UNITED INTERNATIONAL UNIVERSITY
Department of Computer Science and Engineering (CSE)

Course Title: Data Structure & Algorithm Lab Lab II **Course Code: CSE2218**

Trimester & Year: Spring 2022 **Section: D** **Credit Hours: 1.0** **AZ**

ASSIGNMENT 03: Dynamic Programming

Q1: Shooting Game

Samu is playing a shooting game in play station. There are two apples to aim in this shooting game. Hitting first apple will provide her **X** points and hitting second apple will provide her **Y** points. And if she misses the apple she chose to hit, she won't get any point. Now she is having **N** coins and each shoot will cost her **1** coin and she needs to score at least **W** points to win the game.

Samu don't like to lose at any cost. At each turn, she has two choices. The choices include:-

- Hitting first apple with probability **P1** percent. However, she might miss it with probability **(1-P1)** percentage.
- Hitting second apple with probability **P2** percent. However, she might miss it with probability **(1-P2)** percentage.

She would like to know what is the maximal expected probability (as a percentage b/w 0 and 100) of winning the shooting game.

Input Format:

- First line contains the number of test cases **T**.
- Each test case consists of six space separated integers of the form **X Y N W P1 P2** as described in the statement.

Output Format: For each test case, print the result as described above in a separate line.

Note: Choosing to hit any apple is entirely her choice. Both are independent events meaning **P1** + **P2** may/may not exceed 100. Output must contain 6 digits after decimal.

Example :

Input:	**Output:**
1 2 3 2 5 50 25	12.500000

Explanation: Samu is getting **2** points from shooting first apple and **3** points from shooting second Apple.

She had **2** chances to shoot and she need to score atleast **5** points so anyhow she need to shoot Apple 1 in one shoot and Apple 2 in another shoot , if she wants to win.

The maximum probability of winning is **0.5 * 0.25 = 0.125 = 12.5%**

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Q2: Maximize Marks

An exam consists of **N** questions. The marks of the N questions are $\mathbf{m_1, m_2, m_3, .. m_N}$ respectively. Jam is giving the exam and he wants to maximise his number of marks. However he takes some time to solve each question. The time taken by him to solve the questions are $\mathbf{t_1, t_2, t_3, .. t_N}$ respectively. The exams lasts for a total of time **T**.

But Jam's teacher is very smart and she knows that Jam will find out a way to get maximum marks. So, to confuse Jam, she also puts up a bonus offer for him - The offer is that Jam can select a question for which he can double the marks awarded for that question. Now, Jam is indeed confused. Help him find out the maximum number of marks he can gain.

Input

- The first line contains a single integer **N** that represents the number of questions.
- Second line contains a single integer **T**, the total time for which the exam takes place.
- Third line contains N space-separated integers $\mathbf{m_1, m_2, m_3, ... m_N}$, where $\mathbf{m_i}$ represents marks assigned to the $\mathbf{i^{th}}$ question.
- Fourth line contains N space-separated integers $\mathbf{t_1, t_2, t_3, ... t_N}$, where $\mathbf{t_i}$ represents time taken to solve the $\mathbf{i^{th}}$ question.

Output

Output a single integer, that is the maximum number of marks Jam can achieve.

Example

Input:	**Output:**
3 10 1 2 3 4 3 4	8

Constraints

- $\mathbf{1 <= N <= 1000}$
- $\mathbf{1 <= T <= 10000}$
- $\mathbf{1 <= m_i <= 100000}$
- $\mathbf{1 <= t_i <= 10000}$