

ACCENTURE

ACCENTURE1) Octal to Decimal Conversion

ACCENTURE 2: Rat Count House

Problem Description: The method accepts two positive integers 'r' and 'unit' and a positive integer array 'arr' of size 'n' as its argument 'r' represents the number of rats present in an area, 'unit' is the amount of food each rat consumes and each ith element of array 'arr' represents the amount of food present in 'i+1' house number, where $0 \leq i$

Note:

- Return -1 if the array is null
- Return 0 if the total amount of food from all houses is not sufficient for all the rats.
- Computed values lie within the integer range.

Sample Input:

- 7 – number of rats
- 2 – food needed for each rat
- 8 – number of houses
- 2 8 3 5 7 4 1 2 – food available in each house

Sample Output: 4 HOUSES TO BE VISITED TO SATISFY ALL RATS

Explanation: Total amount of food required for all rats = $r * \text{unit}$; which is $= 7 * 2 = 14$. The amount of food in 1st houses = $2+8+3+5 = 18$. Since, amount of food in 1st 4 houses is sufficient for all the rats. Thus, output is 4.

ACCENTURE 3) Problem Description:

The Binary number system only uses two digits, 0 and 1 and number system can be called binary string. You are required to implement the following method:

```
int OperationsBinaryString(String str);
```

The method accepts a string str as its argument. The string str consists of binary digits separated with an alphabet as follows: A denotes AND operation; B denotes OR operation; C denotes XOR Operation You are required to calculate the result of the string str, scanning the string to right taking one operation at a time, and return the same.

Note: 1) No order of priorities of operations is required. 2) Length of str is odd

3) If str is NULL or None (in case of Python), return -1

Sample Input: str: 1C0C1C1A0B1

Sample Output:1

Explanation: The alphabets in str when expanded becomes “1 XOR 0 XOR 1 XOR 1 AND 0 OR 1”, result of the expression becomes 1, hence 1 is returned.

ACCENTURE 4)

N-base notation is a system for writing numbers that uses only n different symbols, This symbols are the first n symbols from the given notation list(Including the symbol for o) Decimal to n base notation are (0:0, 1:1, 2:2, 3:3, 4:4, 5:5, 6:6, 7:7, 8:8, 9:9, 10:A,11:B and so on upto 35:Z)

Implement the following method Char[] **DectoNBase**(int n, int num): The method accept positive integer n and num Implement the method to calculate the n-base equivalent of num and return the same as a string. Steps:

Divide the decimal number by n, Treat the division as the integer division

Write the the remainder (in n-base notation)

Divide the quotient again by n, Treat the division as integer division

Repeat step 2 and 3 until the quotient is 0

The n-base value is the sequence of the remainders from last to first

Assumption: $1 < \text{base} \leq 36$

Example Input:

12 → base

718 → n

Output

4BA

Explanation

Iteration Number	Given number	Given Divisor	Quotient	Remainder
1	718	12	59	10 which is coded as A
2	59	12	4	11 which is coded as B
3	4	12	0	4 which is coded as 4

ACCENTURE 5)

Problem Statement

A carry is a digit that is transferred to left if sum of digits exceeds 9 while adding two numbers from right-to-left one digit at a time

You are required to implement the following method.

Int NumberOfCarries(int num1 , int num2);

The methods accepts two numbers 'num1' and 'num2' as its arguments. You are required to calculate and return the total number of carries generated while adding digits of two numbers 'num1' and ' num2'.

Assumption: num1, num2>=0

C 1 1

Input 1: 451

349

800

Output 1: 2

Explanation:

Adding 'num 1' and 'num 2' right-to-left results in 2 carries since (1+9) is 10. 1 is carried and (5+4=1) is 10, again 1 is carried. Hence 2 is returned.

Sample Input2:

Num 1: 23

Num 2: 563

Sample Output2: 0

Accenture 6

Problem Statement:

Implement the following Function

def ProductSmallestPair(sum, arr)

The function accepts an integer sum and an integer array arr of size n.

Implement the function to find the pair, (arr[j], arr[k]) where $j \neq k$, such that arr[j] and arr[k] are the least two elements of array ($\text{arr}[j] + \text{arr}[k] \leq \text{sum}$) and return the product of element of this pair.

Note:

Return -1 if array is empty or if $n < 2$

Return 0, if no such pairs found.
All computed values lie within integer range.

Example:

Input

sum:9

Arr:5 2 4 3 9 7 1

Output

2

Explanation:

Pair of least two element is (2, 1) $2 + 1 = 3 < 9$, Product of (2, 1) $2 * 1 = 2$. Thus, output is 2.

Java code:

```
import java.util.*;
class Main{
    public static int productSmallestPair (int arr[], int n, int sum)  {
        // CODE HERE
    }
    public static void main (String[]args)  {
        Scanner sc = new Scanner (System.in);
        int sum = sc.nextInt ();
        int n = sc.nextInt ();
        int arr[] = new int[n];
        for (int i = 0; i < n; i++)
            arr[i] = sc.nextInt ();
        System.out.println (productSmallestPair (arr, n, sum));
    }
}
```

Python code:

```
n = int(input())
sum1 = int(input())
arr = list(map(int, input().split()))
if n < 2:
    print('-1')
arr = sorted(arr)
for i in range(n-1):
    if arr[i] + arr[i+1] < sum1:
        print(arr[i] * arr[i+1])
        break
else:
    print('0')
```

Accenture 6

You are given a function,

void *ReplaceCharacter(Char str[], int n, char ch1, char ch2);

The function accepts a string 'str' of length n and two characters 'ch1' and 'ch2' as its argument. Implement the function to modify and return the string 'str' in such a way that all occurrences of 'ch1' in the original string are replaced by 'ch2' and all occurrences of 'ch2' in the original string are replaced by 'ch1'.

Assumption: String Contains only lower-case alphabetical letters.

Note:

Return null if the string is null.

If both characters are not present in the string or both of them are the same , then return the string unchanged.

Example:

Input:

Str: apples

ch1:a

ch2:p

Output:

paales

Explanation:

'A' in the original string is replaced with 'p' and 'p' in the original string is replaced with 'a', thus output is paales.

Java code:

```
import java.util.*;

class Solution
{
    public static void replaceChar (String str, char ch1, char ch2)
    {
        String res = "";
        //////////// code here
        System.out.println (res);
    }

    public static void main (String[]args)
    {
        Scanner sc = new Scanner (System.in);
        String str = sc.next ();
        char ch1 = sc.next ().charAt (0);
        char ch2 = sc.next ().charAt (0);
        replaceChar (str, ch1, ch2);
    }
}
```

Python code:

```
def ReplaceCharacter (user_input, str1, str2):  
    result = "  
    if user_input != None:  
        result = user_input.replace(str1, '*').replace(str2, str1).replace('*', str2)  
        return result  
    return 'Null'  
  
user_input = input()  
str1, str2 = map(str,input().split())  
print(ReplaceCharacter(user_input, str1, str2))
```

Problem Statement:

You are given a function:

Int MaxExponents (int a , int b);

You have to find and return the number between 'a' and 'b' (range inclusive on both ends) which has the maximum exponent of 2.

The algorithm to find the number with maximum exponent of 2 between the given range is

Loop between 'a' and 'b'. Let the looping variable be 'i'.

Find the exponent (power) of 2 for each 'i' and store the number with maximum exponent of 2 so far in a variable , let say 'max'. Set 'max' to 'i' only if 'i' has more exponent of 2 than 'max'.

Return 'max'.

Assumption: $a < b$

Note: If two or more numbers in the range have the same exponents of 2 , return the small number.

Example

Input:

7

12

Output:

8

Explanation:

Exponents of 2 in:

7-0

8-3

9-0

10-1

11-0

12-2

Hence the maximum exponent if two is of 8.

Java code:

```
import java.util.*;

class Main{

    public static int count (int i)  {

        int count = 0;

        while (i % 2 == 0 && i != 0)

        {

            count += 1;

            i = i / 2;

        }

        return count;

    }

    public static int maxExponents (int a, int b)

    {

        int max = 0, num = 0, ans;

        ////////////CODE here

        return num;

    }

    public static void main (String[]args)

    {

        Scanner sc = new Scanner (System.in);

        int a = sc.nextInt ();

        int b = sc.nextInt ();

        System.out.println (maxExponents(a, b));

    }

}
```

Python code:

```
def countExponents(i):
    count = 0
    while i%2 == 0 and i != 0:
        count+=1
        i = i//2
    return count
def maxExponents(a, b):
```



```
maximum, number = 0, a
for i in range(a,b):
    temp = countExponents(i)
    if temp>maximum:
        maximum, number = temp, i
return number
a, b = map(int,input().split())
print(maxExponents(a, b))
```

TCS

TCS Question #1: Sweet Seventeen

Given a maximum of four digits to the base 17(10 -> A, 11 -> B, 12 -> C, 16 -> G) as input, output its decimal value.

Sample Input: 23GF

Sample Output: 10980

TCS Question #2: Word is the key

One programming language has the following keywords that cannot be used as identifiers:

Write a program to find if the given word is a keyword or not.

One programming language has the following keywords that cannot be used as identifiers:

List of keywords = {break, case, continue, default, defer, else, for, func, goto, if, map, range, return, struct, type, var}

Sample Input #1: defer

Output: defer is a keyword

Sample Input #2: While

Sample Output: while is not a keyword

TCS 3:

A party has been organised on cruise. The party is organised for a limited time(T). The number of guests entering (E[i]) and leaving (L[i]) the party at every hour is represented as elements of the array. The task is to find the maximum number of guests present on the cruise at any given instance within T hours.

Sample Input 1: 5

7,0,5,1,3

1,2,1,3,4

Sample Output :8

Explanation:

1st hour: Entry : 7 Exit: 1

No. of guests on ship : 6

2nd hour : Entry : 0 Exit : 2

No. of guests on ship : 6-2=4

Hour 3: Entry: 5 Exit: 1

No. of guests on ship : 4+5-1=8

Hour 4: Entry : 1 Exit : 3

No. of guests on ship : $8+1-3=6$
Hour 5: Entry : 3 Exit: 4
No. of guests on ship: $6+3-4=5$
Hence, the maximum number of guests within 5 hours is 8.

The input format for testing

The candidate has to write the code to accept 3 input.

First input- Accept value for number of T (Positive integer number)

Second input- Accept T number of values, where each value is separated by a new line.

Third input- Accept T number of values, where each value is separated by a new line.

The output format for testing

The output should be a positive integer number or a message as given in the problem statement (Check the output in Example 1)

Constraints:

$$1 \leq T \leq 25$$

$$0 \leq E[i] \leq 500$$

$$0 \leq L[i] \leq 500$$

TCS 4)

Problem Statement

A washing machine works on the principle of Fuzzy System, the weight of clothes put inside it for washing is uncertain but based on weight measured by sensors and the water level chosen, it decides total time needed.

- For low level water, the time estimate is 25 minutes, where approximately weight is between 2000 grams or any nonzero positive number below that.
- For medium level water, the time estimate is 35 minutes, where approximately weight is between 2001 grams and 4000 grams.
- For high level water, the time estimate is 45 minutes, where approximately weight is above 4000 grams.

Assume the capacity of machine is maximum 7000 grams. When the weight is zero, time needed is 0 minutes. If the weight exceeds maximum weight limit, then, print "OVERLOADED", and for all negative weights, the output is "INVALID INPUT".

Sample Input-1: 2000, L

Sample Output-1: Time Estimated: 25 minutes

Input should be in the form of integer value.

Output must have the following format: Time Estimated: NN Minutes

Capegemini

CAP1) Problem Statement –

You're supposed to reduce the size of this string using mathematical logic given as in the example below:

Sample Input-1: aabbbbbeeeeffggg

Sample Output -1: a2b4e4f2g3

Sample Input -2: abbccccc

Sample Output- 2: ab2c5

CAP2) Problem Statement –

You have write a method that accepts, a string which length is "len", the string has some "#", in it you have to move all the hashes to the front of the string and return the whole string back and print it.

Method Syntax: **String moveHash (String str);**

Sample input 1: Move#Hash#to#Front

Sample Output: ###MoveHashtoFront

CAP3)

Problem Statement –

You're given with the size of the array and an array of integers; print the number of times each integer has occurred in the array.

Sample Input 1:

10

1 2 3 3 4 1 4 5 1 2

Sample Output 1:

1 occurs 3 times

2 occurs 2 times

3 occurs 2 times
4 occurs 2 times
5 occurs 1 times

CAP4) Problem Statement –

Write a method to solve the following equation $a^3 + a^2b + 2a^2b + 2ab^2 + ab^2 + b^3$. Write a program to accept three values in order of a, b and c and get the result of the above equation.

Problem Statement – A method is there which tells how many dealerships there are and the total number of cars in each dealership. Your job is to calculate how many tyres would be there in each dealership and find the total number of tyres.

Input

3
4 2
4 0
1 2

Output

44

Explanation:

There are total 3 dealerships: Dealerships1 contains 4 cars and 2 bikes. Dealerships2 contains 4 cars and 0 bikes. Dealerships3 contains 1 car and 2 bikes

Total number of tyres in dealerships1 is $(4 \times 4) + (2 \times 2) = 20$
Total number of tyres in dealerships2 is $(4 \times 4) + (0 \times 2) = 16$
Total number of tyres in dealerships3 is $(1 \times 4) + (2 \times 2) = 8$.
Total tyres = $20+16+8 = 44$.

CTS

CTS -1:

Write a program to convert 4 digit numbers to equivalent English words.

Sample input-1: 1234

Sample output-1: one thousand two hundred thirty four

Sample input-2: 9999

Sample output-2: nine thousand nine hundred ninety nine

CTS 2:

Write a Program to Find the Roots of a Quadratic Equation. If roots are possible, then, there are four cases to be handled as explained below:

Case1) Roots are real and different. For this case, print "RD".

Case2) Roots are real and same. For this case, print "RS".

Case3) Roots are complex. For this case, print "RC".

Case4) In case of wrong inputs, print "Invalid".

CTS -3 :

Problem Statement – Ritik wants a magic board, which displays a character for a corresponding number for his science project. Help him to develop such an application.

For example when the digits 65,66,67,68 are entered, the alphabet ABCD are to be displayed.

[Assume the number of inputs should be always 4]

Sample Input 1:

Enter the digits:

65

66

67

68

Sample Output 1:

65-A

66-B

67-C

68-D

CTS -4 :

Problem Statement – Chaman planned to choose a four-digit lucky number for his car. His lucky numbers are 3,5 and 7. Help him find the number, whose sum is divisible by 3 or 5 or 7. Provide a valid car number. If the input fails to satisfy the condition, then display as unlucky number.

Note: The input other than 4-digit positive number [includes negative and 0] is considered as invalid.

Refer the samples, to read and display the data.

Sample Input 1:1234

Sample Output 1: LUCKY

Sample Input 2: 1214

Sample Output 2: UNLUCKY