202 (space-free subtext) Given a text, write a program to find the longest subtext that does not include a space character “ ” .

After trying the question, scroll down to the solution.

§ Let the text be T . Let i , j , k , and l be natural variables. We shall maintain $0\le i\le j\le k\le l\le\#T$. Define R , A , and Q as follows.

$$R \;=\; (\, T_{i';..j'} \text{ is a longest space-free subtext of } T\,)$$

$$\begin{aligned} A \;=\; & (\, T_{i;..j} \text{ is a longest space-free subtext of } T_{0;..k}\,) \\ \wedge\; & (k>0 \Rightarrow T_{k-1} = \text{“ ”}) \\ \wedge\; & (\, T_{k;..l} \text{ is space-free}) \end{aligned}$$

$$Q \;=\; (\, T_{i';..j'} \text{ is a longest space-free subtext of } T_{0;..l}\,) \;\wedge\; l'=l$$

Now we refine.

$R \;\Leftarrow\; i{:=}\,0.\;\; j{:=}\,0.\;\; k{:=}\,0.\;\; l{:=}\,0.\;\; A{\Rightarrow}R$

$A{\Rightarrow}R \;\Leftarrow\;$ **if** $l{=}\#T$ **then** $A{\Rightarrow}Q$
else **if** $T_l{=}$“ ” **then** $A{\Rightarrow}Q.\;\; l{:=}\,l{+}1.\;\; k{:=}\,l.\;\; A{\Rightarrow}R$
else $l{:=}\,l{+}1.\;\; A{\Rightarrow}R$ **fi fi**

$A{\Rightarrow}Q \;\Leftarrow\;$ **if** $j{-}i < l{-}k$ **then** $i{:=}\,k.\;\; j{:=}\,l$ **else** *ok* **fi**

The time for R is $\#T$. The time for $A{\Rightarrow}R$ is $\#T{-}l$. The time for $A{\Rightarrow}Q$ is 0 .

Proof: NOT YET WRITTEN