

***KING FAHD UNIVERSITY OF PETROLEUM & MINERALS***

***COMPUTER ENGINEERING DEPARTMENT***

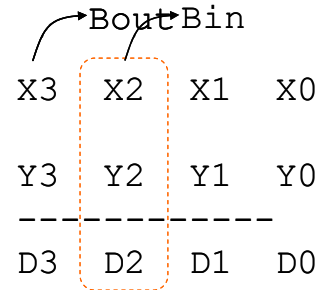
**COE-200 – Fundamentals of Computer Engineering**

**Jan 4<sup>th</sup>, 2009 – Quiz5 (Section 02)**

**Student Name:**

**Student Number:**

We would like to design a 1-bit full subtractor – This is a circuit that subtracts  $Y$  and any possible borrow,  $bin$ , from the bit  $X$ . In other words,  $D = X - Bin - Y$ . Note, the operation may generate a borrow,  $Bout$ , to be taken into account in the next stage. Refer to the figure on the side.



- 1) (10 points) Write the true table for the functions  $D$  and  $Bout$ .
- 2) (10 points) Implement the functions  $D$  and  $Bout$  using a 3-to-8 decoder
- 3) (10 points) Implement the function  $D$  using a  $2^2$ -to-1 MUX.
- 4) (10 points) Implement the function  $Bout$  using a  $2^1$ -to-1 MUX.