Graph Pattern	Hop Type	Expressions in $\mu - RA$
a F m K c	One Hop And Branch	$\widetilde{\pi}_{m}\left(ho_{f_{sl}}^{m}\left(F ight)\bowtie ho_{\mathcal{P}_{sl}}^{m}\left(K ight)\right)$
a F m F c		
↓K d		
	Two hops and a branch	$\widetilde{\pi}_{m}\left(ho_{f_{id}}^{m}(F)\bowtie ho_{p_{id}}^{m}(F)\bowtie ho_{p_{id}}^{m}(K)\right)$
a F b F m F d		
e	Three Hops And Branch	$\widetilde{\pi}_{m}\left(\rho_{f_{sd}}^{m}\left(\widetilde{\pi}_{m}(\rho_{f_{sd}}^{m}\left(F\right)\bowtie\rho_{\rho_{sd}}^{m}\left(F\right)\right)\bowtie\rho_{\rho_{sd}}^{m}\left(F\right)\bowtie\rho_{\rho_{sd}}^{m}\left(K\right)\right)$
a F m F d		
e	Three Hops And Branch	$\widetilde{\pi}_{m,n}\left(\rho_{f_{dd}}^{n}\left(\rho_{f_{dd}}^{m}\left(F\right)\bowtie\rho_{p_{dd}}^{m}\left(F\right)\right)\bowtie\rho_{f_{d}}^{n}\left(F\right)\bowtie\rho_{p_{dd}}^{m}\left(K\right)\right)$
a F m F d		
K		
е	Three Hops And Branch	$\widetilde{\pi}_{m,n}\left(\rho_{f_{id}}^{m}\left(F\right)\bowtie\rho_{p_{id},f_{id}}^{m,n}\left(F\right)\bowtie\rho_{p_{id}}^{n}\left(F\right)\bowtie\rho_{p_{id}}^{m}\left(K\right)\right)$
$a \xrightarrow{F} m \xrightarrow{F} d$		
↓κ ↓κ		
e f	Three Hops And Two Branches	$\widetilde{\pi}_{m,n}\left(\rho_{f_{id}}^{m}\left(F\right)\bowtie\rho_{p_{id}}^{m}\left(\rho_{f_{id}}^{n}\left(F\right)\right)\bowtie\rho_{p_{id}}^{m}\left(\rho_{k_{id}}^{k}\left(K\right)\right)\bowtie\rho_{p_{id}}^{n}\left(F\right)\bowtie\rho_{p_{id}}^{n}\left(F\right)$

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Graph Pattern	Hop Type	Expressions in $\mu-RA$
e K↑		
$a \xrightarrow{F} m \xrightarrow{F} c$		
k		
	Star (Isomorphism based semantics)	$\widetilde{\pi}_{m}\left(\sigma_{k <> k_{id}}\left(\rho_{f_{id}}^{m}(F) \bowtie \rho_{p_{id}}^{m}(F) \bowtie \rho_{p_{id}}^{m}(K) \bowtie \rho_{p_{id}}^{m}\left(\rho_{k_{id}}^{k}(K)\right)\right)\right)$
е к↑		
a F m F c		
K		
k	Star (Homorphism based semantics)	$\widetilde{\pi}_{m}\left(\rho_{f_{id}}^{m}\left(F\right)\bowtie\rho_{p_{id}}^{m}\left(F\right)\bowtie\rho_{p_{id}}^{m}\left(K\right)\bowtie\rho_{p_{id}}^{m}\left(\rho_{k_{id}}^{k}\left(K\right)\right)\right)$