

# DIVE INTO DSA 2.0

Question Sheet by **Vishwaraj Pawar**

GFG STUDENT CHAPTER | GHRCEM PUNE

## INSTRUCTION TO GET MAX BENEFITS FROM THE SHEET

- **READ THE PROBLEM STATEMENT (PS):** Carefully understand the logic required for the task before you start coding.
- **LOOK AT INPUT & OUTPUT:** Always verify your logic against the sample inputs and outputs to ensure your program produces the correct result.
- **HINTS PROVIDED:** All the hints to solve the questions are provided on the **last page** of this sheet. Use them only if you feel truly stuck.
- **HELP & SUPPORT:** If you are still stuck, feel free to connect with **Vishwaraj Pawar** or **Yogesh Kankariya** through LinkedIn.
- **STARRED QUESTIONS (\*):** Questions marked with a \* are hard. It is extra recommended to solve them in the last.

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**Note:** The solutions to this sheet will be given on the **NEXT SESSION OF DIVE INTO DSA 2.0.**

***"Don't aim to finish fast — aim to understand deeply. All the very best!"***

## Q1. The Kilometer Converter

**Problem Statement:** Write a program that takes a distance in Kilometers from the user and outputs the equivalent distance in Meters.

**Sample Input:** 8

**Sample Output:** 8000

## Q2. Rectangle Area

**Problem Statement:** Given the length and width of a rectangle, calculate its total area.

**Sample Input:** 15 4

**Sample Output:** 60

## Q3. The Grocery Bill

**Problem Statement:** A shop sells apples for 20 each and oranges for 10 each. Calculate the total bill including a fixed charge of 5 for a carry bag.

**Sample Input:** 2 3

**Sample Output:** 75

*Explanation:*  $(2 * 20) + (3 * 10) + 5 = 75$

## Q4. Simple Interest

**Problem Statement:** Calculate the simple interest earned given the Principal, Rate of interest, and Time.

**Sample Input:** 2000 10 2

**Sample Output:** 400

## Q5. GHRCEM Pune Result Portal \*

**Problem Statement:** Calculate the final score out of 100 for a GHRCEM student. Total is the sum of CAE Average (CAE1, CAE2), TAE Average (TAE1, TAE2), and End-Sem marks.

**Sample Input:** 20 18 15 15 50

**Sample Output:** 84

*Explanation: CAE Avg: 19, TAE Avg: 15, EndSem: 50. Total:  $19+15+50 = 84$ .*

## Q6. Total Seconds \*

**Problem Statement:** Convert a time duration provided in Hours, Minutes, and Seconds into total seconds.

**Sample Input:** 2 30 45

**Sample Output:** 9045

## Q7. The Natural Row

**Problem Statement:** Print all natural numbers from 1 to N in a single line using a loop.

**Sample Input:** 5

**Sample Output:** 1 2 3 4 5

## Q8. The Table of N

**Problem Statement:** Print the multiplication table of a given number N up to 10 iterations.

**Sample Input:** 7

**Sample Output:** 7 14 21 28 35 42 49 56 63 70

## Q9. The Step Climber

**Problem Statement:** A climber starts at step A and moves D steps forward in every jump. Show their position for exactly 10 jumps.

**Sample Input:** 10 5

**Sample Output:** 10 15 20 25 30 35 40 45 50 55

## Q10. The Doubling Bacteria

**Problem Statement:** A bacterial culture starts with B bacteria and doubles its population every hour. Print the population count for N hours.

**Sample Input:** 5 4

**Sample Output:** 5 10 20 40

## Q11. Monthly Savings

**Problem Statement:** A student starts with a certain amount in savings. Every following month, they save 10% more than what they saved in the very first month. Print savings for 12 months.

**Sample Input:** 1000

**Sample Output:** 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100

## Q12. The Power Series \*

**Problem Statement:** Print the first 5 powers of a number X ( $X^1$ ,  $X^2$ ,  $X^3$ ,  $X^4$ ,  $X^5$ ) without using the pow() function.

**Sample Input:** 3

**Sample Output:** 3 9 27 81 243

### Q13. Star Square

**Problem Statement:** Generate an N x N square grid made of asterisks (\*).

**Sample Input:** 2

**Sample Output:**

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### Q14. Hash Rectangle

**Problem Statement:** Create a solid rectangle of '#' based on R rows and C columns provided by the user.

**Sample Input:** 2 3

**Sample Output:**

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### Q15. The Row Identity

**Problem Statement:** Print a right-angled triangle where each number in a row is the row index.

**Sample Input:** 3

**Sample Output:**

1

22

333

## Q16. The Column Identity

**Problem Statement:** Print a right-angled triangle where numbers in each row show the column index.

**Sample Input:** 3

**Sample Output:**

```
1
12
123
```

## Q17. Inverted Star Triangle

**Problem Statement:** Print a triangle that starts with N stars and reduces to 1 star in the final row.

**Sample Input:** 3

**Sample Output:**

```
***
**
*
```

## Q18. Floyd's Triangle \*

**Problem Statement:** Print a triangle where numbers increment continuously across the entire shape.

**Sample Input:** 4

**Sample Output:**

```
1
2 3
4 5 6
7 8 9 10
```

# HINTS & LOGIC

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**Hint Q1:** Meters = Kilometers \* 1000.

**Hint Q2:** Area = Length \* Width.

**Hint Q3:** Total = (Apples \* 20) + (Oranges \* 10) + 5.

**Hint Q4:**  $SI = (P * R * T) / 100$ .

**Hint Q5:** Total =  $[(CAE1 + CAE2) / 2.0] + [(TAE1 + TAE2) / 2.0] + EndSem$ .

**Hint Q6:** Total Seconds = (Hours \* 3600) + (Minutes \* 60) + Seconds.

**Hint Q7:** Loop from 1 to N and print 'i'.

**Hint Q8:** Loop from 1 to 10 and print (i \* N).

**Hint Q9:** CurrentStep = A + (i \* D) inside the loop.

**Hint Q10:** Keep a population variable and multiply it by 2 in each loop.

**Hint Q11:** Every month add (InitialSavings \* 0.1) to the previous month's value.



**Hint Q12:** Maintain a 'result' variable initialized to 1. Inside loop:  $\text{result} = \text{result} * X$ .

**Hint Q13:** Use nested loops where both i and j run from 1 to N.

**Hint Q14:** Outer loop i = 1 to Rows; Inner loop j = 1 to Columns.

**Hint Q15:** Inner loop runs up to 'i'. Print the value of the outer loop variable 'i'.

**Hint Q16:** Inner loop runs up to 'i'. Print the value of the inner loop variable 'j'.

**Hint Q17:** Make the outer loop run backwards from N to 1.

**Hint Q18:** Declare 'int count = 1' outside. Inside inner loop: print count and  $\text{count}++$ .