CS270 - System Software
Lab Assignment #5
Spring 2021

The purpose of this assignment is to give you practice using some of the UNIX system calls to build a new utility program.

You are to write a C/C++ program, using the raw UNIx file I/O system calls, that implements a "file classifier" - that is, a program that accepts a file name on the command line and tries to guess the type of the file. The possibilities are:

- A postscript file. A postscript file is an ASCII file whose first line contains the characters "%!PS-Adobe"

- A pdf file. The first line in a pdf file consists of the string "%PDF-1.x" where the 'x' is an ASCII numeric digit.

- A "DOS" file - an ASCII file, but every *newline* character (i.e., ASCII *linefeed*) is preceeded by a *carriage return* character.

- A "regular" ASCII file (for example, a C source file). The file contains only legal ASCII characters, values less than 128, that isn't one of the types above.

- An ELF file (for example, a.out). ELF files are binary files - they contain bytes with values greater than 127. The first byte contains the value 127, followed by the ASCII characters 'E', 'L', 'F'. If the file is an ELF fille, then your program should futher indicate if the file is a relocatable object file or an executable file. (Hint: Detailed information about the ELF header in an ELF file is available on the class website.)

- An otherwise unidentifiable "binary" file.

If there is some problem with opening the file (for example, if the file doesn't exist or is unreadable) a message to that effect should be displayed, and your program should return a -1 back to the shell.

For example, here is some output that your program (named `classify` in these examples) might produce:

```
$ classify exampl.txt
    exampl.txt is a regular ASCII file
$ classify exampl.ps
    exampl.ps is a postscript file
$ classify dosexampl.txt
    dosexampl.txt is a DOS ASCII file
$ classify a.out
    a.out is an ELF executable file
```

```
$ classify main.o
    main.o is an ELF relocatable file
$ classify binfile.bin
    binfile.bin is a binary file
```