

Make

This lab provides an opportunity for you to become familiar with creating **make** files,

Exercise

In this lab exercise, we will trace the motion of a wireless node across different floors. We use a $M \times N$ matrix to represent the floors. The row and column represents the floor number and room number respectively. The upper left position (0,0), represents ground floor, room number 0.

You are to create four separate source files: **motion.h**, **printfloor.c**, **motion.c** and the source file for your main program. All output from this program is to be redirected to a file named, **motion.txt**.

motion.h

The header file, **motion.h**, begins with the following lines:

```
#define ROW 10
#define COLUMN 10
#define NODES 4
enum direction { NorthEast, North, NorthWest, SouthEast, South, SouthWest,
East, West };
```

...

and continues with other global declarations that you need for your main program.

printfloor.c

This external routine does the following:

Prints out the current location of the nodes in a floor with an appropriate border that contains a row of '-' characters above and below and a column of '|' characters to the left and right.

printfloor prints out EXACTLY four elements – nodeid, row, column, direction. For example the output below

```
-----
| 1 | 2 | 3 | North |
-----
```

means node number 1 is currently in second floor, room number 3 and it will move north (that is to third floor room number 3) in the next iteration. There are 10 floors with 10 rooms in each floor and 4 nodes.

main.c

Write a C program that first reads in 4 **sample** lines of test data (basically 4 nodes placed in different rooms). Each sample line of test data contains three integers corresponding to:

nodeid row column

- The restriction is that no two nodes can be in the same room.
- For each node generate a random number between 1 to 7 (1 corresponding to NorthEast and 7 corresponding to West).

- In the next iteration, move the node towards the directions generated by the random number.
- Trace the movement of the nodes over 10 iterations.

Create a make file. Your make file should contain macros, all possible targets including phony targets and dependencies.

Next implement the function *printfloor()* as a static library and change the make file accordingly.

Deliverables

You should turn in the header file, the C files and the make file. Mail the document to cs242@iitp.ac.in with subject "Lab <no>".

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