University of Hyderabad
School of Computer & Information Sciences
IT Lab (ALGO)
MINOR EXAMINATION - M.TECH(CS)

28 September 2019 Max Marks: 15 Duration: 3 hours

- PLEASE LOG INTO EXAM ACCOUNT.
- You are not permitted to connect to email/internet during the examination.
- Answer all the questions
- The programs should be run using command line arguments:
  ./prog input.txt output.txt
- **Submission Instructions:** Place all your program files in a directory named RollNumber_Minor containing all the files (programs, input files, readme file, sample output etc) of your submission and tar/ zip the directory and submit.

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1. Implement Cocktail Sort Algorithm which is a variation of bubble sort algorithm. **[5 Marks]**

Step 1: Carry out one round of bubble sort from left to right. (in the first round, the largest element of the array $A[1..n]$ moves to its correct position n)

Step 2. Carry out next round of bubble sort from right to left leaving out the sorted element(s): (in the second round, from A(n-1) to A(1), the smallest element moves to A(1))

Repeat Steps 1 and 2 leaving out the correctly placed elements, with appropriate index positions of A until the size of the list gets reduced to 1.

The input of numbers are read from an input file and the sorted output has to be written to an output file. The program is run using command line arguments:
./cocktail input.txt output.txt

Input file format: The first line contains the size of the list followed by the numbers.
Example:
5
6
100
2
-6
5

2. Solve **0/N** Knapsack problem using dynamic programming strategy. **[10 Marks]**
   Input file format: The number of items N and the max capacity W (space separated) in the first line followed by (w_i, p_i) of weight and profit of item i in each line.
   The program should return the maximum profit obtained along with the solution in a vector format. The program is run using command line arguments: ./knapsack input.txt output.txt

   Example: Input:
   3 50
   10 50
   20 110
   30 120

   Output:
   270
   1 2 0

All the Best!