++)

printf("number of '%d' pairs: %d\n", m,value[m]);

\*/

for (m=0;m<10;m++)

if (value[m]>max){

max = value[m];

val = m;

}

return val;

}

// print out a matrix row by row.

// given, NOT to be changed!

void print\_matrix(int matrix[][MAX\_COL], int numRows, int numCols)

{

int i, j;

for (i=0; i<numRows; i++)

{

for (j=0; j<numCols; j++)

{

printf("%d ", matrix[i][j]);

}

printf("\n");

}

}