

Answer #3

The algorithm is not correct.

To see the reason why?

we consider a nail length of 4.

Here, length 1 has price 1.

length 2 has price 15.

length 3 has price 24.

Again, looking at the given scenario,

price	1	15	24
length	1	2	3

- i) The maximum per-inch price is that of length 3 with price being:
- $$\frac{\text{price}}{\text{length}} = \frac{24}{3} = \$8$$

- ii) The given algorithm will cut the piece of length 3, and the remainder will be piece of length 1.

Now, purchase the canal. Then,

$$\begin{aligned} \text{the total price becomes : } & \$24 + \$1 \\ & = \$25 \quad \text{--- (1)} \end{aligned}$$

But now if the rod is cut into two identical pieces, we end up with a different case (The length of the 2 rods will be 2 each).

$$\begin{aligned} & 2L + 2L = 4L \\ \hookrightarrow \text{Therefore the total price is : } & \$15 + \$15 \\ & = \$30 \quad \text{--- (2)} \end{aligned}$$

Hence comparing — (1) and — (2) it is proven that the given strategy doesn't give the optimal cost.

Hence proved