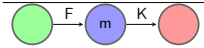
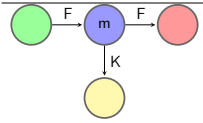
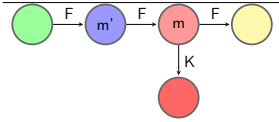
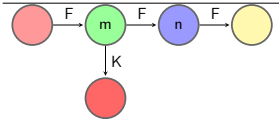
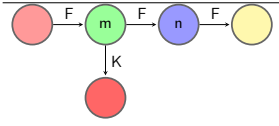
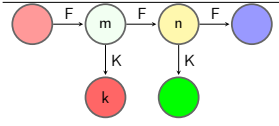
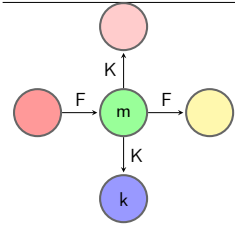
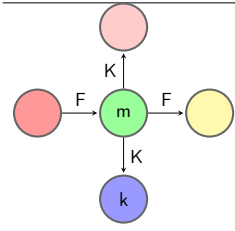
Graph Pattern	Hop Type	Expressions in $\mu - RA$
	One Hop And Branch	$\widetilde{\pi}_m \left(\rho^m_{f_{id}}(F) \bowtie \rho^m_{p_{id}}(K) \right)$
	Two hops and a branch	$\widetilde{\pi}_m \left(\rho^m_{f_{id}}(F) \bowtie \rho^m_{p_{id}}(F) \bowtie \rho^m_{p_{id}}(K) \right)$
	Three Hops And Branch	$\widetilde{\pi}_m \left(\rho^m_{f_{id}} \left(\widetilde{\pi}_m (\rho^m_{f_{id}}(F) \bowtie \rho^m_{p_{id}}(F) \right) \bowtie \rho^m_{p_{id}}(F) \bowtie \rho^m_{p_{id}}(K) \right)$
	Three Hops And Branch	$\widetilde{\pi}_{m,n} \left(\rho^n_{f_{id}} \left(\rho^m_{f_{id}}(F) \bowtie \rho^m_{p_{id}}(F) \right) \bowtie \rho^n_{f_{id}}(F) \bowtie \rho^m_{p_{id}}(K) \right)$
	Three Hops And Branch	$\widetilde{\pi}_{m,n} \left(\rho^m_{f_{id}}(F) \bowtie \rho^{m,n}_{p_{id},f_{id}}(F) \bowtie \rho^n_{p_{id}}(F) \bowtie \rho^m_{p_{id}}(K) \right)$
	Three Hops And Two Branches	$\widetilde{\pi}_{m,n} \left(\rho^m_{f_{id}}(F) \bowtie \rho^m_{p_{id}} \left(\rho^n_{f_{id}}(F) \right) \bowtie \rho^m_{p_{id}} \left(\rho^k_{k_{id}}(K) \right) \bowtie \rho^n_{p_{id}}(F) \bowtie \rho^n_{p_{id}}(K) \right)$

Graph Pattern	Hop Type	Expressions in $\mu - RA$
	Star (Isomorphism based semantics)	$\widetilde{\pi}_m \left(\sigma_{k<>k_{id}} \left(\rho^m_{f_{id}} (F) \bowtie \rho^m_{p_{id}} (F) \bowtie \rho^m_{p_{id}} (K) \bowtie \rho^m_{p_{id}} \left(\rho^k_{k_{id}} (K) \right) \right) \right)$
	Star (Homorphism based semantics)	$\widetilde{\pi}_m \left(\rho^m_{f_{id}} (F) \bowtie \rho^m_{p_{id}} (F) \bowtie \rho^m_{p_{id}} (K) \bowtie \rho^m_{p_{id}} \left(\rho^k_{k_{id}} (K) \right) \right)$