A postscript to EWD755.

While presenting my proof of Theorem 2 in EWD755 I had forgotten my own preaching (in EWD731): with explicitly named predicates a more symmetric presentation is possible. With

C n p = n is the product of a bag of primes containing p
D n p = n is the product of a bag of primes not containing p

we have (as obviously as before) for positive integers p, x, and y :

1) $\neg(\text{prime } p) \vee \neg(p \mid (x \cdot y)) \vee (C\,(x \cdot y)\; p)$
2) $p \mid x \vee p \mid y \vee (D\,(x \cdot y)\; p)$
3) $\neg(C\,(x \cdot y)\; p) \vee \neg(D\,(x \cdot y)\; p) \vee \neg(\text{UPF}(x \cdot y))$

Theorem 2 now follows by the standard inference rule. Note that for 1) and 2) we need Theorem 0. (In EWD755 I failed to mention this.)

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The above I regard as a different (and preferable) presentation of the same proof as in EWD755. The following alternative proof for Theorem 0 from EWD755 I consider (perhaps somewhat arbitrarily) different.

Consider, for $n \geq 1$, the following program

```
if n=1 → bag := ∅ [] n>1 → bag := {n} fi;
do bag contains a composite multiple →
      replace each occurrence of the
      largest composite multiple  c  in bag
      by the multiples  x and y , where
      x·y = c
od
```

The repetition leaves the product of the numbers in bag equal to n. On account of (3') from EWD755 - which is, of course, again needed - the lowest upper bound for composite multiples in bag can be taken as variant function, and termination is guaranteed. This proof is more constructive; Euclid would have liked it (if he did not prove it that way!).

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23 October 1980

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