

DEPARTMENT OF COMPUTER SCIENCE

COMPSCI 314 S1 C 2006

Assignment 2, due Wednesday, 5 April 2006

Marks may be lost for poor presentation, or for answers without adequate explanation (a reader should not have to guess where some number or formula comes from).

Question 1.

This question assumes the Cyclic Redundancy Check generator polynomial x^4+x+1 .

NOTE – *It is essential that your answer have a “standard” layout, with columns properly aligned etc. Use a fixed-width font for the division details, or put them in a table or spreadsheet, etc. Marks may be lost for poor presentation*

- i. Show that the codeword from checksumming the information word 0010 0011 0110 is 0010001101101000. [5 marks]
- ii. Check the validity of the received codeword 11100111000010101001. [3 marks]
- iii. Check the validity of the received codeword 11100110100010101001. [2 marks]
- iv. Check the validity of the received codeword 11100111000010111010. [2 marks]
- v. You expect that each of the previous 3 codewords came from the same original information word. Comment on the three results, stating if possible the original information word. [bonus 3 marks]

Question 2.

An SDLC/HDLC protocol is being used to send information via a geosynchronous satellite, with the parameters –

- | | |
|---------------------------------|-------------------------------------|
| • satellite altitude | 35,786 km (assume 36,000km) |
| • data rate | 50 kbit/s |
| • information part of the frame | 128 octets |
| • Frame Check Sequence | 16 bits |
| • velocity of radio waves | 300,000 km/s (3×10^8 m/s) |

Assume no overheads apart from the message encapsulation and end-to-end transmission delay.

Calculate the maximum data throughput (as seen by a user) for –

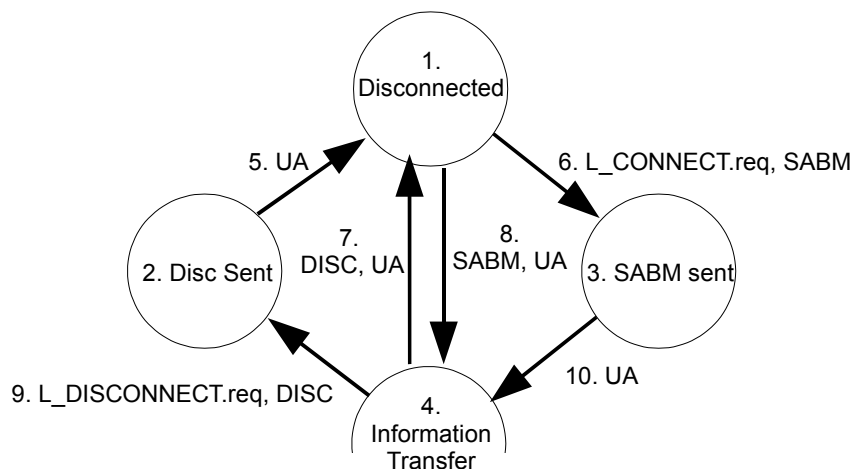
- i. 8 bit address & control [5 marks]
- ii. 16 bit address & control [5 marks]

Question 3.

The diagram shows part of the State Transition Diagram for HDLC, operating in Asynchronous Balanced Mode (ABM). The diagram is copied as part of Fig 1.37 (b) on page 82; if it differs from the original the textbook is definitive.

(You should not need to worry about the fine details of the HDLC protocol; the textbook description of state machines should be adequate, together with your general knowledge of data communications protocols.)

- i. What is the general purpose of this part of the diagram? [2 marks]
- i. Briefly describe each of the 10 numbered states, actions, etc, giving for each as appropriate –
 - the purpose of the state (or action etc),
 - whether it applies to primary (initiating station), secondary (responding station) or both
 - the reason for a transition etc,
 - the action taken by a transition,
 - the state resulting from a transition
 - anything else that seems relevant.[5 marks]



Some important abbreviations are –

- | | | |
|--------|--------------------------------|-----------------------|
| • UA | Unnumbered acknowledgement | Acknowledge a command |
| • SABM | Set Asynchronous Balanced Mode | Connection request |
| • DISC | Disconnect | Disconnection request |