

REVIEW for Final Exam

1. Secret Text

Ames and Bono are a pair of secret agents on an espionage mission. They agree to use secret text to hide coordinate location where they will exchange messages or other operations. They need a program to translate text message into location.

To create location coordinate, they will need two (2) text inputs (S_1 and S_2), where S_1 will represent x-axis and S_2 will represent y-axis. S will have the following format:

$HH:MM > word_0 word_1 \dots word_n$

$HH:MM$ is a 24-hour time format and text will have word as many as n . Digits in HH will determine whether the position is in negative or positive axis, if the hour is between 00 to 12, then it is positive, else negative. Each digit of MM will determine word position to be taken to calculate value of position (C). C is the sum of alphabet order, i.e. a to z means 1 to 26 from each of the alphabet of the character in the word. C must not exceed 180. If it does, it will be calibrated back to 0 and continued with the remaining value (i.e. 190 means 10).

Input Format

The first line will be S_1 with the format $HH:MM>word$

The second line will be S_2 with the format $HH:MM>word$

Output Format

The output will be: " C_1, C_2 " where C_1 is the coordinate (x) obtained from S_1 and C_2 is the coordinate (y) obtained from S_2 .

Constraint

$$\begin{aligned} 00 &\leq HH \leq 23 \\ 00 &\leq MM \leq 59 \\ 1 &\leq n \leq 9 \\ -180 &\leq C \leq 180 \\ 1 &\leq |word_i| \leq 10000, i = 0..n \end{aligned}$$

Example Case

Sample Input 1	Sample Output 1
12:33>do you like Taiwanese cuisine? 03:07>I'm watching everyone	-14,22
Sample Input 2	Sample Output 2
07:30>please send my hello! 10:01>yummy breakfast today	110,180

Explanation Sample 1

The first text is for x axis, the second text is for y axis

- The first text has five words, we will use minute (MM): 33. Therefore, we will get "Taiwanese" for word 1 and word 2 (as the first M is 3, the second M is 3). The sum

of word 1 and word 2 is 194. This C value (194) exceeds 180. Therefore, we will calibrate the C value to be 14

- As HH is outside the range of 00-12, then the coordinate will be negative. Hence, $C_1 = -14$
- The second text has three words, we will use minute (MM): 07. Therefore, we will get "I'm" for word 1 and nothing for word 2 as there is no word in position 7. The sum that we obtained from I'm is 22
- As HH is in the range of 00-12 then the coordinate will be positive. Hence, $C_2 = 22$
- Output is -14,22

2. Make a Triangle

Alice has n line segments, the length of each line segment is a_i . Bob challenged her to use three (3) line segments to construct a non-degenerate triangle. Alice consulted you that whether she could win this challenge.

Alice should use **exactly** 3 line segments, she is not allowed to concatenate two line segments to form a new line segment or cut a line segment into two line segments. A non-degenerate triangle is a triangle with positive area.

Input Format

The first line contains single integer n ($3 \leq n \leq 30,000$) – the number of line segments Alice has

The second line contains n integers a_1, a_2, \dots, a_n ($1 \leq n \leq 10^9$) – the lengths of line segments.

Output Format

Print "YES" if she can choose exactly three line segments and form a non-degenerate triangle with them, and "NO" otherwise.

Example

Sample Input 1	Sample Output 1
5 1 5 3 2 4	YES
Sample Input 2	Sample Output 2
3 4 1 2	NO

Explanation

For the first example, she can use line segments with length 2, 4, and 5 to construct a non-degenerate triangle.

3. The Puzzle

During Christmas holiday, Bibi and Lili play the new released RPG game and face a coop-mission. After defeating enemies and solving puzzles, they will get a prize (gems) that can be used to purchase limited edition equipment or upgrades. In the new patch, the

puzzle is to calculate how many bombs are inside a room/cave with the following formula they found online:

$$f(n, x) = \begin{cases} 1, & n \leq 1 \\ n + f(n-1, x+1) + f(n-2, x+2), & n > 1 \end{cases}$$

Where n denotes the level of labyrinth they are located at and x is the number of prize figures on the room entrance.

Input Format

The input will be n and x

Output Format

The output will be the number of bombs calculated using the given formula

Example

Sample Input 1	Sample Output 1
3 1	8
Sample Input 2	Sample Output 2
5 2	29

4. The Tax

Every employee working in Indonesia, will have to pay for the tax. The company hiring them is usually responsible for the cut. Hence, the employee will get the take home pay after tax deduction. The tax is calculated as according to the yearly payroll after deducted with PTKP, and usually called as PKP.

PTKP is the amount of payroll that will not be charged with tax according to tax status of the employee, where:

- Not married (TK): 54,000,000
- Married with 0 dependent (K/0): 58,500,000
- Married with 1 dependent (K/1): 63,000,000
- Married with 2 dependents (K/2): 67,500,000
- Married with 3 dependents (K/3): 72,000,000
- Note that the maximum number of dependents considered is 3

The tax is calculated using a progressive formula as follows

Layer	PKP	Tax
I	0 – 60,000,000	5%
II	> 60,000,000 – 250,000,000	15%
III	> 250,000,000 – 500,000,000	25%
IV	> 500,000,000 – 5,000,000,000	30%
V	> 5,000,000,000	35%

You are asked to create a program to read the input of “employee.txt” where it has the employee name, employee tax status, and employee monthly payroll to determine the

monthly take home pay (THP) that employee will receive after tax, with the assumption that yearly there will be 12 months of payroll.

Input Format

“employee.txt” file, with the following format:

Employee_name#tax_status#monthly_payroll

Output Format

EmployeeName – monthlyTHP

Constraint

- Tax status is: TK, K/0, K/1, K/2, K/3
- Monthly payroll is between 5,000,000 to 300,000,000 and it is a multiple of thousands
- A year consists of 12 months

Example

Sample Input	Sample Output
Jessica#TK#10000000	Jessica - 9675000
Julian#K/0#8000000	Julian - 7843750
Jovidi#K/0#35500000	Jovidi - 30427083

Explanation for the first example

Monthly Payroll is 10,000,000 (before tax). Her tax status is TK, means there is PTKP of: 54,000,000 yearly. Yearly Payroll thus = $10,000,000 \times 12 = 120,000,000$. PKP = $120,000,000 - 54,000,000 = 66,000,000$.

The first 60,000,000 will be charged with 5% = 3,000,000 and the remaining 6,000,000 will be charged with the second layer: 15% = 900,000.

The total tax (yearly) = 3,900,000. Thus, monthly tax = $3,900,000 / 12 = 325,000$.

Hence monthly THP = $10,000,000 - 325,000 = 9,675,000$.