Q3

Supp LI(c) holds before an arbi. iter. and LI(a), LI(b) holds

$c' = c + p'$ [line 7] $j' = j + 1$ [line 7]

c = # of non-empty even parity substrings in $b[0:j]$ by LI(b)
c' is similar

$c' = c + p' \Rightarrow p' = c' - c$

Prove difference in c' and c is # of EP suffixes in $b[0:j']$
$b[0:j'] = b[0:j] \cdot 0$ or $b[0:j] \cdot 1$
Its easy to see that $c' \geq c$ bc. all the s.s. in $b[0:j]$ are in $b[0:j']$
If you disregard all s.s. in $b[0:j]$ that are in $b[0:j']$, all remaining s.s. must be suffixes

Even parity substrings clearly must be substrings

So $c' - c = |\{$even parity substrings in $b[0:j']$ but not $b[0:j]\}|$
$= |\{$even parity suffixes in $b[0:j']\}|$
as wanted

Since $p' = c' - c$, $p' = |\{$even parity suffixes in $b[0:j']\}|$

∴ LI(c) holds ∎