Cognizant Coding CheatSheet

1. **Problem Statement –** Write a program to calculate the fuel consumption of your truck.The program should ask the user to enter the quantity of diesel to fill up the tank and the distance covered till the tank goes dry.Calculate the fuel consumption and display it in the format (liters per 100 kilometers).

   Convert the same result to the U.S. style of miles per gallon and display the result. If the quantity or distance is zero or negative display " is an Invalid Input".

   [**Note:** The US approach of fuel consumption calculation (distance / fuel) is the inverse of the European approach (fuel / distance). Also note that 1 kilometer is 0.6214 miles, and 1 liter is 0.2642 gallons.]

   The result should be with two decimal place.To get two decimal place refer the below-mentioned print statement :

   float cost=670.23;

   System.out.printf("You need a sum of Rs.%.2f to cover the trip",cost);

   Sample Input 1:

   - Enter the no of liters to fill the tank

   20

   - Enter the distance covered

   150

   Sample Output 1:

   - Liters/100KM

   13.33

   - Miles/gallons

   17.64

   Explanation:

   - For 150 KM fuel consumption is 20 liters,
   - Then for 100 KM fuel consumption would be (20/150)*100=13.33,
   - Distance is given in KM, we have to convert it to miles (150∗0.6214)=93.21,
   - Fuel consumption is given in liters, we have to convert it to gallons (20∗0.2642)=5.284,
   - Then find (miles/gallons)=(93.21/5.284)=17.64

2. **Problem Statement –** Vohra went to a movie with his friends in a Wave theatre and during break time he bought pizzas, puffs and cool drinks. Consider the following prices :

   - Rs.100/pizza
   - Rs.20/puffs
   - Rs.10/cooldrink

   Generate a bill for What Vohra has bought.

   Sample Input 1:

   - Enter the no of pizzas bought:10
   - Enter the no of puffs bought:12
   - Enter the no of cool drinks bought:5

   Sample Output 1:

   Bill Details

   - No of pizzas:10
   - No of puffs:12
   - No of cooldrinks:5
   - Total price=1290

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:65666768

   Sample Output 1:

   65-A

   66-B

   67-C

68-D

4. **Problem Statement –** FOE college wants to recognize the department which has succeeded in getting the maximum number of placements for this academic year. The departments that have participated in the recruitment drive are CSE,ECE, MECH. Help the college find the department getting maximum placements. Check for all the possible output given in the sample snapshot

   Note : If any input is negative, the output should be "Input is Invalid". If all department has equal number of placements, the output should be "None of the department has got the highest placement".

   Sample Input 1:

   - Enter the no of students placed in CSE:90
   - Enter the no of students placed in ECE:45
   - Enter the no of students placed in MECH:70

   Sample Output 1:

   - Highest placement

   CSE

5. **Problem Statement –** In a theater, there is a discount scheme announced where one gets a 10% discount on the total cost of tickets when there is a bulk booking of more than 20 tickets, and a discount of 2% on the total cost of tickets if a special coupon card is submitted. Develop a program to find the total cost as per the scheme. The cost of the k class ticket is Rs.75 and q class is Rs.150. Refreshments can also be opted by paying an additional of Rs. 50 per member.

   Hint: k and q and You have to book minimum of 5 tickets and maximum of 40 at a time. If fails display "Minimum of 5 and Maximum of 40 Tickets". If circle is given a value other than 'k' or 'q' the output should be "Invalid Input".

   The ticket cost should be printed exactly to two decimal places.

   Sample Input 1:

   - Enter the no of ticket:35
   - Do you want refreshment:y
   - Do you have coupon code:y
   - Enter the circle:k

Sample Output 1:

- Ticket cost:4065.25

6. **Problem Statement –** Rhea Pandey's teacher has asked her to prepare well for the lesson on seasons. When her teacher tells a month, she needs to say the season corresponding to that month. Write a program to solve the above task.
   - Spring – March to May,
   - Summer – June to August,
   - Autumn – September to November and,
   - Winter – December to February.

   Month should be in the range 1 to 12. If not the output should be "Invalid month".

   Sample Input 1:

   - Enter the month:11

   Sample Output 1:

   - Season:Autumn

7. **Problem Statement –** To speed up his composition of generating unpredictable rhythms, Blue Bandit wants the list of prime numbers available in a range of numbers.Can you help him out?

   Write a java program to print all prime numbers in the interval [a,b] (a and b, both inclusive).

   Note

   - Input 1 should be lesser than Input 2. Both the inputs should be positive.
   - Range must always be greater than zero.
   - If any of the condition mentioned above fails, then display "Provide valid input"
   - Use a minimum of one for loop and one while loop

   Sample Input 1:

   2

   15

   Sample Output 1:

   2 3 5 7 11 13

8. **Problem Statement –** Goutam and Tanul plays by telling numbers. Goutam says a number to Tanul. Tanul should first reverse the number and check if it is same as the original. If yes, Tanul should say “Palindrome”. If not, he should say “Not a Palindrome”. If the number is negative, print “Invalid Input”. Help Tanul by writing a program.

   Sample Input 1 :

   21212

   Sample Output 1 :

   Palindrome

9. XYZ Technologies is in the process of increment the salary of the employees. This increment is done based on their salary and their performance appraisal rating.

   If the appraisal rating is between 1 and 3, the increment is 10% of the salary.

   If the appraisal rating is between 3.1 and 4, the increment is 25% of the salary.

   If the appraisal rating is between 4.1 and 5, the increment is 30% of the salary.

   Help them to do this, by writing a program that displays the incremented salary. Write a class “IncrementCalculation.java” and write the main method in it.

   Note : If either the salary is 0 or negative (or) if the appraisal rating is not in the range 1 to 5 (inclusive), then the output should be “Invalid Input”.

   Sample Input 1 :

   - Enter the salary

   8000

   - Enter the Performance appraisal rating

   3

   Sample Output 1 :

   8800

10. **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, Fails to provide a valid input then display that number is not a valid car 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:

- Enter the car no:1234

Sample Output 1:

- Lucky Number

11. **Problem Statement –**

IIHM institution is offering a variety of courses to students. Students have a facility to check whether a particular course is available in the institution. Write a program to help the institution accomplish this task. If the number is less than or equal to zero display “Invalid Range”.

Assume maximum number of courses is 20.

Sample Input 1:

- Enter no of course:

5

- Enter course names:

Java

Oracle

C++

Mysql

Dotnet

- Enter the course to be searched:

C++

Sample Output 1:

C++ course is available

12. **Problem Statement –** Mayuri buys “N” no of products from a shop. The shop offers a different percentage of discount on each item. She wants to know the item that has the minimum discount offer, so that she can avoid buying that and save money.

[**Input Format**: The first input refers to the no of items; the second input is the item name, price and discount percentage separated by comma(,)]

Assume the minimum discount offer is in the form of Integer.

Note: There can be more than one product with a minimum discount.

Sample Input 1:

4

mobile,10000,20

shoe,5000,10

watch,6000,15

laptop,35000,5

Sample Output 1:

shoe

Explanation: The discount on the mobile is 2000, the discount on the shoe is 500, the discount on the watch is 900 and the discount on the laptop is 1750. So the discount on the shoe is the minimum.

13. **Problem Statement –** Raj wants to know the maximum marks scored by him in each semester. The mark should be between 0 to 100 ,if goes beyond the range display "You have entered invalid mark."

Sample Input 1:

- Enter no of semester:

3

- Enter no of subjects in 1 semester:

3

- Enter no of subjects in 2 semester:

4

- Enter no of subjects in 3 semester:

2

- Marks obtained in semester 1:

50

60

70

- Marks obtained in semester 2:

90

98

76

67

- Marks obtained in semester 3:

89

76

Sample Output 1:

- Maximum mark in 1 semester:70
- Maximum mark in 2 semester:98
- Maximum mark in 3 semester:89

14. **Problem Statement –** Bela teaches her daughter to find the factors of a given number. When she provides a number to her daughter, she should tell the factors of that number. Help her to do this, by writing a program. Write a class FindFactor.java and write the main method in it.

    Note :

    - If the input provided is negative, ignore the sign and provide the output. If the input is zero
    - If the input is zero the output should be “No Factors”.

    Sample Input 1 :

    54

    Sample Output 1 :

    1, 2, 3, 6, 9, 18, 27, 54

15. You want to buy a particular stock at its lowest price and sell it later at its highest price. Since the stock market is unpredictable, you steal the price plans of a company for this stock for the next N days.

    Find the best price you can get to buy this stock to achieve maximum profit.

    Note: The initial price of the stock is 0.

Input Specification:

Input1: N, number of days

Input2: Array representing change in stock price for the day.

Output Specification:

Your function must return the best price to buy the stock at.

Example1:

Input1: 5**Input2:** (-39957,-17136,35466,21820,-26711}**Output:** -57093**Explanation:** The best time to buy the stock will be on Day 2 when the price of the stock will be -57093.

16. Given a positive whole number n, find the smallest number which has the very same digits existing in the whole number n and is greater than n. In the event that no such certain number exists, return – 1.

    Note: that the returned number should fit in a 32-digit number, if there is a substantial answer however it doesn't fit in a 32-bit number, return – 1.

Example 1:

Input: n = 12

Output: 21

Explanation: Using the same digit as the number of permutations, the next greatest number for 12 is 21.

17. Henry is extremely keen on history and every one of the ages of his family. He does a ton of exploration and understands that he has plummeted from the incomparable Amaya line. After a ton of looking through old records and the most recent records of the general public, he can discover all the parent-kid connections in his family right from the extraordinary ruler Ming of the tradition to himself.

    These connections are given in the structure of a direct exhibit where the emperor is at the main position and his kids are at pos (2i + 1) and (2i + 2)

    This is the pattern followed throughout.

    Henry needs to sort out every one of the kin of individual X from the information.

    Write a program for Henry to figure out all the siblings of person X from the data.

    Return the sorted list of all of Henry's siblings.

    If no sibling return {-1}

- **input 1:** N, the length of the array
- **input2:** An array representing the ancestral tree
- **input 3:** X, the person whose siblings are sought.
- **output** – return the array of all siblings in increasingly sorted order.

Example 1 :

input 1: 5

input 2: {1,2,3,4,5}

input 3: 1

output: {-1}

Explanation: x is the root of the tree and has no siblings

18. Rohan and his team are participating in the Treasure Hunt event of college in which in each step they have to solve one problem to get a clue about the Treasure location. Rohan's team has performed very well and reached the final step where they have to provide a code of a problem to get a final clue about treasure .

    Given a string s, they need to find the longest palindromic subsequence's length in s.

    A subsequence is a sequence that can be derived from another sequence by deleting some or no elements without changing the order of the remaining elements.

    The string contains only lowercase letters.

    Write a program to help Rohan's team that takes in input as String x and returns the length of the longest palindromic subsequence of x.

Input Specification:

input1: string input

Output Specification:

Return the length of the longest palindromic subsequence

Example 1:

Input: s = "bbbab"

Output: 4

Explanation: One possible longest palindromic subsequence is "bbbb".

19. Given a number n, the task is to find the remainder when n is divided by 11. The input number may be very large.

    Since the given number can be very large, you can not use n % 11.

    ### Input Specification:

    inputs a large number in the form of a string

    ### Output Specification:

    Return the remainder modulo 11 of input1

    ### Example1:

    Input: str = 13589234356546756

    Output: 6

20. Jasleen has bought a new bulb factory. The factory has a single file of machines, numbered from 1 to N. Each machine has a certain number of fully prepared bulbs.

    Jasleen has a rule she wants to follow. She wants to collect an equal amount of bulb from

    each machine from which she collects bulbs.

    Jasleen can start collecting bulb from any machine, but once she starts collecting, she collects

    from every consecutive machine until she reaches the last machine she wants to collect from. Find the maximum number of bulbs she can collect.

    Input Specification:

    Input1: N, the number of machines

    Input2: An array of N elements (a1,a2 a3.....aN], denoting the number of fully prepared bulbs in each machine of the factory.

    Output Specification:

    An integer output denoting the maximum number of bulbs that Allie can collect.

    Example 1:

    input1: 3

    Input2: [1,2,3]

    Output: 3

21. An astrologer gives a matrix to devilliers and tells him to add a largest row sum and largest column sum of the given matrix.The number which appears as a result is his lucky number for the final match jersey.

    Write a program that adds up the largest row sum and the largest column sum from an N- rows*M-columns array of numbers to help devilliers for finding his lucky number for the final match jersey.

    As a preliminary phrase , you should reformat the sequence of numbers as a matrix, whose number of rows and columns are to be specified as arguments.

    Input Specification:

    - **Input 1**: Integer for row dimension of the array
    - **Input 2:** Integer for column dimension of the array
    - **Input 3:** Array elements to be entered in row major.

    Output Specifications:

    - Largest row sum+ Largest column sum

    Example 1:

    Input1:4

    Input2: 4

    Input3: {1,1,1,1,2,2,2,2,3,3,3,3,4,4,4,4}

    Output: 26

22. Williamson is an analyst he needs to analyse a particular topic for performing analysis for that he needs to find a permutation of a given object.He don't know how to find permutation so for simplifying his work he is hiring one software developer who can code for him and find a permutation and combination of a given object.

    Consider you are giving an interview to williamson for working with him. Find a permutation of given input to proof that you are fit for his requirement.

    Input Specification:

    nCr where n and r are numbers given by Williamson to you

    nCr is defined as n! / (r! x (n-r)!)

    Here, n! denotes the factorial of a number. Also, you have to calculate this number as modulo

    Input Specification:

    - input1: The number n.
    - Input2: The number r.

- Input3: The number m,.

Output specification:

- The value of nCr%m.

Example 1:

Input1: 3

Input2: 2

Input3: 10000000009

Output:3

Explanation:

n=3.r=2,m=100 So, n!=3!=6, r!=2!=2, (n-1)!= 1!=1.

So, nCr = (6/(2*1))%1000000009= 3.

23. A Derangement is a permutation of n elements, such that no element appears in its original position.

    For example, a derangement of {0, 1, 2, 3} is {2, 3, 1, 0}.

    Given a number n, find the total number of Derangements of a set of n elements.

    Input Specification:

    input1: N, the number of Objects

    Output Specification:

    Return the number of arrangements in which no object occurs at its original position

    Example 1:

    Input: n = 2

    Output: 1

    For two elements say {0, 1}, there is only one possible derangement {1, 0}

24. Vira writes an apology letter to anu. However, before Anu can read it, Vira's enemy Rohan takes it and rotates the characters of each word left to right N times. Find the number of words that remain the same even after this shifting of letters.

    Input Specification:

    - input1: String of words

- input2: N, number of times rotation happens

Output Specification:

- Your function should return the number of correct words.

Example 1:

input1: llohe ereth

input2: 2

Output : 2

25. After Watching a movie at PVR, Adil is pondering over the number of ways in which he can pay for the movie. He has x1, x2, x3, x4 coins of values 1,2,5 and 10 respectively. He wants to determine the number of ways in which he can pay an amount A.

    You need to fill in a function that returns the number of ways to pay total amount

    Input Specifications:

    Input 1: An integer value denoting the total amount to be paid

    Output Specification:

    Return an Integer value denoting the number of ways to pay the total amount

    Example1:

    Input1: 40

    Output : 195

26. Minimum Number of Steps to Reduce X to 0

- **Problem**: Given an array of positive integers `nums` and a target integer `x`, return the minimum number of steps to reduce `x` to exactly 0 by subtracting elements from the array, either from the beginning or the end. If it's not possible, return -1.
- **Input**:
  - `nums = [1, 1, 4, 2, 3], x = 5`
- **Output**:
  - `2`
- **Explanation**: We can subtract 3 from the end and 2 from the end to reach 0.

27. Longest Substring Without Repeating Characters

- **Problem**: Given a string, find the length of the longest substring without repeating characters.
- **Input**:
  - `s = "abcabcbb"`
- **Output**:
  - `3`
- **Explanation**: The answer is "abc", with the length of 3.

28. Kth Smallest Element in a Sorted Matrix

- **Problem**: Given an `n x n` matrix where each of the rows and columns is sorted in ascending order, find the `kth` smallest element in the matrix.
- **Input**:
  - `matrix = [[1,5,9],[10,11,13],[12,13,15]], k = 8`
- **Output**:
  - `13`
- **Explanation**: The 8th smallest number in the matrix is 13.

29. Container With Most Water

- **Problem**: Given `n` non-negative integers `a1, a2, ..., an`, where each represents a point at coordinate `(i, ai)`. `n` vertical lines are drawn such that the two endpoints of the line `i` are at `(i, ai)` and `(i, 0)`. Find two lines, which together with the x-axis forms a container, such that the container contains the most water.
- **Input**:
  - `height = [1,8,6,2,5,4,8,3,7]`
- **Output**:
  - `49`
- **Explanation**: The container formed between the second and last lines can contain the most water (49 units).

30. Maximum Subarray

- **Problem**: Given an integer array `nums`, find the contiguous subarray (containing at least one number) which has the largest sum and return its sum.
- **Input**:
  - `nums = [-2,1,-3,4,-1,2,1,-5,4]`
- **Output**:

    - `6`

- **Explanation**: The subarray `[4,-1,2,1]` has the largest sum, which is 6.