Note Title 29-08-2012

Aug 29

$$Perf = \frac{Programs}{seconds}$$

$$= \frac{Programs}{\# insts} \times \frac{\# insts}{\# cycles} \times \frac{\# cycles}{\# seconds}$$

$$= \frac{IPC \times (f)}{\# insts}$$ {Perf. Equation}

$f \to$ frequency

$f \uparrow$ — signal integrity

— $P \propto V^2 f$ $(V \propto f)$

$\Rightarrow P \propto f^3$ [physics]

IPC — Instructions per cycle

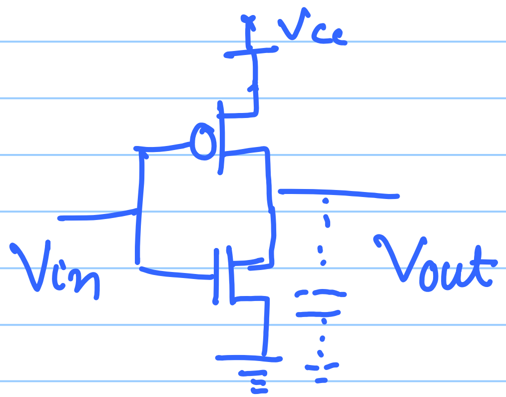
$1/IPC = CPI$ — Cycles per inst.
(architecture)

\# insts — compiler

50%　　　　50%

CPI → 2　　　　CPI - 3

Power



$$P = CV^2 f$$

Amdahl's Law.

$$\text{Speedup} = \frac{1}{1 - p + \frac{p}{enh}}$$

$p \rightarrow$ fraction of the program sped up.

$enh \rightarrow$ enhancement

Parallel Programs:

```
main() {
  parallel { for ( int i = 0 ; i < 10 ; i++ )
                  A[i] = i ;
  sequential { a = 10 + c ;
}
```

$p = 0.9$

$$Speedup = \frac{1}{(1 - 0.9) + \frac{0.9}{10}}$$

$$Speedup = \frac{1}{1 - p + p/n}$$

$n \to \infty \qquad speedup = \dfrac{1}{1-p}$