

Προβλημα 1 [Λυσή]

$$N = 10^4$$

$$m = 0$$

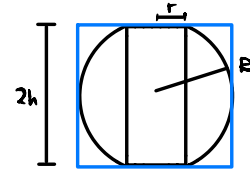
for $_$ in range(N):

$$x = 2RU() - R$$

$$y = 2RU() - R$$

$$z = 2RU() - R$$

if $x^2 + y^2 + z^2 < R^2$ and $x^2 + y^2 > r^2$: $m++$



$$V = (2R)^3$$

$$P = m/N$$

$$I = P \cdot V$$

$$\delta I = \frac{V}{\sqrt{N}} \sqrt{P(1-P)}$$

$$\frac{\delta I}{I} = \frac{1}{\sqrt{N}} \sqrt{\frac{1-P}{P}}$$

Για πεγατο N

$$P \approx P_{true} = \frac{I_{true}}{V} = \frac{\frac{4}{3} \pi h^3}{(2R)^3} = \frac{\frac{4}{3} \pi 3^3}{10^3} \approx 0.11$$

$$N \geq \frac{1-P}{P} \left(\frac{I}{\delta I} \right)^2$$

$$N \geq \frac{1-0.11}{0.11} 10^4 \approx 7.8 \cdot 10^4$$