



Fundamentals

Student Solutions

Exercises Computer Architecture

1 | Chip & Die Fabrication

1.1 Fabrication

- a) 71.8%
- b) 235.5 dies
- c) 169.1 good_dies
- d) 1.18 CHF

fun/fabrication-01

1.2 Fabrication

- a) $120 \frac{\text{wafers}}{\text{ingot}}$
- b) 250CHF
- c) 0.796CHF
- d) 209.3 dies
- e) 158.23 dies
- f) 2.05CHF

fun/fabrication-02

1.3 Fabrication

- a) 200CHF
- b) $\approx 600 \frac{\text{dies}}{\text{wafer}}$
- c) $1.06 \frac{\text{CHF}}{\text{die}}$

fun/fabrication-03



2 | Moore's Law & Dennard scaling

2.1 Dennard Scaling

- a) $1.414 = \sqrt{2}$
- b) 406pm equals to 16601 times smaller

fun/dennardscaling-01

2.2 Dynamic power consumption of a CMOS circuit is:

Two statements are true, one is false.

fun/dennardscaling-02

3 | Power Consumption

3.1 Cell phone battery life

- a) 112.6h
- b) 9.19h

fun/powerconsumption-01