Date: September 10, 2011 12:37 PM
Topic: cis501 hw1: paper review

"Cramming More Components onto Integrated Circuits" by Moore, 1965

Questions and Answers

1.The figure on page 2 graphs relative manufacturing cost per component against the number of components per integrated circuit. Why do the chips becomes less cost effective per component for both very large and very small numbers of components per chip?

Answer: For very small numbers of components per chip, the cost-effect of each component will increase as the number of components goes up, and it is quite nature, since more products you produce, less cost you will have for each one.

But after passing a threshold, the technique cannot handle the large amount of components added in one chip, then the cost for one chip will sharply increase, and the yields of chips will decrease due to the high failure rate. Therefore, the cost effect of high complexity chips will decrease as well.

2. One of the potential problems which Moore raises (and dismisses) is heat. Do you agree with Moore's conclusion? Either justify or refute Moore's conclusions.

Answer: No, I do not agree. Moore declares that heat would not be a problem, because the two-dimension structure would facilitate heat dissipation, and limited wafer area would confine the amount of heat as well.

However, according to current situation of CPU, heat is the most significant problem. As more and more transistors are added in a chip, a quite small area, heat cumulatively produced by those transistors becomes quite a lot, and the temperature in the core of a CPU even reaches to 100 centigrade. Obviously, heat is a big problem and becomes a power wall problem.

3. A popular misconception of Moore's law is that it states that the speed of computers increases exponentially, however, that is not what Moore foretells in this paper. Explain what Moore's law actually says based on this paper.

Answer: In the paper, "the complexity for minimum component costs has increased at a rate of roughly a factor of two per year" tells us that actually Moore foretells the number of transistors in a chip will double roughly every year.