King Fahd University of Petroleum and Minerals
College of Computer Sciences and Engineering
Department of Computer Engineering

COE 341 – Data & Computer Communications (T111)

Homework # 03 (*due date: Sunday 04/12/2011 during class period*)

*** Show all your work. No credit will be given if work is not shown! ***

(100 points) Using the generator polynomial (x^4 + x^2 + 1), generate the CRC code for the data bit sequence `010011001` (leftmost bit is the most significant):

1. **(20 points)** Show the shift register circuit.
2. **(20 points)** Use the *shift register circuit* method to compute the CRC.
3. **(20 points)** Use the *modulo-2 arithmetic* method to compute the CRC.
4. **(20 points)** Use the *polynomial* method to compute the CRC.
5. **(20 points)** Assume that the 3rd and the 5th most significant bit of the received frame are flipped (i.e. frame received = `011001001` + CRC). Show that this error is detectable using the *polynomial* method. What is the remainder value?