California Institute of Technology
Department of Computer Science
Computer Architecture

CS184a, Winter 2003 Background Questionnaire Monday, January 6

Please answer the following questions and return before leaving class today. This will **not** be used to affect your grade or enrollment in this class. I will use it to understand what students already know and how much variance there is among your backgrounds so I can better plan the course.

1. Name:
2. Email address:
3. Year: Soph Junior Senior G__ (circle one)
4. Course: EE ECE EAS EAS/CS CS(grad) other: (circle one)
5. What related courses have you taken? (if you've taken a non-caltech equivalent, please list what and where)
   - EE4 (digital logic)
   - EE5x (microprocessor/logic project lab)
   - EE105 (application-specific Computers)
   - CS20 (intro computer science)
   - CS181 (VLSI)
   - CS134b (compiler)
6. Other courses you are taking this semester (best estimate, fine):
7. Reduce the following to Minimum Sum-of-Products form:

   $(a+b)\cdot\left(\overline{b}+\overline{c}\right)$

8. How does the area of addition scale with n, the number of inputs to each of the operands? (delay?)

   Area

   Delay

9. How does the area of an **arbitrary** n-input function scale with n? (delay? – explain your assumptions)

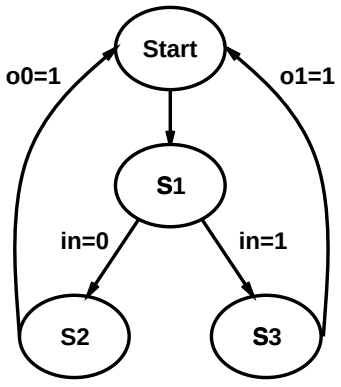
Area	
Delay	

10. Express the following in Two's compliment (8b words):

	← MSB							
decimal 10								
0								
decimal -1								
hexadecimal 23								
decimal -2								

11. Draw an ADDER bit-slice using only two-input NAND gates.

12. Write or draw logic to implement the following finite-state machine (one transition per clock, `in` is input, `o0`, `o1` outputs):



13. Describe a function which cannot be implemented in purely digital logic: