Problem 1. Give a proof of the proposition $Q \Rightarrow (P \Rightarrow (Q \Rightarrow P))$ in the system $N_m$. 

Problem 2. (1) Give a proof of the proposition $Q \Rightarrow (((P \Rightarrow Q) \Rightarrow P) \Rightarrow P)$ in the system $N_m$. 

(2) Give a proof of the proposition $P \Rightarrow (((P \Rightarrow Q) \Rightarrow P) \Rightarrow P)$ in the system $N_m$. 

What happens if you try to prove $((P \Rightarrow Q) \Rightarrow P) \Rightarrow P$? Keep your answer short!

Problem 3. Prove that if $P \Rightarrow Q$ and $Q \Rightarrow R$ are provable from the set of premises $\Gamma$ in the system $N_m$, then $P \Rightarrow R$ is also provable from $\Gamma$ in $N_m$. 

What this means is that you have to describe a procedure that takes a deduction of $P \Rightarrow Q$ from the set of premises $\Gamma$ and a deduction of $Q \Rightarrow R$ from the set of premises $\Gamma$ and produces a deduction of $P \Rightarrow R$ from the set of premises $\Gamma$.

Problem 4. Give a proof of the proposition $(P \Rightarrow Q) \Rightarrow (((P \Rightarrow (Q \Rightarrow R)) \Rightarrow (P \Rightarrow R))$ in the system $N_m$. 