1. Linux compression commands:

Here is the compression commands demoed in the class. Please find a linux terminal to practice the commands using different files.

Following links are recommended: <https://explainshell.com/> and https://tldr.sh/

* 7za a tensorflow-master: This command compresses the "tensorflow-master" directory or file into a 7z archive using the 7-Zip compression algorithm.
* tar -zcf tensor.tar.gz tensorflow-master: This command creates a gzip-compressed tarball named "tensor.tar.gz" from the "tensorflow-master" directory or file. The **-z** flag indicates gzip compression.
* tar -jcf tensor.tar.bz2 tensorflow-master: This command creates a bzip2-compressed tarball named "tensor.tar.bz2" from the "tensorflow-master" directory or file. The **-j** flag indicates bzip2 compression.
* tar -Zcf tensor.tar.Z tensorflow-master: This command creates a compress-compressed tarball named "tensor.tar.Z" from the "tensorflow-master" directory or file. The **-Z** flag indicates compress compression.
* 7za x tensorflow-master.7z: This command extracts the contents of the "tensorflow-master.7z" archive using the 7-Zip utility.
* tar -Zxf tensor.tar.Z: This command extracts the contents of the "tensor.tar.Z" archive using the **uncompress** utility.
* tar -jxf tensor.tar.bz2: This command extracts the contents of the "tensor.tar.bz2" archive using the **bzip2** utility.
* tar -zxf tensor.tar.gz: This command extracts the contents of the "tensor.tar.gz" archive using the **gzip** utility.

1. One method of reducing bandwidth use is to compress the data being transmitted. Let A = {a/20, b/15, c/5, d/15, e/45} be the alphabet and its frequency distribution. Compute the optimal coding for each character. What is the average number of bits/symbol of the codes?

* a: 00
* b: 010
* c: 0111
* d: 0110
* e: 1

Average number of bits/symbol = (20 \* 2 + 15 \* 3 + 5 \* 4 + 15 \* 4 + 45 \* 1) / (20 + 15 + 5 + 15 + 45)

1. Please describe the information exchanges and the actions taken for both server and client according to the diagram for delta compression.

Chart

Description automatically generated with medium confidence

1. One method of reducing bandwidth use is to compress the data being transmitted. Use the LZW algorithm to compress the string: BABAABAAA. Note that Uppercase A has ASCII value 65 in decimal. Draw diagrams to aid your explanation if appropriate.

The LZW (Lempel-Ziv-Welch) algorithm is a dictionary-based compression algorithm. Here's how the LZW algorithm compresses the string "BABAABAAA":

1. Initialize the dictionary with single-character entries: {'B': 66, 'A': 65}.
2. Start reading the input string from left to right.
3. Initialize an empty string as the current symbol.
4. Read the first character 'B' from the input string.
5. Add 'B' to the current symbol: current symbol = 'B'.
6. Check if the current symbol exists in the dictionary:
   * If it exists, continue reading