COMPUTER SCIENCE – 2005

Paper-2

(PRACTICAL)

(Reading Time : 15 minutes)

(Planning Session : onehour)

(Examination Session: two hour)

(Maximum Marks: 100)

INSTRUCTIONS

As it is a practical examination, the candidate is expected to do the following:

(a) *Write an algorithm for the selected problem.*

(b) *Write a program in C++/Java. Document your program by using mnemonic names and comments.*

(c) *Test run the program on the computer using the given test data and get a print out (hard copy) in the format specified in the problem along with the program listing.*

Solve any **one** *of the following problems:*

Q1. Write a program which takes a sting (maximum 80 characters) terminate by a full stop. The in this string are assumed to be separated by one or more blanks.

Arrange the words of the input string in descending order of their lengths. Same length words should be stored alphabetically. Each word must start with an uppercase letter and the sentence should be terminated by a full stop.

Test your program for the following data and some random data.

SAMPLE DATA :

INPUT :

" This is human resource department "

OUTPUT :

Department Resource Human This is.

INPUT :

"To handle yourself use your head and to handle others use your heart."

OUTPUT :

Yourself Handle Handle Ohers Heart Head Your Your And Use Use To To.

Q2 A wondrous square is an n by n grid which fulfils the following conditions:

(i) It contains integers from 1 to n^2, Where each integer appears only once.

(ii) The some of integers in any row or column must add up to $0.5 \times n \times (n^2+1)$.

For example the following grid is a wondrous square when the sum of each row or column is 65 when n = 5:

17	24	1	8	15
23	5	7	14	16
4	6	13	20	22
10	12	19	21	3
11	18	25	2	9

Write a program to read n ($2 \leq n \leq 10$) and the values stored in these n by n cells and output if the grid represents a wondrous square or not.

Also output all the prime numbers in the grid along with their row index and column index as shown in the output. A natural number is said to be prime if it has exactly two divisors. E.g.2,3,5,7,11……

The first element of the given grid i.e. 17 is stored at row index 0 and column index 0 and the next element in the row i.e. 24 is stored at row index 0 and column index 1.

Test your program for the following data and some random data.

SAMPLE DATA :
INPUT
N = 4

16	15	1	2
6	4	10	14
9	8	12	5
3	7	11	13

OUTPUT :
YES IT REPRESENTS A WONDROUS SQUARE.

PRIME	ROW INDEX	COLUMN INDEX
2	0	3
3	3	0
5	2	3
7	3	1
11	3	2
13	3	3
15	0	1

INPUT
N = 3

1	2	4
3	7	5
8	9	6

OUTPUT :
NOT A WONDROUS SQUARE.

PRIME	ROW INDEX	COLUMN INDEX
2	0	1
3	1	0
5	1	2
7	1	1

INPUT :
N = 2

2 3
3 2

OUTPIUT:
NOT A WONDROUS SQUARE

PRIME	ROW INDEX	COLUMN INDEX
2	0	0
3	0	1

Q3. We would like to generate all possible anagrams of a word. For example if the given words is "TOP" , there will be 6 possible anagrams.

TOP
TPO
OPT
OTP
PTO
POT

An anagram must be printed only once. You may output the anagrams in any order. Also output the total number of anagrams. You may assume that the number of letters, N, in the word will be 7 at most, i.e. $N \leq 7$.

Test your program for the given data and some random data.

SAMPLE DATA :
INPUT:
TO
OUTPUT
TO
OT

Total number of anagrams = 2

INPUT :
LEAN
OUTPUT ;
LEAN
LENA
LAEN
LANE
LNEA
LNAE
EALN
EANL
ELAN
ELNA
ENLA
ENAL
ALNE
ALEN
ANLE
ANEL
AENL
AELN
NLEA

NLAE
NELA
NEAL
NALE
NAEL

Total number of anagrams = 24

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