Portable Elvish Zip

The portable elvish zip format (abbreviated PEZ) is a polyglot format, and it is simultaneously:

- a ZIP file
- a PDF file
- an ELF binary.

This README is also a PEZ file. It is a statically linked ELF binary that can be used to create PEZ files on Linux systems. Usage:

```
chmod +x README.pdf
```

```
./README.pdf <executable file> <pdf file> [zip file] [other flags] -o <output_path>
```

The created file will look exactly the same as the input PDF file if viewed with a PDF viewer. It will work as if it was the input binary file when executed. The resulting ZIP file contains both the original executable file and PDF file unchanged. This is done with minimal duplication of the contents and the file size will be almost equal to the file sizes of the pdf and the executable file added together. The ZIP file if given as an input will be concatenated with the other ZIP file contents.

How?

The file is layed out in the following order

- ELF header – this is a modified version of the original, with the offsets to the program header and section header modified
- A local file header (ZIP file entry) for the PDF file
- The original PDF file in its entirety
- A newly created program header
    - → A new load segment is created so this new program header is also loaded when the program is started
    - → All offsets related to the ELF file are shifted forward appropriately
- A newly created section header
    - → All offsets related to the ELF file are shifted forward appropriately
- A local file header for the ELF file
- The original ELF file in its entirety
    - → This still contains the old elf header, section header and program header, but they are unused
- Rest of the ZIP file stuff

- A copy from the end of the PDF file is attached as a ZIP file comment and is located at the end of the file

Why is it a PDF file?

It contains the %PDF1.7 header at the start-ish of the file and the pointer to the xref table at the very end of the file. This seems to be enough for most PDF viewers to consider it a valid PDF file.

Why is a ZIP file?

ZIP files are parsed by starting from the back of the file looking for the magic bytes that occur at the start of an End of Central Directory header. This is then used to figure out where the rest of the file contents are.

Why is it an ELF file?

It has an ELF header at the start of the file and the program headers and section headers are modified to account for shifting the contents forwards in the file. At the moment there's no support for dynamically linked executables as those are a bit more complex than statically linked ones and would require more fixing to make work.

The PEZ compiler also supports the --shell option, which works with all types of executables. However this version of the format is less fancy, since it inserts a simple shell script at the start of the file which extracts the binary into a file and runs it.