ECS 30 **Practice Final**

Closed book, closed notes.

1. (218 points) Write a complete C program that reads information about a house, sorts the information by the area of the rooms, and then displays the information on the screen. Here are the specifications:
   1. On the command line the user will enter the name of the file that contains the information. If there are more command line arguments than required your program must notify the user, and then exit. If the file cannot be found then your program must notify the user, and then exit.
   2. The file has the following format:
      Line 1: Name_of_owner <char [80].>
      Line 2: Price <float> Number_of_rooms <int>
      Lines 3 - 3 + Number_of_rooms: Num_of_windows<int>**:**Area<float>**:**Name of room<char [20]>
   3. The information about each room should be stored in a struct. The information about all of the rooms must be stored in a dynamically allocated array of these structs. You must access the file room lines (lines after the first two) using strtok.
   4. main() must contain only variable declarations and function calls.
   5. The program should have only three functions besides main: read_file, sort, and show_results. The function named sort will sort the room struct array based on the area of the rooms
   6. Output of the program should closely match the sample below.

   If the file contains:

```
Bill Mueller
129450.98  4
2:300.5:Living Room
1:107.0:Bedroom 1
2:158.3:Master Bedroom
3:98.3:Kitchen
```

   then the output would be:

```
Bill Mueller 4 room house  $129450.98
Area   Windows Room
 98.3     3    Kitchen
107.0     1    Bedroom 1
158.3     2    Master Bedroom
300.5     2    Living Room
```

2. (10 points) Write the UNIX command that changes the name of a sub-directory from "old_directory_name" to "new_directory_name".

3. (10 points) In vi, how would you replace all occurrences of the word "hate" with the word "love"?

4. (10 points) In gdb, what would you type so that that value of the variable *x* is printed each time the program is suspended?

5. (38 points)) The string library function strrchr() will return a pointer to the last occurrence of a specific character in a target string, or NULL if the character is not in the target string. It's header is :
   char* strrchr(const char *target, char c). Write a recursive version of the function strrchr(). .

6. (20 points) Write on the lines provided the output to the screen when following correct program is run. There may be more lines provided than are needed.

```
#include <stdio.h>
#define ADD(x,y)  x + y                    _____________________________
#define N 12
main(){                                    _____________________________
#ifdef N
    puts("Hello");                         _____________________________
#else
    puts("Hi");                            _____________________________
#endif
    printf("%d\n", ADD(7, 3) * 4);         _____________________________
#undef N
#ifdef N                                   _____________________________
    puts("Tata");
#else
    puts("Goodbye");
#endif
}
```