

Tape ARchive, or tar, is a file format and a utility used to store and manipulate collections of files. The original intention behind the tar archive was to aggregate the contents of many files to improve the read/write performance of tape drives. These days we use it to create archives to store and transmit multiple files as a single file. Let's write a simplified version of tar. Note that you are NOT reimplementing tar. Let's call this tar-like utility **sludge**.

You may NOT simply wrap the functionality of another archiving tool, but must instead implement it from scratch and in C. You are allowed to use any standard libraries. **sludge** should be able to recognize command-line options for creating a new archive with a specified name and a list of files, adding to an existing archive with a specified name and a list of files, listing the contents of an existing archive, and extracting some or all of the files from an existing archive.

We should be able to interact with **sludge** as follows:

List the contents of the archive_name.sludge:

```
./sludge -l archive_name.sludge
```

Add files file.4 and file.5 to archive_name.sludge (if archive_name.sludge doesn't exist, it is created):

```
./sludge -a archive_name.sludge file.4 file.5
```

Extract all files from archive_name.sludge:

```
./sludge -e archive_name.sludge
```

Extract only file.2 and file.5 from archive_name.sludge:

```
./sludge -e archive_name.sludge file.2 file.5
```

Let's say we have a single file that is 20 bytes long and we want to archive it and the archive doesn't yet exist, we'd do something like:

```
./sludge -a archive_name.sludge file.1
```

File archive_name.sludge should be created and have the following structure:

```
+-----+
| name: "file.1"      |
| size: 20            |
+-----+
| <file.1 data>      |
|                    |
+-----+
```

So now, if we add a second (200 byte) file to the archive with:

```
./sludge -a archive_name.sludge file.2
```

the resulting archive should look like:

```
+-----+
| name: "file.1"      |
|                    |
| size: 20            |
+-----+
```

+-----+
<file.1 data>
+-----+
name: "file.2"
size: 200
+-----+
<file.2 data>
+-----+