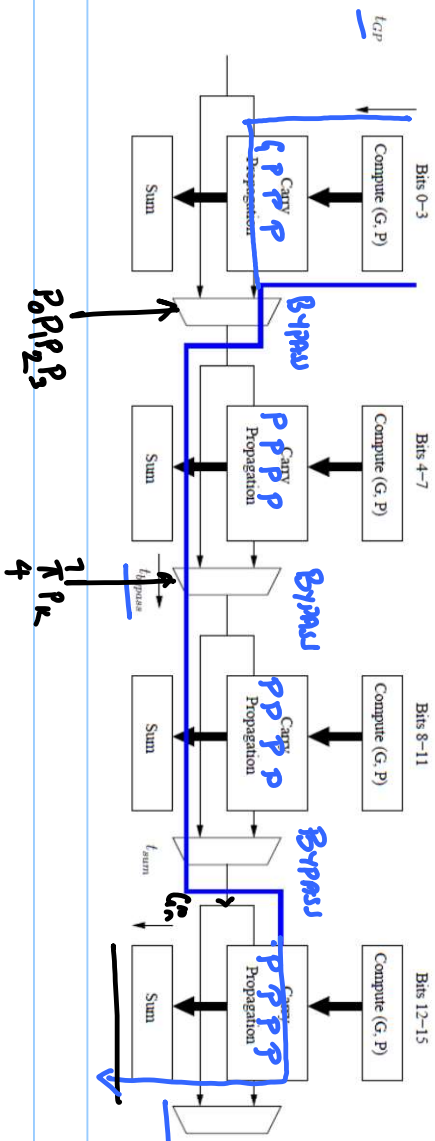


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Module-6- Adders

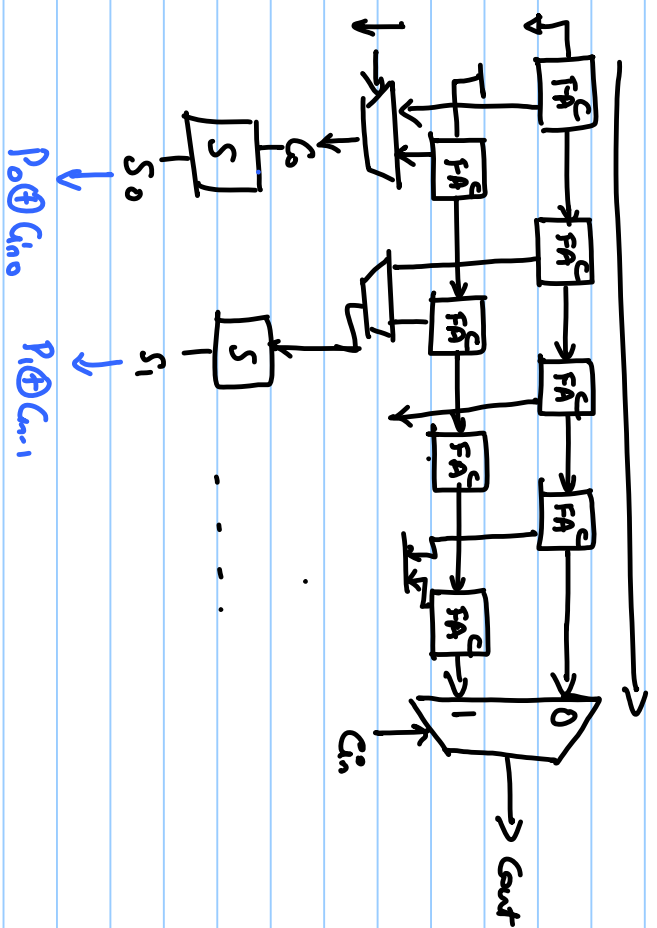
CARRY SKIP ADDER

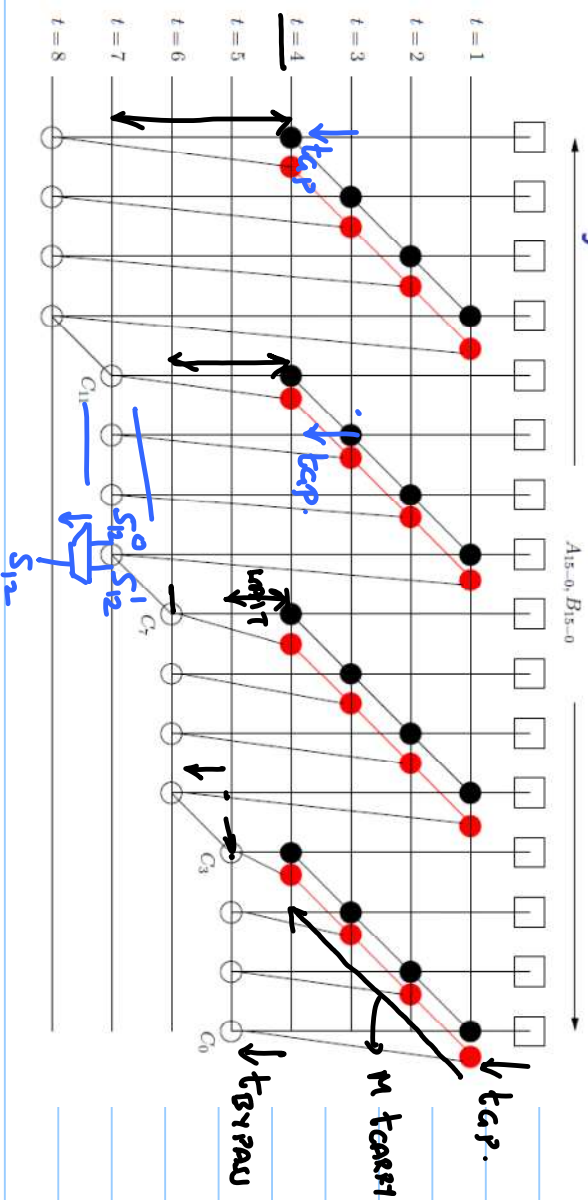
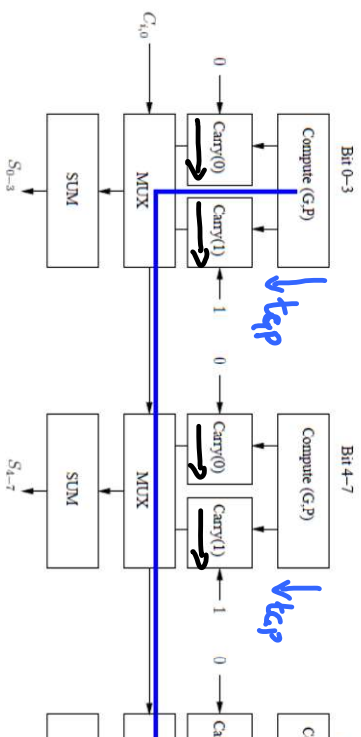


$$t_{ripple} = t_{sum} + (N-1) t_{carry}$$

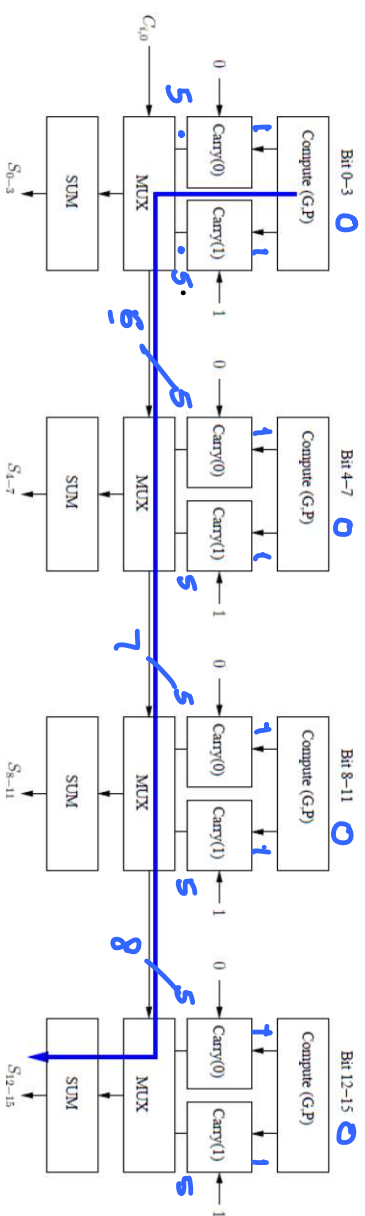
$$t_{CARRY-SKIP} = t_{GP} + N t_{CARRY} + \left(\frac{N-1}{n}\right) t_{bypass} + (N-1) t_{CARRY} + t_{sum}$$

LINEAR CARRY SELECT ADDER





$$\begin{aligned}
 t_{\text{carry-sum}} &= t_{cp} + M t_{\text{carry}} + \left(\frac{N}{M} - 1 \right) t_{\text{bypass-cy}} + t_{\text{mux-sum}} \\
 &= t_{cp} + M t_{\text{carry}} + \frac{N}{M} t_{\text{bypass}} + \underline{t_{\text{sum}}}
 \end{aligned}$$



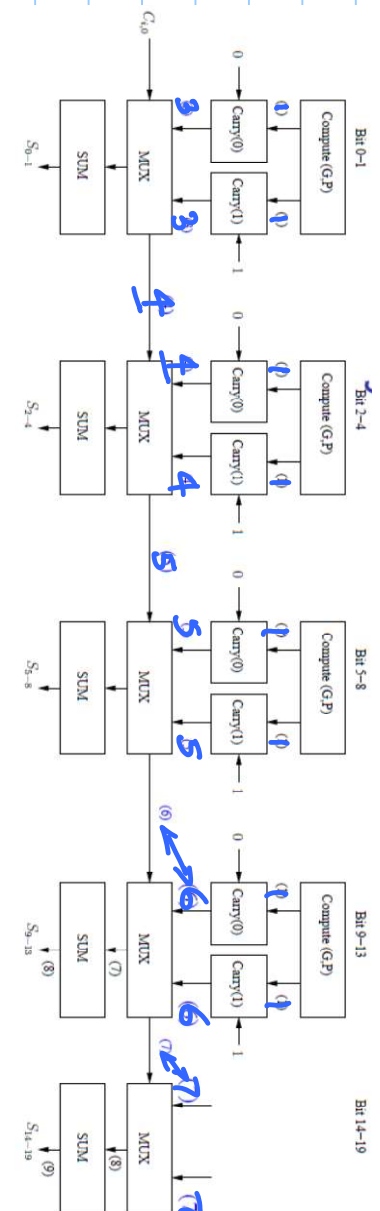
tap = 1

tsum = 1

tcarry = 1

t mux = t bypass = 1

CARRY SAVING R_{RED} ~ SELECT ADDER



\uparrow
 M -BITS
 $M+1$
 $(M+2)$

$$\begin{aligned}
 N &= M + (M+1) + (M+2) + \dots + (M+P-1) \\
 &= M(P) + \frac{P(P-1)}{2} = (P)(M + \frac{P-1}{2}) \\
 \Rightarrow N &\sim \frac{P^2}{2} \Rightarrow P = \sqrt{2N}
 \end{aligned}$$

$$\begin{aligned}
 t_{\text{SAVING}} &= t_{\text{CP}} + M t_{\text{CARRY}} \\
 &+ P t_{\text{GPMUS}} + t_{\text{SUM}} \\
 &\sim \sqrt{2N}
 \end{aligned}$$

