SunBeam Institute of IT

Instructions:

1. Each file should contain your name and course in comments.
2. Make appropriate use of functions, arrays and structures.
3. Use proper naming conventions.
4. Use comments to explain the logic implemented.
5. You can use any IDE, editor and C compiler.
6. **You need to prepare zip of each source code files (.c) of all assignments and email to your admission officer on or before 19th Aug.**
7. **Lab exam based on these assignments will be conducted in first week of the course.**

C Programming Assignment: Q.1 to Q.7

Q.1

Given an array arr[] of N integers, the task is to sort the array without changing the position of negative numbers (if any) i.e. the negative numbers need not be sorted.

Examples:

Input: arr[] = {2, -6, -3, 8, 4, 1}

Output: 1 -6 -3 2 4 8

Input: arr[] = {-2, -6, -3, -8, 4, 1}

Output: -2 -6 -3 -8 1 4

Q.2

Given an unsorted sequence a[], the task is to find the K-th missing contiguous element in the increasing sequence of the array elements i.e. consider the array in sorted order and find the kth missing number. If no k-th missing element is there output -1.

Note: Only elements exist in the range of minimum and maximum element to be considered.

Examples:

Input: arr[] = {2, 4, 10, 7}, k = 5

Output: 9

Missing elements in the given array: 3, 5, 6, 8, 9

5th missing is 9.

Input: arr[] = {1, 3, 4}, k = 5

Output: -1

Q.3

Find two numbers in given unsorted array, so that sum of two numbers which is closest to K. Note that sum should be less than K. If there are more than one answer, print any one.

Examples:

Input: arr[] = {2, 1, 4, 9, 2, 3, 8, 5}, k = 18

Output: (9, 8)

Input: arr[] = {2, 1, 4, 9, 2, 3, 8, 6}, k = 13

Output: (9, 3) or (8, 4)

Q.4

You are given an 2-D array A of size m*n matrix. It contains 1's and 0's. Here 1 means path is allowed, while 0 means path is not allowed. One cell contains 9. You have to start from cell (0,0) and find out whether it is possible to reach at the cell which contains 9. Note that only vertical and horizontal moves are allowed.

Examples:

Input:

1	1	0
9	1	0
0	0	1

Output: Possible

Input:

1	1	0
0	1	0
1	0	9

Output: Not Possible

Q. 5

Write a program to manage database of cricket teams and players into binary files. Provide functionalities to add team, edit team, delete team, find team by name, add player into team, edit player, delete player, search player by name. Note that each team have 11 players. Team information includes team_id, team_name, team_rank; while player information includes player_id, player_name, role (batsman, bowler and all-rounder), batting average, bowling economy.

Q. 6

Write a program to convert given integer into Roman string. Here is a chart of Roman numerals for 1 to 100 for your reference.

1	I	21	XXI	41	XLI	61	LXI	81	LXXXI
2	II	22	XXII	42	XLII	62	LXII	82	LXXXII
3	III	23	XXIII	43	XLIII	63	LXIII	83	LXXXIII
4	IV	24	XXIV	44	XLIV	64	LXIV	84	LXXXIV
5	V	25	XXV	45	XLV	65	LXV	85	LXXXV
6	VI	26	XXVI	46	XLVI	66	LXVI	86	LXXXVI
7	VII	27	XXVII	47	XLVII	67	LXVII	87	LXXXVII
8	VIII	28	XXVIII	48	XLVIII	68	LXVIII	88	LXXXVIII
9	IX	29	XXIX	49	XLIX	69	LXIX	89	LXXXIX
10	X	30	XXX	50	L	70	LXX	90	XC
11	XI	31	XXXI	51	LI	71	LXXI	91	XCI
12	XII	32	XXXII	52	LII	72	LXXII	92	XCII
13	XIII	33	XXXIII	53	LIII	73	LXXIII	93	XCIII
14	XIV	34	XXXIV	54	LIV	74	LXXIV	94	XCIV
15	XV	35	XXXV	55	LV	75	LXXV	95	XCV
16	XVI	36	XXXVI	56	LVI	76	LXXVI	96	XCVI
17	XVII	37	XXXVII	57	LVII	77	LXXVII	97	XCVII
18	XVIII	38	XXXVIII	58	LVIII	78	LXXVIII	98	XCVIII
19	XIX	39	XXXIX	59	LIX	79	LXXIX	99	XCIX
20	XX	40	XL	60	LX	80	LXXX	100	C

Q. 7

Input two strings from user as command line arguments. Write a program to find the smallest sub-string in the first string containing all characters of second string.

Input:

string1: “this is a test string”

string2: “rist”

Output:

“t stri”

DS Programming Assignment: Q.7 to Q.10

Q. 8

Create a doubly linked list of integers given by user. Numbers can be positive or negative. Write a program to delete all the nodes whose sum is zero.

Input:

3, -1, 5, 2, -6, 4, 1

Output:

3, 5

Explaination:

1 + -1 = 0

-6 + 4 + 2 = 0

Q. 9

Input a file path from command line. Check whether opening and closing paranthesis are balanced or not.

Exmaples:

Input:

```
int main() {
    int arr[] = { 1, 2, 3, 4 };
    printf("%u", sizeof(arr));
    return 0;
}
```

Output:

Correct.

Input:

```
int main() {
    int arr[] = { 1, 2, 3, 4 };
    printf("%u", sizeof arr));
    return 0;
}
```

Output:

Incorrect.

Q. 10

Write a program to input array of students from the user. The student info includes roll number, name and marks. The array size should be taken from the user. Sort the student array based on marks in descending order using quick sort. Then find the student based on marks using binary search.