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1)

i-) $S^* = \{\Lambda, ab, bb, abbb, bbab, abab, bbbb, ababab, abbbab, ababbb \ldots\}$

ii-) $T^* = \{\Lambda, ab, bb, bbb, abbb, bbab, abab, bbbb, abbbb, bbbbb, bbbab, bbbbbb \ldots$

iii-) Yes, $bbbbababbb \rightarrow (bb)(bb)(ab)(ab)(bb) \in S^*$

iv-) No, $bbbaab \rightarrow (bbb)a(ab) \notin T^* \sim (bb)ba(ab) \notin T^*$

v-) $bbbbb \in T^*$ but $bbbbb \notin S^*$
$abbbb \in T^*$ but $abbbb \notin S^*$
$bbbab \in T^*$ but $bbbab \notin S^*$
$\Rightarrow S^* \neq T^*$

vi-) $abab \in S^*$ and $abab \in T^*$
$ab \in S^*$ and $ab \in T^*$
$bb \in S^*$ and $bb \in T^*$
$bbb \notin S^*$ but $bbb \in T^*$
$abbbb \notin S^*$ but $abbbb \in T^*$
$\Rightarrow \{ab, bb\} \subset T$, $\{ab, bb\}^* \subset T^*$, $S^* \subset T^*$

2)

i-) Rule-1: $aa \in L\_AA$
Rule-2: If $x \in L\_AA$, then $\{bx, xb, ax, xa\} \in L\_AA$

• baabb → ① By Rule-1, $aa \in L\_AA$
② By Rule-2, if $aa \in L\_AA$ then $baa \in L\_AA$,
(By Rule-2) ③ if $baa \in L\_AA$ then $baab \in L\_AA$ ④ if $baab \in L\_AA$, then $baabb \in L\_AA$

ii-) Rule-1: $\{\Lambda, a\} \in L\_NOTAA$
Rule-2: If $w \in L\_NOTAA$ then $\{bw, wb, abw, wba\} \in L\_NOTAA$

• babab → ① By Rule-1, $a \in L\_NOTAA$ ② By Rule-2, if $a \in L\_NOTAA$ then $ba \in L\_NOTAA$
③ By Rule-2 if $ba \in L\_NOTAA$ then $baba \in L\_NOTAA$
④ By Rule-2, if $baba \in L\_NOTAA$, then $babab \in L\_NOTAA$

3)

i-) $[b+(aaa)]^*$

ii-) $a^*ba^*ba^*(b+\Lambda)a^*$

iii-) $a^*[b(bb)^*aa^*]^*[\Lambda+b(bb)^*]$

iv-) All words with a suffix (a) or a suffix (abbbb). These words can't have any other suffixes.

v-) Words containing at least one (a), and if there is more (a), the total (a) is odd. In any case they contain an odd number of (a)'s.