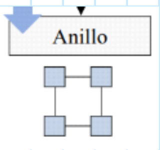
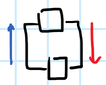
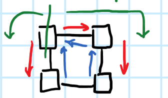
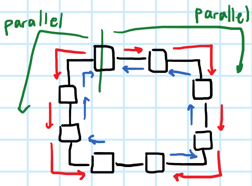
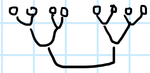
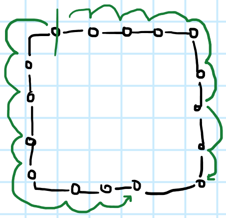
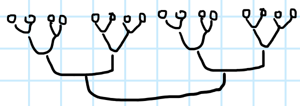
Sunday, March 20, 2022 8:12 PM

(b) Conmuted - Direct - Ring

Solution



	Case		Data / Diagram	time	Tree (sums)
(serial)	$kp=0$	$2^{kp}=2^0=1$	P_1	$t=\emptyset$	$\emptyset$] O
(parallel)	$kp=1$	$2^{kp}=2^1=2$		$t=6=1(2)(3) + \emptyset(2)(3)$; $\frac{np}{2}-1$	1] 
	$kp=2$	$2^{kp}=2^2=4$	parallel 	$t=1(2)(3)+1(2)(3)$ $=12$; $\frac{np}{2}-1$	2] 
	$kp=3$	$2^{kp}=2^3=8$	parallel, parallel 	$t=1(2)(3)+3(2)(3)$ $=24$; $\frac{np}{2}-1$	3] 
	$kp=4$	$2^{kp}=2^4=16$		$t=1(2)(3)+7(2)(3)$; $\frac{np}{2}-1$	4] 

Thus, in a general way, we see that

$$t_c = (2)(3) + \left[\frac{np}{2}-1\right](2)(3)$$

$$t_c = 6 + \left[\frac{np}{2}-1\right]6$$

$$t_c = 6 + \frac{6np}{2} - 6$$

$$t_c(np,n) = \boxed{t_c = 3np}$$

for communication time complexity in a commuted - direct - ring network.