1. (213 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.
   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 **gdb**, how would you check the value of a variable **var** on entry into a function, **NewFun( )**, and upon exit from it.

4. (50 points) Write a function to delete the last node in a linked list. The header is:
   NODE * delete_last_node (NODE * head, int * success);

5. (30 points) How would you copy the values from an array of ints **a[]** into an array of ints **b[]** if no loops were allowed?

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
}
```