4. States $\{a, b, c\}$

start state: a

i) Paths :   length $= 0$:   a

length $= 1$: $a \to b$, $b \to c$, $b \to a$

length $= 2$: $a \to b \to a$, $a \to b \to c$

length $= 3$: $a \to b \to a \to b$

length $= 4$: $a \to b \to a \to b \to c$

ii)