COMP 3980

Assignment 1
Testing

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[COMP 3980](#)

Tests

Test List

1.

Te	Description	Result	Status
1	No arguments	Printed incorrect message	Partially Passed
2	Nonexistent file	Handled correctly	Passed
3	Directory instead of file	Detected non-regular file	Passed
4	File too small	Reported invalid ELF	Passed
5	Non-ELF file	Detected wrong magic	Passed
6	Valid ELF executable	Worked partially (macOS)	Partially Passed
7	Valid ELF shared library	Printed correct header	Passed

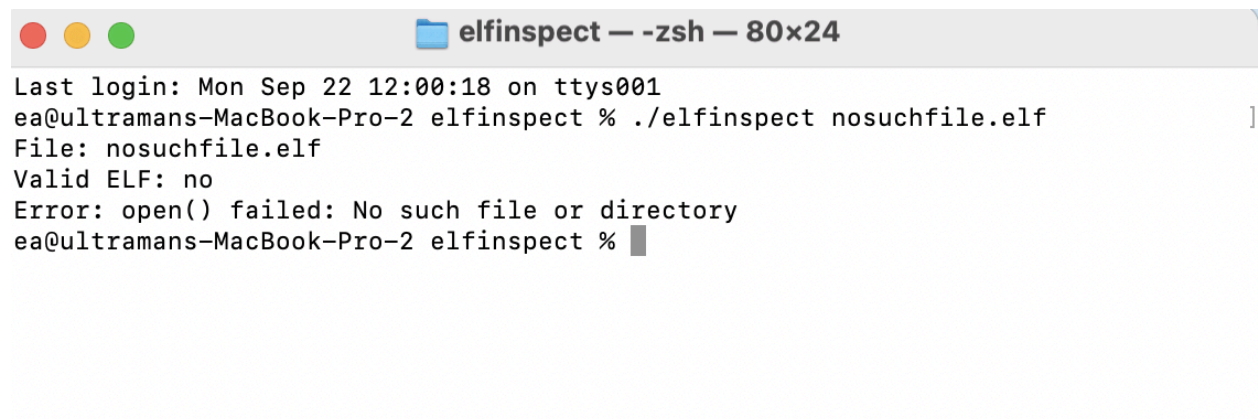| 8	Truncated ELF file	Detected correctly	Passed
9	Another truncated ELF	Detected correctly	Passed
10	Valid ELF executable (retest)	Printed header correctly	Passed
11	Big-endian header	Detected properly	Passed
12	Small ELF32 header	Recognized correctly	Passed
13	Minimal valid ELF64 header	Recognized correctly	Passed
14	EI_CLASS validation	Verified successfully	Passed
15	Wrong_small_32 file	Rejected invalid header	Passed
16	32-bit ELF detection	Detected correctly	Passed
17	Invalid endianness byte	Handled correctly	Passed
18	Wrong big-endian data	Detected properly	Passed
19	Wrong magic	Rejected correctly	Passed

Test 1

Couldn't fix the problem of printing error message

```
Last login: Mon Sep 22 11:46:31 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect
Usage: ./elfinspect <filename>
ea@ultramans-MacBook-Pro-2 elfinspect % ▊
```

🗂 elfinspect — -zsh — 80×24

Test 2

Nonexistent file

```
Last login: Mon Sep 22 12:00:18 on ttys001
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect nosuchfile.elf
File: nosuchfile.elf
Valid ELF: no
Error: open() failed: No such file or directory
ea@ultramans-MacBook-Pro-2 elfinspect % ▊
```
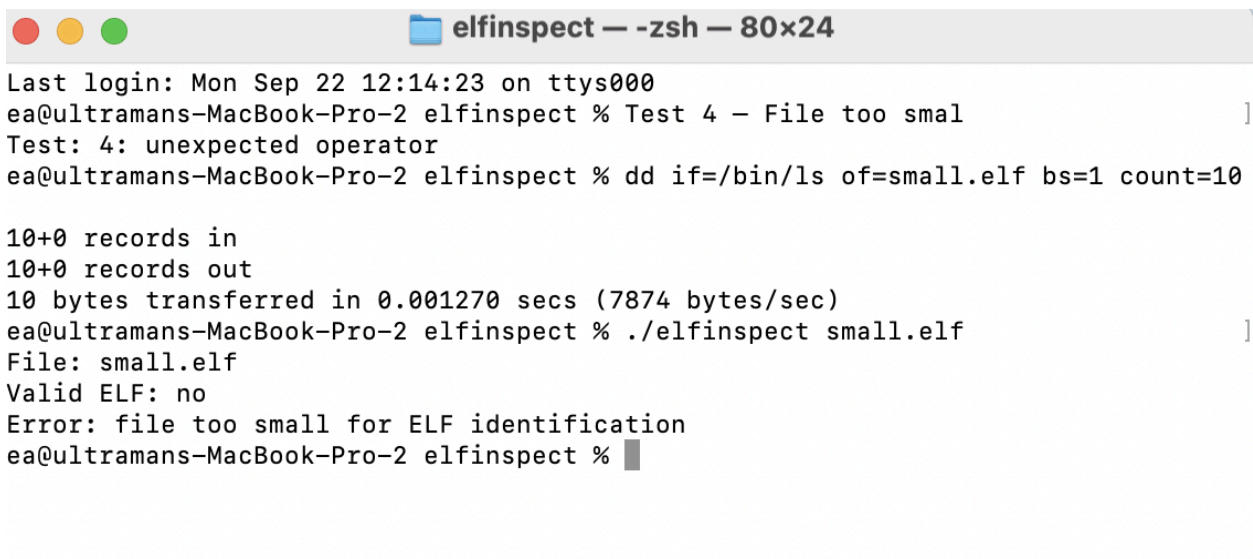
🗂 elfinspect — -zsh — 80×24

Test 3

Directory instead of file

```
●  ●  ●              📁 elfinspect — -zsh — 80×24

Last login: Mon Sep 22 12:12:23 on ttys003
[ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect /bin/          ]
File: /bin/
Valid ELF: no
Error: not a regular file
ea@ultramans-MacBook-Pro-2 elfinspect % ▊
```

Test 4

File too small;
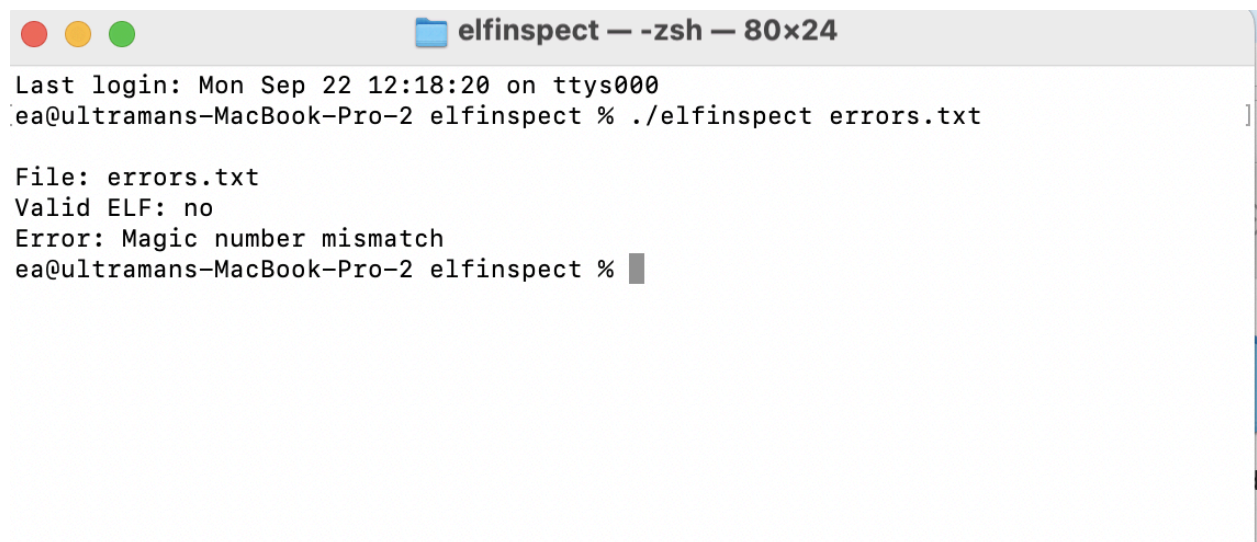
```
●  ●  ●              📁 elfinspect — -zsh — 80×24

Last login: Mon Sep 22 12:14:23 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % Test 4 — File too smal      ]
Test: 4: unexpected operator
ea@ultramans-MacBook-Pro-2 elfinspect % dd if=/bin/ls of=small.elf bs=1 count=10

10+0 records in
10+0 records out
10 bytes transferred in 0.001270 secs (7874 bytes/sec)
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect small.elf      ]
File: small.elf
Valid ELF: no
Error: file too small for ELF identification
ea@ultramans-MacBook-Pro-2 elfinspect % ▊
```

Test 5

No ELF file

```
Last login: Mon Sep 22 12:18:20 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect errors.txt

File: errors.txt
Valid ELF: no
Error: Magic number mismatch
ea@ultramans-MacBook-Pro-2 elfinspect %
```

Test 6

on mac

```
●●●                 📁 elfinspect — -zsh — 80×24

Last login: Sat Oct  4 17:14:42 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect hello.elf

File: hello.elf
Valid ELF: no
Error: Magic number mismatch
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect hello.elf

File: hello.elf
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF64
Endianness: Little Endian
Version: 1
Type: Executable (ET_EXEC)
Machine: x86-64 (EM_X86_64)
Entry point: 0x0000000000000078
ea@ultramans-MacBook-Pro-2 elfinspect % ▊
```

Test 7:

```
●●●                 📁 elfinspect — -zsh — 80×24

Last login: Mon Sep 22 12:27:09 on ttys001
ea@ultramans-MacBook-Pro-2 elfinspect % dd if=/bin/ls of=trunc.elf bs=1 count=60

60+0 records in
60+0 records out
60 bytes transferred in 0.000799 secs (75094 bytes/sec)
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect trunc.elf

File: trunc.elf
Valid ELF: no
Error: Magic number mismatch
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect trunc.elf
▊
```

Test 8

(Valid ELF Shared Library) passed!

```
ea@ultramans-MacBook-Pro-2 elfinspect % nano hello.c

ea@ultramans-MacBook-Pro-2 elfinspect % brew install x86_64-elf-gcc

Warning: x86_64-elf-gcc 15.2.0 is already installed and up-to-date.
To reinstall 15.2.0, run:
  brew reinstall x86_64-elf-gcc
ea@ultramans-MacBook-Pro-2 elfinspect % x86_64-elf-gcc -shared -o libhello.so he
llo.c

/usr/local/opt/x86_64-elf-binutils/bin/x86_64-elf-ld: warning: cannot find entry
 symbol _start; defaulting to 00000000004000c0
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect libhello.so

File: libhello.so
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF64
Endianness: Little Endian
Version: 1
Type: Executable (ET_EXEC)
Machine: x86-64 (EM_X86_64)
Entry point: 0x00000000004000c0
ea@ultramans-MacBook-Pro-2 elfinspect %
```
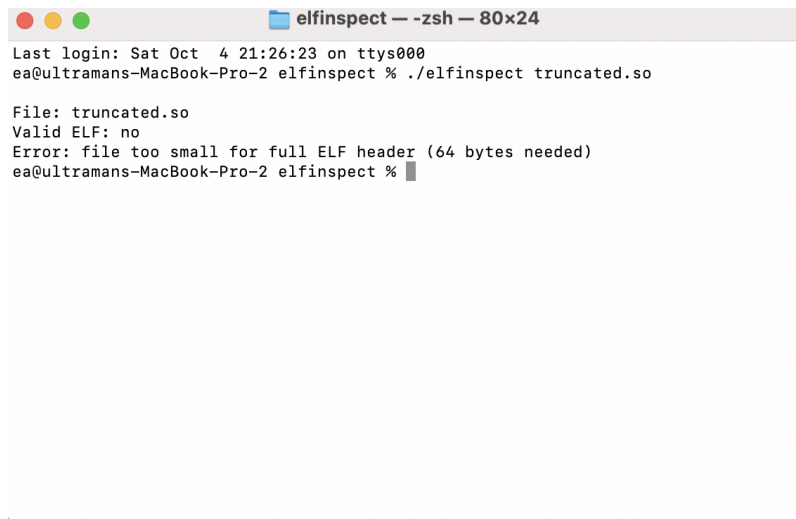
Test 9

Truncated ELF file

```
● ● ●                    📁 elfinspect — -zsh — 80×24
Last login: Sat Oct  4 21:26:23 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect truncated.so

File: truncated.so
Valid ELF: no
Error: file too small for full ELF header (64 bytes needed)
ea@ultramans-MacBook-Pro-2 elfinspect %
```

Test 10

(Valid ELF Executable)

```
● ● ●                    📁 elfinspect — -zsh — 80×24
Last login: Sat Oct  4 21:35:39 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % cd /Users/ea/Documents/elfinspect

ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect hello.elf

File: hello.elf
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF64
Endianness: Little Endian
Version: 1
Type: Executable (ET_EXEC)
Machine: x86-64 (EM_X86_64)
Entry point: 0x0000000000000078
ea@ultramans-MacBook-Pro-2 elfinspect %
```

Test 11

big_endian


```
● ● ●                elfinspect — -zsh — 80×24
cmake-build-debug       small.elf              wrong_e_version
CMakeLists.txt          src                    wrong_ei_class
elfinspect              test                   wrong_ei_data
err.txt                 trunc.elf              wrong_ei_version
errors.txt              truncated.so           wrong_magic
hello.c                 type_exec              wrong_program_trunked
hello.elf               type_rel               wrong_section_trunked
libhello.so             wrong_big_endian       wrong_small_32
main.c                  wrong_e_entry          wrong_small_64
min_32                  wrong_e_machine
ea@ultramans-MacBook-Pro-2 elfinspect % cd /Users/ea/Documents/elfinspect

ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect big_endian

File: big_endian
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF64
Endianness: Big Endian
Version: 1
Type: Shared Object (ET_DYN)
Machine: x86-64 (EM_X86_64)
Entry point: 0x00000000000025e0
ea@ultramans-MacBook-Pro-2 elfinspect %
```



```
● ● ●                elfinspect — -zsh — 80×24
Last login: Sat Oct  4 21:48:38 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect class_elf32

File: class_elf32
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF32
Endianness: Little Endian
Version: 1
Type: Shared Object (ET_DYN)
Machine: x86-64 (EM_X86_64)
Entry point: 0x00000000000025e0
ea@ultramans-MacBook-Pro-2 elfinspect %
```

Test 12

valid small ELF32 headers

```
●  ●  ●              📁 elfinspect — -zsh — 80×24

Last login: Sat Oct  4 21:54:51 on ttys000
[ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect min_32              ]
File: min_32
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF32
Endianness: Little Endian
Version: 1
Type: Shared Object (ET_DYN)
Machine: x86-64 (EM_X86_64)
Entry point: 0x000000000000004d
ea@ultramans-MacBook-Pro-2 elfinspect % ▮
```
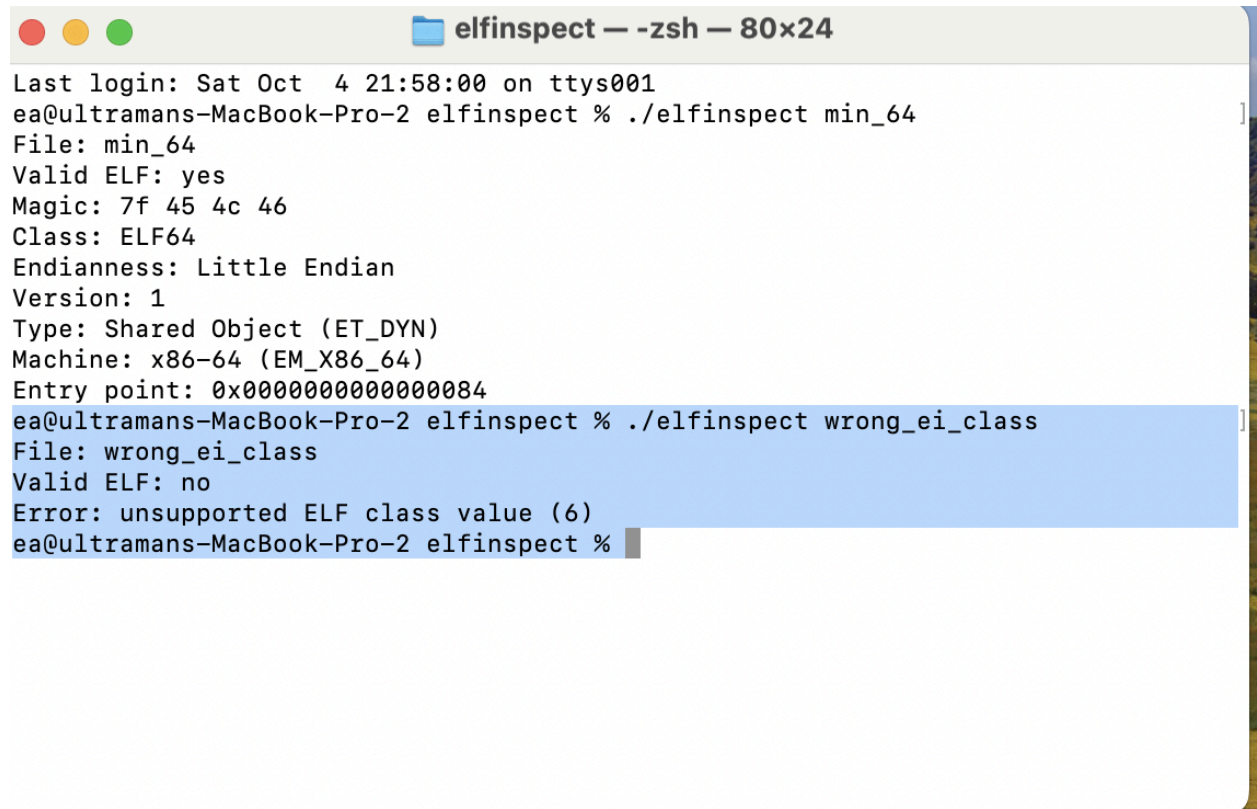
Test 13

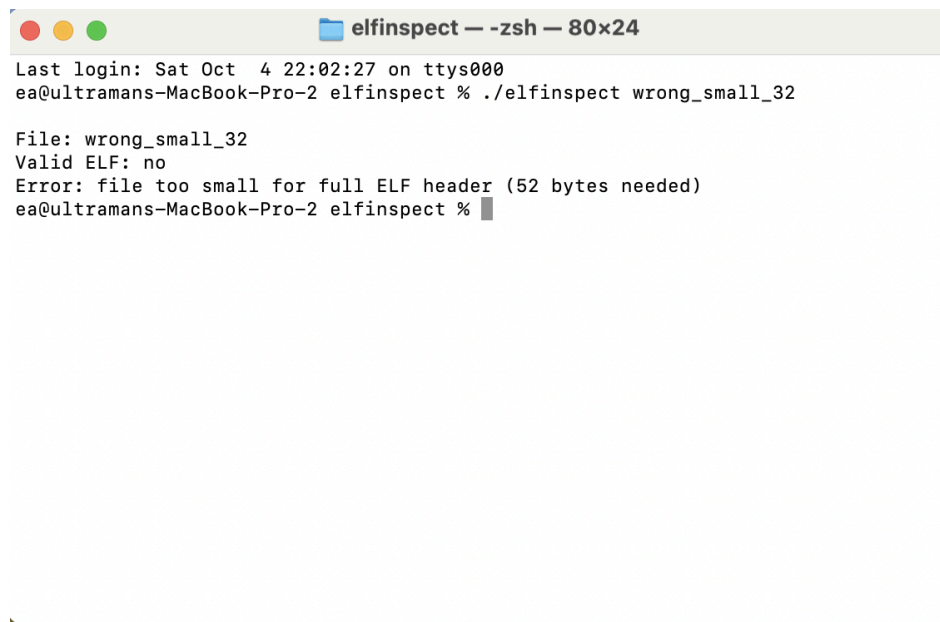**minimal valid ELF64 headers**

```
●  ●  ●              📁 elfinspect — -zsh — 80×24

Last login: Sat Oct  4 21:58:00 on ttys001
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect min_64              ]
File: min_64
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF64
Endianness: Little Endian
Version: 1
Type: Shared Object (ET_DYN)
Machine: x86-64 (EM_X86_64)
Entry point: 0x0000000000000084
ea@ultramans-MacBook-Pro-2 elfinspect % ▮
```

Test 14

validates the EI_CLASS byte

```
Last login: Sat Oct  4 21:58:00 on ttys001
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect min_64
File: min_64
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF64
Endianness: Little Endian
Version: 1
Type: Shared Object (ET_DYN)
Machine: x86-64 (EM_X86_64)
Entry point: 0x0000000000000084
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect wrong_ei_class
File: wrong_ei_class
Valid ELF: no
Error: unsupported ELF class value (6)
ea@ultramans-MacBook-Pro-2 elfinspect %
```

Last login: Sat Oct 4 22:01:36 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect wrong_program_trunked
File: wrong_program_trunked
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF64
Endianness: Little Endian
Version: 1
Type: Shared Object (ET_DYN)
Machine: x86-64 (EM_X86_64)
Entry point: 0x00000000000001e0
ea@ultramans-MacBook-Pro-2 elfinspect %

Test 15

Wrong_small_32

```
● ● ●                  📁 elfinspect — -zsh — 80×24
Last login: Sat Oct  4 22:02:27 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect wrong_small_32

File: wrong_small_32
Valid ELF: no
Error: file too small for full ELF header (52 bytes needed)
ea@ultramans-MacBook-Pro-2 elfinspect % █
```

Test 16

detection of 32-bit ELF format

```
●  ●  ●                    📁 elfinspect — -zsh — 80×24

Last login: Sat Oct  4 22:05:06 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect class_elf32

File: class_elf32
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF32
Endianness: Little Endian
Version: 1
Type: Shared Object (ET_DYN)
Machine: x86-64 (EM_X86_64)
Entry point: 0x00000000000025e0
ea@ultramans-MacBook-Pro-2 elfinspect % ▌
```

Test 17

Tests invalid data encoding (endianness byte)

```
●  ●  ●                    📁 elfinspect — -zsh — 80×24

Last login: Sat Oct  4 22:05:06 on ttys000
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect class_elf32

File: class_elf32
Valid ELF: yes
Magic: 7f 45 4c 46
Class: ELF32
Endianness: Little Endian
Version: 1
Type: Shared Object (ET_DYN)
Machine: x86-64 (EM_X86_64)
Entry point: 0x00000000000025e0
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect wrong_ei_data

File: wrong_ei_data
Valid ELF: no
Error: unsupported data encoding value (9)
ea@ultramans-MacBook-Pro-2 elfinspect % ▌
```
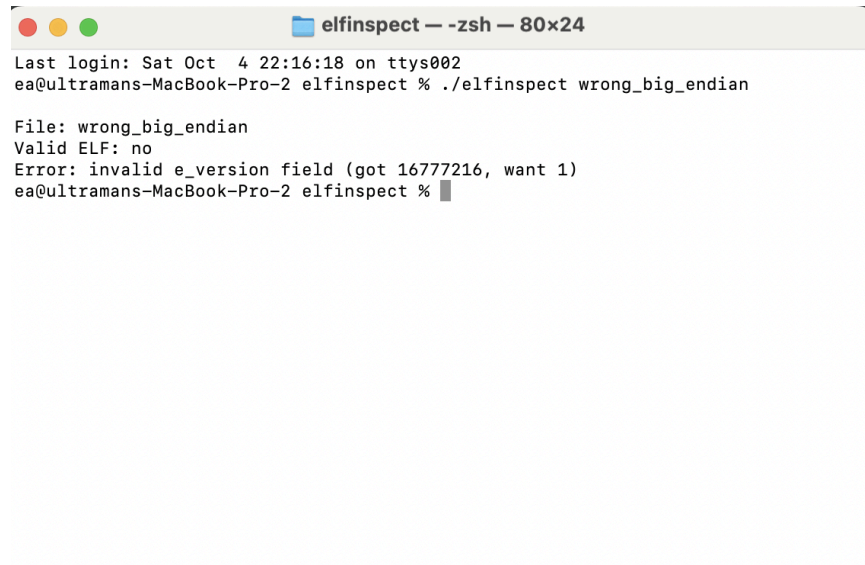
Test 18

Wrong Big endian

```
● ● ●              📁 elfinspect — -zsh — 80×24
Last login: Sat Oct  4 22:16:18 on ttys002
ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect wrong_big_endian

File: wrong_big_endian
Valid ELF: no
Error: invalid e_version field (got 16777216, want 1)
ea@ultramans-MacBook-Pro-2 elfinspect %
```
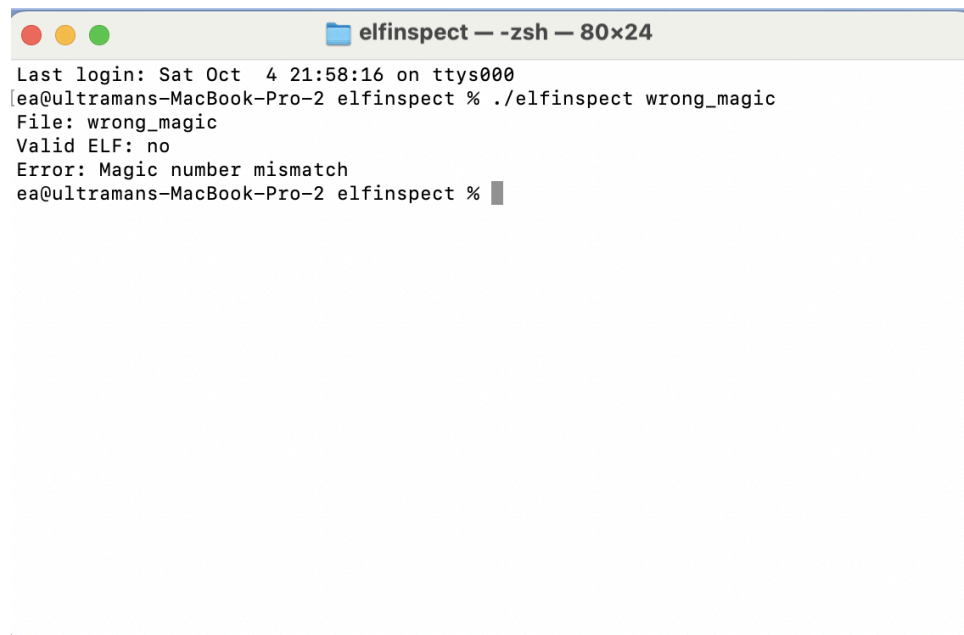
Test 19

Wrong magic

```
● ● ●              📁 elfinspect — -zsh — 80×24
Last login: Sat Oct  4 21:58:16 on ttys000
[ea@ultramans-MacBook-Pro-2 elfinspect % ./elfinspect wrong_magic            ]
File: wrong_magic
Valid ELF: no
Error: Magic number mismatch
ea@ultramans-MacBook-Pro-2 elfinspect %
```