Ranick Patra ⏻

The TCS Global Coding Contest

Coding Area

00 Hr **00** Min
01 Sec

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ONLINE EDITOR (H)

VM Fitment

➕ Problem Description

You are a System Administrator and have access to unlimited number of servers with same amount of CPU (#of cores) and Memory (GB).

On these servers, you need pack number of applications K, deployed as VMs such that the total cost of ownership without affecting the application performance, is the least. Application resource requirements are provided in the following format

* CPU Utilization in percentage for a single core system

* Memory Allocated in MB

You need to pack the applications on the server in such a manner that its resource requirement is fully met on that server i.e. you cannot deploy the same application across different servers.

Each server that hosts the application has a constant initial cost in terms of

* Reserved CPU in percentage for a single core system

* Reserved Memory in MB

The cost of the server can be calculated from the following equation:

Cost per Hour = constant initial cost + (1.5/10000)(cpu_utilization_os_server ^ 3) + 0.5(mem_utilization_of_server)

where 0 <= cpu_utilization_os_server, mem_utilization_of_server <= 100

and constant initial cost = 100

Your task is to find the minimum cost per hour for running the applications.

➕ Constraints

1 <= number of cores <= 10

1 <= memory in GB <= 10

0 <= number of VMs <= 100

1 GB = 1024 MB

✚ Input Format

First line provides the number of cores, C, in each server

Second line provides the amount of memory, M, in gigabytes in each server

Third line provides number of applications, K, to be packed on servers

Next, K * 2 lines consists of the following information, on one line each

CPU requirement in percentage of single core for current application

Memory requirement in megabytes for current application

Last 2 lines consists of the following information

Reserved CPU in percentage of a single core system

Reserved Memory in MB

✚ Output

Least cost per hour for hosting all applications, rounded up to the next integer

✚ Test Case

✚ Explanation

Example 1

Input

2

1

4

29.72

366

25.53

163

28.98

206

26.64

506

11.21

176

Output

289

Example 2

Input

3

1

4

26.66

451

25.8

294

26.81

207

26.77

192

8.03

184

Output

277

Upload Solution [Question : H]

☐ I, **ranick patra** confirm that the answer submitted is my own.

☐ Took help from online sources (attributions)

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