Nearest Square

DiPS CodeJam 22

Prompt

Given an array of n integers, find the nearest squares of all the integers.

Input Format

The first and only line of input contains a space-separated array of n integers.

Output Format

The first and only line of your output must contain a single a space-separated array of n integers.

Constraints

- $2 \geq n \geq 100$
- $1 \geq \text{integer} \geq 1000$

Sample Input/Output

Input	Output
`748 253 142`	`729 256 144`

Solution

Let's take a random number, say **125**. Now, to obtain the 2 nearest squares, we find the squares of $\lfloor\sqrt{125}\rfloor$ and $\lfloor\sqrt{125}\rfloor + 1$:

$$\begin{aligned} &\lfloor\sqrt{125}\rfloor^2 \\ &\quad = \lfloor 11.18033\ldots\rfloor^2 \\ &\quad = 11^2 \\ &\quad = 121 \end{aligned}$$

$$\begin{aligned} &(\lfloor\sqrt{125}\rfloor + 1)^2 \\ &\quad = (\lfloor 11.18033\ldots\rfloor + 1)^2 \\ &\quad = (11 + 1)^2 \\ &\quad = 12^2 \\ &\quad = 144 \end{aligned}$$

As 121 is closer to 125, that's our answer.

Sample Program

```
import math

arr = list(int(e) for e in input().split())
outputContent = []
for i in range(0,len(arr)):
     sr = math.floor(math.sqrt(arr[i]))
     a = sr * sr
     b = (sr + 1) * (sr + 1)
     outputContent.append(a) if ((arr[i] - a) < (b - arr[i])) else outputContent.append
    (b)

print(" ".join(str(e) for e in outputContent))
```