Assignment-7

1. Suppose, you have been given "N" rectangular wooden blocks, where "N" is a user-defined integer.

Collect the dimensions of each box from a file (format described below), and then store the numbers in an array of structure, where each entry of the array is a structure called "box" containing three floats, containing the three dimensions of the boxes. Note that since "N" is not initially known, the array must be allocated space dynamically.

Then, call a function "float find_maximum_height (box *box_array, int num_boxes)" to calculate and return the maximum height that can be obtained by arranging these cube one above another.

Note that a box can be placed on any of its six faces. While accessing each element from the "box_array" array, do not directly use the individual elements of the array but, use pointer to a structure.

e.g. to access the "i"-th element of the array, declare and use a structure pointer as follows:

```
box *box_ptr;
.....
box_ptr = box_array + i; // note the use of pointer arithmetic
```

INPUT: Input will be given in a file "dimensions.txt", which you should create yourself. The first line of the file contains the numerical value "N", and each of the next "N" lines contains 3 floating point values separated by spaces. You can consider using the "fgets()" function to read the lines from the file, and "sscanf()" or "strtok()" to collect the individual numbers from a line.

Example "dimension.txt":

```
4
1.2 2.5 3.1
2.7 4.0 2.4
5.3 6.4 2.2
3.0 4.1 6.8
```

OUTPUT: the maximum height of the arrangement

[6 marks]

2. A file "input.txt" contains a some lines of text. Collect the name of the file from the user, and then use the C "system()" function, and the standard UNIX command "wc", to find the number of lines, words and characters in the file. Ensure that the file is readable before trying the "system()" function.

INPUT: read file name from command line as: ./a.out input.txt

OUTPUT: the number of lines, words characters in the file "input.txt" [2 marks]

3. The median of a finite list of numbers can be found by arranging all the numbers from the lowest value to the highest value, and then picking the middle one (e.g., the median of {3, 3, 5, 9, 11} is 5). Your task is to take "N" real values, probably containing repitions, through command-line, and find the median of those numbers.

Remember that all commnad line arguments are of "char *" type, hence you need to use the "atof()" function.

INPUT: Example: ./a.out 2.355 4.5 3.6 2.12 3.6 6.4 2.355
OUTPUT: 3.6 (median of the given numbers)
[2 marks]