

Complete the following computations. Show your work.

- 1) You want to download a video that is 15GB over an Internet connection that is 150 Mbps. The link you are downloading over is 300 km and is fiber. Data travels 2×10^8 m/s in fiber. Compute the total latency.
- 2) Using the same link as #1 calculate the RTT. Show your answer in milliseconds.
- 3) Consider a 400 Mbps link between the International Space Station and Lunar Colony Alpha. The distance between the Earth and the moon is approximately 385,000 km. Data travels 3×10^8 m/s in a vacuum. Calculate the Delay \times Bandwidth product for the link.
- 4) Using the same link as #3 calculate how long it will take to upload a new 16MB firmware file to the colony's environmental control computer (i.e. total latency).
- 5) Using the same link as #3 calculate the throughput of the link when you upload a 100MB file to the colony.

Due date: Monday 26th at the start of class.

How to submit: Prepare your submission as described below in the "Simple Guidelines for written assignments". Submit a printed copy at the start of class.

Simple guidelines for written assignments:

Documents may be prepared with your your favorite text editing tool (L^AT_EX, LibreOffice, MS-Word) or hand written NEATLY. Documents prepared with L^AT_EX are preferred.

For typed documents you must use a 12 point size of a standard font (Modern, Times, Courier). Your margins (top, bottom, left, and right) should not be larger than 1 inch. Please use single line spacing.

Clearly number/label all responses. You may use both sides of the paper. If your document is more than one page, staple your sheets together in the correct order. Documents must include the following information on the top of the first page: your name, CS 440, due date, and the assignment number.

When an electronic submission is required, acceptable digital formats for submission are PDF, DOC, DOCX, and ODT. The preferred digital format is PDF.

If you need help with the content of your document, you may drop by during office hours or email. If you need help with style or grammatical issues, please visit the University Writing Center (www.una.edu/writingcenter/).