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Let the original program be P. Modify it—thereby obtaining P'—by replacing all `HALT` states by loops as in part (i).

Now suppose *per impossibile* that we had a procedure that would tell us whether or not a program looped.

First ask: Does P loop?

> If the answer is 'yes', then P does not halt. Exit, co's we've got the answer
>
> If the answer is 'no'...

Ask: Does P' loop?

> If the answer is 'yes' this can only be because P' gets into a new, artificial loop of the kind not experienced by P. (Remember that P doesn't loop, or we wouldn't have got here) But this means that P halts.
>
> If the answer is 'no' then P certainly doesn't halt.