1) Given the finite state machine illustrated below, find the output for the input string “abc”

2) Given the finite state automata illustrated below, determine whether the string $abbca$ is accepted or rejected. Show your work.
3) Given the grammar $G = (N, T, P, \sigma)$ with $N = \{A, B\}$, $T = \{a, b, c, d\}$, $\sigma = A$, and $P$ consisting of the productions below, give a derivation to show that $abc \in L(G)$.

$$
A \rightarrow abA \\
A \rightarrow Abc \\
bAb \rightarrow b \\
bA \rightarrow B \\
B \rightarrow aB \\
B \rightarrow bB \\
B \rightarrow c \\
B \rightarrow abc
$$