Intra-University Programming Contest – Spring 2016

Selection Test-Solution

Total Time: 90 minutes

Total Marks: 100

		Marks
1.	You will be given N test cases. Each test case contains two integers A and B. Your task is to write a C/C++ program to print out the sum of all integers between A and B (inclusive) in separate lines.	10

Sample Input	Sample Output
2 **1 5** **5 1**	**15** **15**

Solution:

```
#include<bits/stdc++.h>
using namespace std;
int main(){
    int testCase, A, B, i, j, sum;
    scanf("%d", &testCase);
    for(i = 1; i <= testCase; i++){
        scanf("%d", &A);
        scanf("%d", &B);
        sum = 0;
        if(A >= B){
            for(j = B; j <= A; j++){
                sum += j;
            }
        } else {
            for(j = A; j <= B; j++){
                sum += j;
            }
        }
        printf("%d\n", sum);
    }
    return 0;
}
```

		Marks
2.	You have to write a C/C++ program to find out the maximum and minimum value from a set of integers. First line of input will contain an integer N. Each of N following lines will contain an integer. Output contains only two integers, the maximum and minimum value of the set separated by a blank space in a single line.	10

Sample Input	**Sample Output**
5 **1 5 33 2 5**	**33 1**

Solution:

```
#include<bits/stdc++.h>
using namespace std;
int main(){
    int testCase, number, maxNumber, minNumber;
    scanf("%d", &testCase);
    for(int i = 1; i <= testCase; i++){
        scanf("%d", &number);
        if(i == 1){
            maxNumber = minNumber = number;
        }
        if(number > maxNumber){
            maxNumber = number;
        }
        if(number < minNumber){
            minNumber = number;
        }
    }
    printf("%d %d\n", maxNumber, minNumber);
    return 0;
}
```

		Marks

3.	There will be an integer N, next line will contain N space separated integers and the 3rd line contains a query number q. You have to write a C/C++ program to find out the position of the query number q in the given sequence.
	
	Sample Input
	5
	1 3 4 6 8
	4
	
	Sample Output
	3
	
	Solution:
	`#include<bits/stdc++.h>`
	`using namespace std;`
	`int main(){`
	`  int testCase, arrNum[100], Q, index;`
	`  scanf("%d", &testCase);`
	`  for(int i = 1; i <= testCase; i++){`
	`  scanf("%d", &arrNum[i]);`
	`  }`
	`  scanf("%d", &Q);`
	`  for(int i = 1; i <= testCase; i++){`
	`  if(arrNum[i] == Q){`
	`  index = i;`
	`  break;`
	`  }`
	`  }`
	`  printf("%d\n", index);`
	`  return 0;`
	`}`
		10

4.	Cos(0)* Cos(1)* Cos(2)* Cos(3)* Cos(4)* … Cos(100) = ? **Solution:** Cos(0)* Cos(1)* Cos(2)* Cos(3)* Cos(4)* … Cos(100) = 0 Because, cos(90) is 0.	5
5.	9 + 9 / 9 * 9 – 9 = ? **Solution:** 9 + ((9 / 9) * 9) – 9 = 9	5
6.	There is an M * N rectangular room. You have to cover it up with minimum number of equal sized square tiles. What will be the dimension of each tile? **Solution:** GCD(M, N) Greatest Common Divisor of M and N	5

		Marks
7.	$\log_2(2 * 4 * 8 * \ldots * 2^N) = ?$ **Solution:** $\log_2(2 * 4 * 8 * \ldots * 2^N)$ $= \log_2(2^1 * 2^2 * 2^3 * \ldots * 2^N)$ $= \log_2(2^1) + \log_2(2^2) + \log_2(2^3) + \ldots + \log_2(2^N)$ $= 1 + 2 + 3 + \ldots + N$ $= N * (N + 1)/ 2$	5
8.	**A fisherman has 5 fishes (namely A, B, C, D, E) each having a different weight.** (i) A weighs twice as much as B. (ii) B weighs four and a half times as much as C. (iii) C weighs half as much as D. (iv) D weighs half as much as E. (v) E weighs less than A but more than C. Which fish is the lightest? **Solution:** C	5

		Marks
9.	There will be T test cases. Each case has 2 lines of input. 1st line will contain a string and the 2nd line has a single character. You have to write a C/C++ program to print the given string as it is except when the given character is found you have to ignore it.	10

Sample Input	Sample Output
2 **I am a proud IIUCian** **a** **Avoid Haram at all times** **z**	**I m proud IIUCin** **Avoid Haram at all times**

Solution:

```
#include<bits/stdc++.h>
using namespace std;
int main(){
    int testCase, len;
    char str[100], ch, tempCh;
    scanf("%d", &testCase);
    scanf("%c", &tempCh);
    for(int i = 1; i <= testCase; i++){
        gets(str);
        scanf("%c", &ch);
        len = strlen(str);
        for(int j = 0; j < len; j++){
            tempCh = str[j];
            if(tempCh != ch){
                printf("%c", tempCh);
            }
        }
        printf("\n");
    }
    return 0;
}
```

10.	Any number can be represented as the product of a prime factor in only one way. Example : $1400 = 2^3 * 5^2 * 7$ Given two numbers, $A = 2^{333} * 5^{13} * 7^{99}$ $B = 2^{33} * 3^3 * 5^3 * 13^{39}$ Find out the GCD and LCM of A and B, represent the answer as the product of prime as shown in the example.	5

Solution:

GCD = $2^{33} * 5^3$

LCM = $2^{333} * 3^3 * 5^{13} * 7^{99} * 13^{39}$

		Marks

11.	**A** and **B** is playing a game with N stones. In each of their turns they can take exactly two stones. A will always start playing the game first. If any of them can't take stones in their turn he will lose the game.
	Input will contain only one positive integer that denotes the number of stones.
	You have to write a C/C++ program to find out who will win the game and print a single line containing '**A**' if **A** wins or '**B**' if **B** wins (without quotation).
	
	Sample Input | **Sample Output**
	5 | **B**
	
	Solution:
	`#include<bits/stdc++.h>`
	`using namespace std;`
	`int main(){`
	`  int num;`
	`  scanf("%d", &num);`
	`  if((num / 2) % 2 == 0){`
	`  printf("B\n");`
	`  } else {`
	`  printf("A\n");`
	`  }`
	`  return 0;`
	`}`
		10

12.	Ralph likes 25 but not 24; he likes 400 but not 300; he likes 144 but not 145. Which does he like: a) 10, b) 50, c) 124, d) 200, e) 1600 **Solution:** e) 1600 Hint : He likes square numbers	5
13.	( ) + ( ) + ( ) + ( ) + ( ) = 30 This is what you have for equation. The following are the numbers that you can use to fill in the brackets: 1, 3, 5, 7, 9, 11, 13 and 15 You can repeat the numbers if required. The resulting sum should be 30. **Solution:** No solution ☺ Hint : Odd number of odd numbers total is always an odd number.	5

		Marks
14.	What number comes inside the circle? A) 9 B) 4 C) 5 D) 6  **Solution:** D) 6 Hint : (9 + 3) / 2 = 6 The centre of every row is half of the sum of the entire row.	5
15.	I purchases perfume from a store and gave him a thousand taka note. The perfume cost Tk. 300. Since the store person have no change, he gets the change from next shop and return me 800 takas. After a while, the next shopkeeper comes and told the 1st shopkeeper that the note is a fraud and takes his money back. How much loss does the 1st shopkeeper have to bear? **Solution:** 1900	5