2D ARRAYS & FILES

CSSE 120—Rose Hulman Institute of Technology

Final Exam Facts

- Date: Thursday, February 25, 2010
- Time: 8:00 to 12:00 PM
- Venue: **See schedule lookup page or course schedule**
- Chapters: Zelle chapters 1 to 12.1, Assigned C readings from Kochan plus Web resources linked from ANGEL Resources page
- You may bring two sheets of paper this time.

Q1,2

Two-dimensional Arrays

- Like a list of lists in Python

- But size is fixed, like C arrays

- Visualize as a matrix:

NUM_COLS = 6 (loop using j)

NUM_ROWS = 3
(loop using i)

4	3	6	31	8	2
9	4	7	8	4	1
34	2	16	5	3	6

- Can make ragged arrays (different number of items in each row) but more difficult to do

2D Array Syntax

- Declaration reserves space, but doesn't set values to anything!

```
int nums[NUM_ROWS][NUM_COLS];
```

- Display

```
for (i = 0; i < NUM_ROWS; i++) {
    for (j = 0; j < NUM_COLS; j++) {
        printf("%2d ", nums[i][j]);
    }
    printf("\n");
}
```

Q3,4

Modify your code

- Ask the user for the number of rows and columns instead

- Then prompt them to input the value of each element

- Print out the values they entered in matrix form

- Challenge: print out the row sums and column sums

File handling

- Need to include <stdlib.h> to access many file handling functions

- Open a file using **fopen()**

- Modes:
  - "r" (read)
  - "w" (write)
  - "a" (append)

- Returns a file pointer to access the file: **FILE***

- Close a file using **fclose()**

Q5,6

A simple example

```
FILE *inFile;
inFile = fopen("my_file.txt", "r");
if (inFile == NULL) {
    exit(EXIT_FAILURE);
}

// Read data from the file pointed to by inFile

fclose( inFile );
```

How do we read from a file?

- getc(my_fileptr) ;   /* read the next character
                                               from the file*/

- fgets(buffer, n, my_fileptr);

                              /* read the next line of text
                                 from file, up to **n-1** chars,
                                  into buffer */

- fscanf(my_fileptr, "%d", &num);

                              /* read the next int value
                                 from file into variable
                                 num*/

How do we write to a file?

- putc(c, my_fileptr) ;   /* Converts int c to a char
                                                and write it to file */

- fputs(my_string, my_fileptr);

                                                /* Copies my_string to file,
                                                    except the string
                                                    terminating char */

- fprintf(my_fileptr, "%s\n", my_string) ;

                                                /* Similar to printf() except
                                                    the first parameter is a
                                                    file pointer */

Q12

File Handling

- Check out *FileDemo* from your SVN repo

- See problem description in comments

- Work on solving problem for 10 minutes

Q13

HW27

- See instructions linked from ANGEL

- You'll read two 2D matrices from a file, perform math on them and then output the result back to a file.