

Q: Algorithm ([Answered](#) ★★★★★, 0 Comments)

Question

Subject: **Algorithm**

Category: [Computers > Algorithms](#)

Asked by: **cool2-ga**

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A data source produces 7-bit IRA characters. Derive an expression of the max effective data rate ove a B-bps line for the following:

- e. Asynchronous transmission, with a 1.5-unit stop element and a parity bit.
- f. Synchronous transmission, with a frame consisting 48 control bits and 128 information bits. The information field contains 8-bit (parity included) characters.
- g. Same as b), except that the information fiels is 1024 bits.

For each case, compute the fraction g of transmitted bits that are data bits. Then the maximum effective data rate R is: $R=gB$, where B is the data rate on the line.

Answer

Subject: **Re: Algorithm**

Answered By: [livioflores-ga](#) on 08 Jul 2004 08:10 PDT

Rated: ★★★★★

Hi cool2!!

Thank you for asking to Google Answers.

This is the solution that I found:

First of all remember the following:

·In asynchronous transmission, 1 start bit (0) was sent at the beginning and 1 or more stop bits (1s) was sent at the end of each byte. There may be a gap between each byte.

·In synchronous transmission, bits was sent one after another without start/stop bits or gaps. It is the responsibility of the receiver to group the bits.

· Asynchronous transmission, with a 1.5-unit stop element and a parity bit.

There are 7 data bits, 1 start bit, 1.5 stop bits, and 1 parity bit, then:

$$\begin{aligned} g &= 7 / (1 + 7 + 1 + 1.5) = \\ &= 7 / 10.5 = \\ &= 0.666 \end{aligned}$$

$$R = 0.666B$$

· Synchronous transmission, with a frame consisting 48 control bits and 128 information bits. The information field contains 8-bit (parity included) characters.

Each frame contains 48 control bits + 128 information bits, so each frame will have a total of:

$$48 + 128 = 176 \text{ bits}$$

The number of characters is $128/8 = 16$, then the number of data bits will be:

$$16 * 7 = 112$$

then:

$$g = 112/176 = 0.636$$

then:

$$R = gB = 0.636B$$

· Synchronous transmission, with a frame consisting of 48 control bits and 1024 information bits. The information field contains 8-bit (parity included) IRA characters.

$$\text{Total bits} = 48 + 1024 = 1072 \text{ bits}$$

$$\text{Number of characters} = 1024/8 = 128$$

$$\text{Number of data bits} = 128 * 7 = 896$$

$$g = 896/1072 = 0.836$$

$$R = gB = 0.836B$$

For additional reference see the following document (look for "Physical Interface" section at page 6):
<http://www.cs.ust.hk/faculty/hamdi/Class/Training-M-Sol.ps>

To see this document you need a PostScript viewer:
GSview 4.6:
Read carefully the instructions, note that GSview requires Ghostscript. You must download Ghostscript separately, there is a link in the page.
<http://www.cs.wisc.edu/~ghost/gsview/get46.htm>

If you don't want to install this software, just go after the following link and look for the highlighted text " maximum effective data rate":
<http://66.102.9.104/search?q=cache:WbIGtxqNadQJ:www.cs.ust.hk/faculty/hamdi/Class/Training-M-Sol.ps+%22maximum+effective+data+rate+%22+b-tps&hl=es>

I hope that this helps you. Please request for any clarification needed before rate this answer, I will gladly respond your requests.

Best Regards.
liviolflores-ga
cool2-ga rated this answer:★★★★☆

Comments

There are no comments at this time.

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