

# **AN APPLE II BUILD PIPELINE FOR INFORM**

**PDF HANDOUT & DEMO FILES AT  
[HTTPS://16KRAM.COM](https://16kram.com)**

# ADMINISTRIVIA

- PDF & DEMO FILES @ [HTTPS://16KRAM.COM/](https://16kram.com/)  
CATEGORY: KFEST2017
- USING GNU TOOLS – MACOS, LINUX, & WINDOWS/CYGWIN

# ACKNOWLEDGMENTS

- **GRAHAM NELSON**  
INFORM COMPILER & Z-MACHINE SPECS
- **DAVE BERNAZZANI**  
MINFORM LIBRARIES
- **STEVE NICKOLAS (AKA “THE USOTSUKI”)**  
APPLE II DISK SECTOR INTERLEAVING TOOLS

# GOAL

- CREATE APPLE II DISK IMAGE(S) CONTAINING :
  - INFOCOM INTERPRETER
  - NON-INFOCOM STORY FILE
- INTERPRETER & STORY FILE TO BE VERSION 3 OR 5

# INGREDIENTS NEEDED

- APPLE II Z-MACHINE INTERPRETER PROGRAM
- Z-CODE (STORY FILE)
  - INFORM COMPILER
  - INFORM LIBRARIES
- SECTOR INTERLEAVING TOOL

# MIT - ZORK (1977-79)

```
; "SUBTITLE HOUSE AND VICINITY"
```

```
<ROOM "WHOUS"
```

```
"This is an open field west of a white house, with a boarded front door."
```

```
"West of House"
```

```
<EXIT "NORTH" "NHOUS" "SOUTH" "SHOUS" "WEST" "FORE1"
```

```
"EAST" #NEXIT "The door is locked, and there is evidently no key.">  
(<GET-OBJ "FDOOR"> <GET-OBJ "MAILB"> <GET-OBJ "MAT">)
```

```
<>
```

```
<+ ,RLANDBIT ,RLIGHTBIT ,RNWALLBIT ,RSACREDBIT>
```

```
(RGLOBAL ,HOUSEBIT)>
```

```
<ROOM "NHOUS"
```

```
"You are facing the north side of a white house. There is no door here,  
and all the windows are barred."
```

```
"North of House"
```

```
<EXIT "WEST" "WHOUS" "EAST" "EHOUS" "NORTH" "FORE3"
```

```
"SOUTH" #NEXIT "The windows are all barred.">
```

```
()
```

```
<>
```

```
<+ ,RLANDBIT ,RLIGHTBIT ,RNWALLBIT ,RSACREDBIT>
```

```
(RGLOBAL <+ ,DWINDOW ,HOUSEBIT>)>
```



## ZORK™ is more than an adventure.

Zork™ is a computer fantasy of ultimate challenge. Unearthly creatures guard treasures beyond your imagination. Mazes confound your quest. So quicken your wits and pick your path carefully through the Great Underground Empire. The least likely object may be the only thing that can save your life.

Yet, you can succeed. Discover the 20 treasures of Zork, return them to the Trophy Case and leave alive. But bring all the cunning and courage you can muster. Because in Zork, they take no prisoners.

Zork, The Great Underground Empire, was created by Infocom, Inc., and is available for 32K Apple® II and II Plus and 32K TRS-80™ Model I Level II disk systems.

Also new from Personal Software is MONTY™ Plays Monopoly,\* which lets an Apple or TRS-80 play America's favorite board game with the family.

Arcade Classics is a new TRS-80 action game featuring Cosmic Raiders, Pinball, Ricochet and Blockade. A great way to have fun without feeding quarters into the machines.

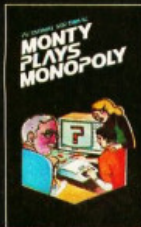
Zork, Monopoly and more.

Gammon Gambler, Checker King, Bridge Partner and Time Trek.

See these great strategy games at your Personal Software computer retailer. For the dealer nearest you, call Personal Software Inc. at 408/745-7841, or write 1330 Bordeaux Drive, Sunnyvale, CA 94086.

When you put your computer to work, use Personal Software™ Productivity Products: VisiCalc™, DESKTOP/PLAN™ and CCA Data Management System.

**PERSONAL  
SOFTWARE**



Zork, The Great Underground Empire, was created by Infocom, Inc., and is available for 32K Apple® II and II Plus and 32K TRS-80™ Model I Level II disk systems.

Zork is a trademark of Infocom, Inc.; Apple is a registered trademark of Apple Computer, Inc.; TRS-80 is a trademark of Radio Shack Division of Tandy Corp.; MONTY is a trademark of Ralston Corp.; Monopoly is a trademark of Parker Brothers, Inc.; MONTY is not sponsored or endorsed by Parker Brothers, Inc.

# INFOCOM'S BUILD PROCESS

**ZIL SOURCE FILE**



**ZILCH COMPILER**



**ZAP ASSEMBLER**



**Z-CODE (STORY FILE)**



# Z-MACHINE

- IMAGINARY COMPUTER OPTIMIZED FOR RUNNING TEXT ADVENTURE PROGRAMS
- SOME INSPIRATION FROM PASCAL'S P-MACHINE & P-CODE
- INFOCOM'S Z-MACHINE INTERPRETS Z-CODE
- CROSS-COMPILE MDL-LIKE ZORK I SOURCE TO Z-CODE

# INGREDIENT 1:

## Z-MACHINE INTERPRETER PROGRAM

- WHAT IS A ZIP
- WHAT VERSIONS OF ZIPS EXIST FOR THE APPLE II
- WHERE & HOW TO ACQUIRE A ZIP

# ZIP

- ZIP = Z-MACHINE INTERPRETER PROGRAM
- INTERPRETS Z-CODE AND EXECUTES IT ON THE APPLE II
- AN EMULATOR OF THE Z-MACHINE

# ZIP MAJOR VERSIONS

VERSION	NAME	MAX STORY FILE
1-3	ZIP	128K
4	EZIP/LZIP	256K
5	XZIP	256K
6	YZIP	576K

# ZIP MINOR VERSIONS

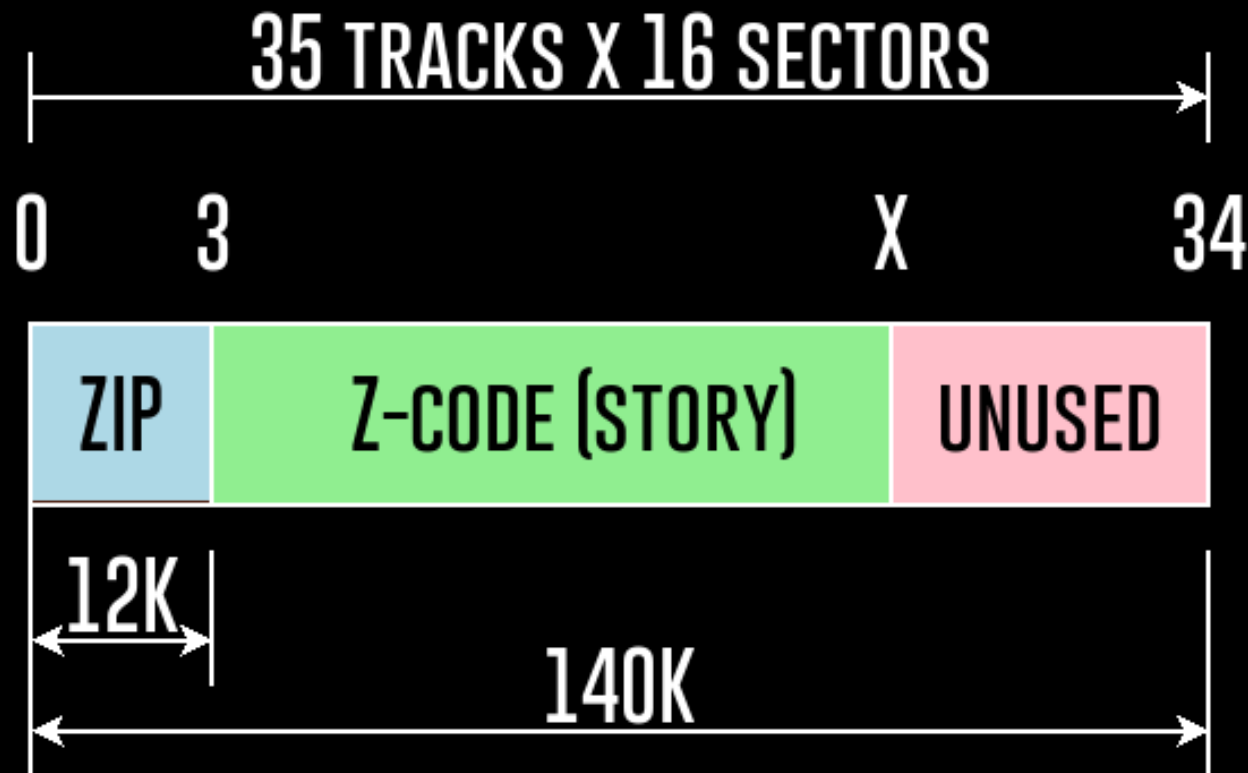
MAJOR	MINOR	EXAMPLE TITLE	SERIAL
2	-	ZORK I	UG3AU5
3	-	DEADLINE	820311
3	A	SORCERER	840131
3	B	SEA STALKER	840320
3	E	WISHBRINGER	850501
3	H	SPELLBRINGER	850916
3	K	LEATHER GODDESSES	860711
3	M	MOONMIST	861022
4	A	A MIND FOREVER VOYAGING	850814
4	B	TRINITY	860509
4	C	BUREAUCRACY	870212
4	H	NORD AND BERT	870722
5	A	BORDER ZONE	871008
5	E	HITCHHIKER'S GUIDE (SOLID GOLD)	871119
5	F	SHERLOCK HOLMES	871214

# DISK ORGANIZATION

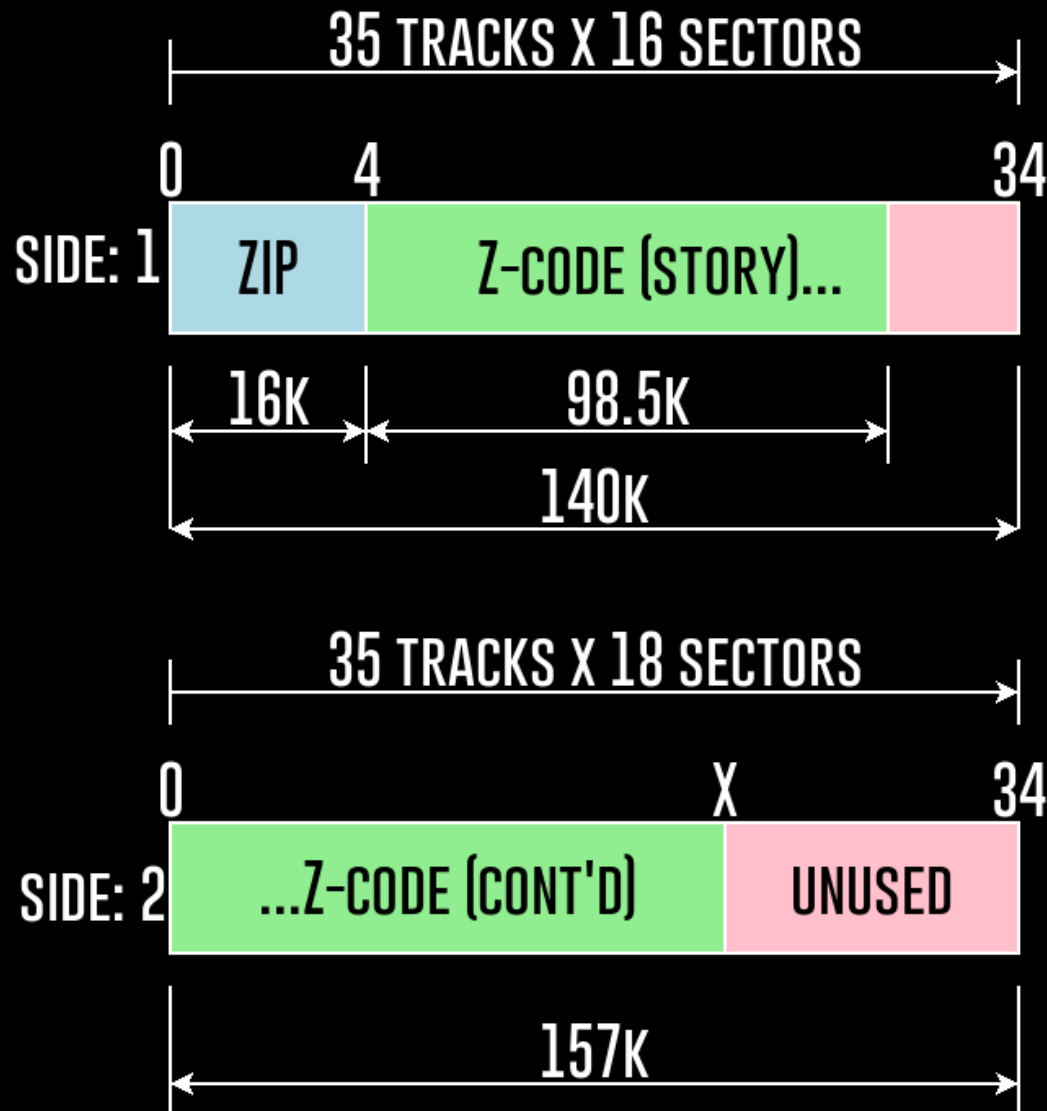
## 3 SEGMENTS OF AN APPLE II INFOCOM DISK:

- 1) BOOT CODE & Z-MACHINE INTERPRETER (ZIP)
- 2) Z-CODE (STORY FILE)
- 3) REMAINING UNUSED SPACE

# DISK ORGANIZATION - ZIP (z3)

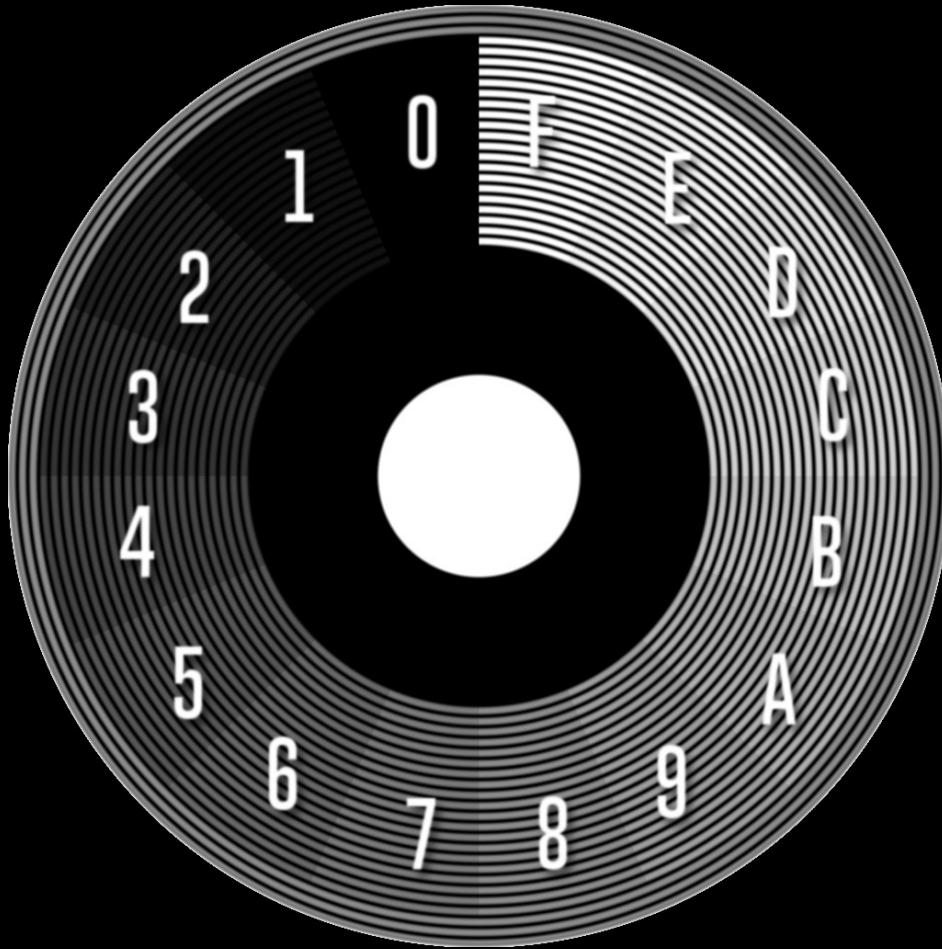


# DISK ORGANIZATION – XZIP (z5)

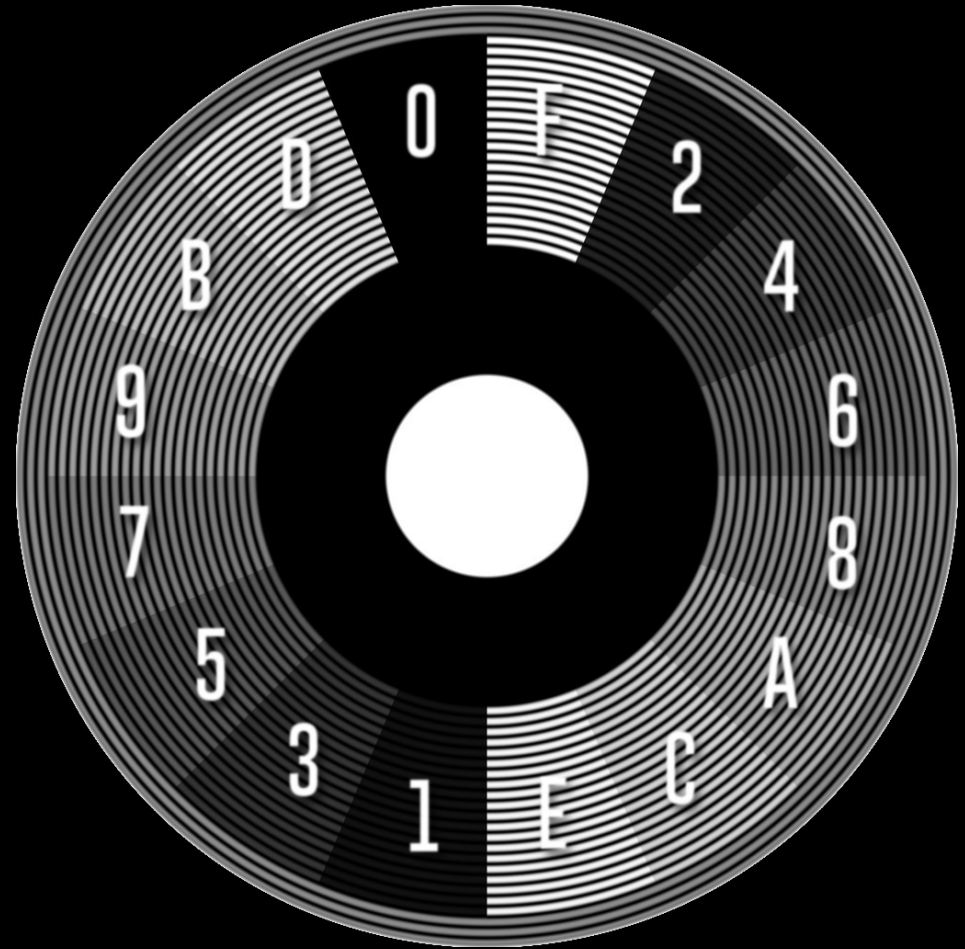




# SECTOR INTERLEAVING



**NON-INTERLEAVED**

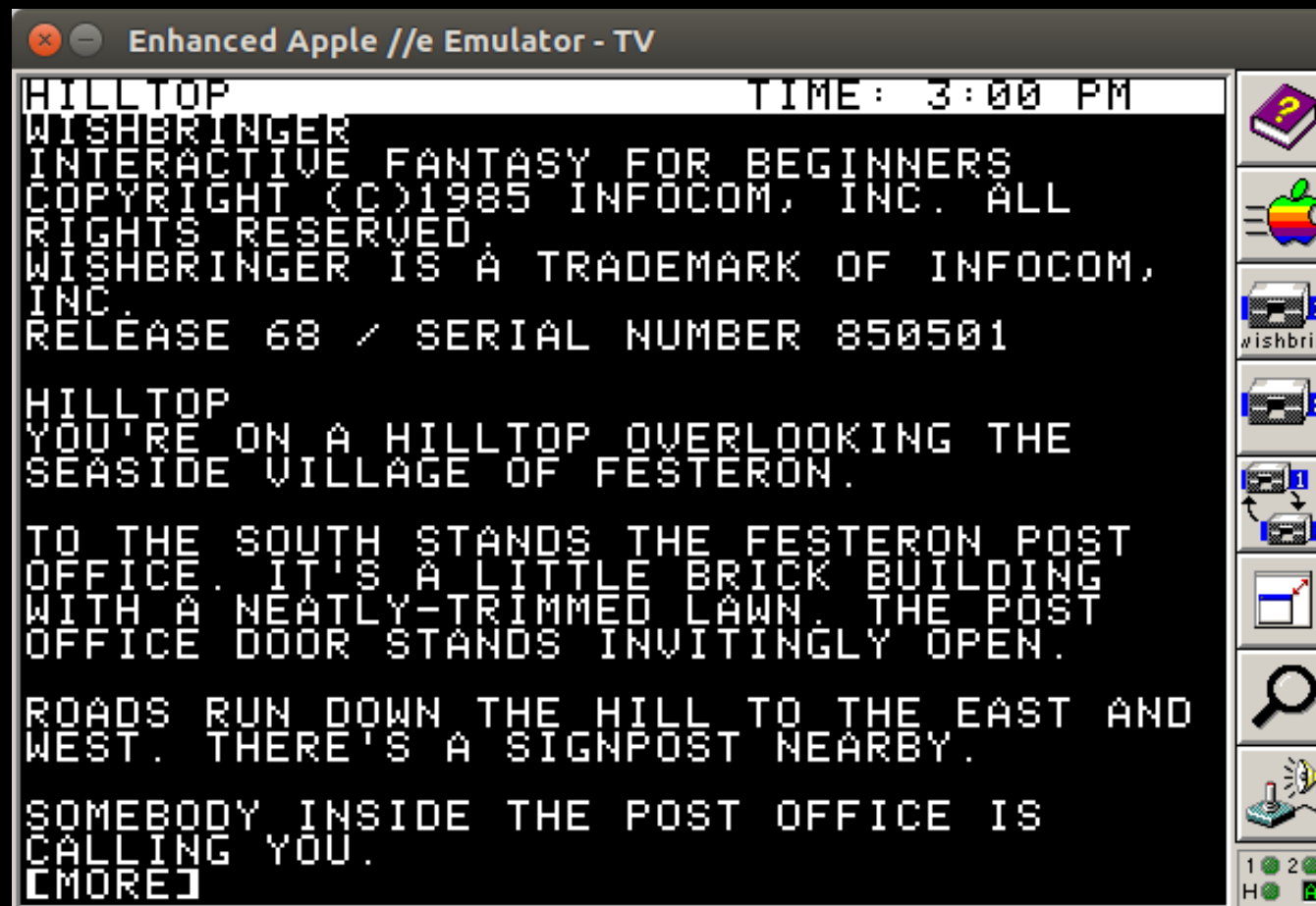


**INTERLEAVED**

# EXTRACTING AN APPLE II ZIP (Z3)

- 1) DETERMINE THE MAJOR VERSION
- 2) DETERMINE THE MINOR VERSION USING \$VERIFY
- 3) USE UNIX 'HEAD' UTILITY TO READ FIRST 12K  
& REDIRECT OUTPUT TO A FILE.

# DETERMINE MAJOR VERSION (z3)



# DETERMINE MAJOR VERSION (z3)

```
$ hexdump -C wishbringer_850501_r68_z3.dsk | less
```

```
/850501
```

```
00002ff0  87 05 ee e4 44 4a 7c 19  3e 0e 7c 52 00 06 13 19  |....DJ|.>.|R....|
00003000  03 02 00 44 57 02 58 f1  3a 76 02 aa 24 09 2c bf  |...DW.X.:v..$.|. |
00003010  00 00 38 35 30 35 30 31  01 ea fb dc 81 a5 00 00  |..850501.....|
00003020  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00  |.....|
```

# DETERMINE MINOR VERSION

## ZIP (v3)

WISHBRINGER (SERIAL: 850501 RELEASE: 68)



```
OKAY, WHAT DO YOU WANT TO DO NOW?  
>$VERIFY  
VERIFYING DISK.  
  
APPLE II VERSION E  
CORRECT.
```

THE LURKING HORROR (SERIAL: 870918 RELEASE: 221)



```
SITTING AT A TERMINAL IS A HACKER WHOM  
YOU RECOGNIZE.  
  
>$VERIFY  
VERIFYING...  
  
APPLE II VERSION M  
THE DISK IS CORRECT.
```

# EXTRACTING A ZIP (z3) FROM AN INFOCOM DISK

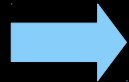
```
$ head --bytes 12288 wishbringer.dsk > info3e.bin
```

```
$ head --bytes 12288 lurking_horror.dsk > info3m.bin
```

# DETERMINE MINOR VERSION

## XZIP (v5)

### BEYOND ZORK (SERIAL: 870917 RELEASE: 49)



```
Hilltop
```

```
>VERSION
```

```
BEYOND ZORK: The Coconut of Quendor  
Copyright (C)1987 Infocom, Inc. All rights reserved.  
ZORK is a registered trademark of Infocom, Inc.  
Release 49 / Serial Number 870917  
Apple //e Version A
```

### SHERLOCK (SERIAL: 871214 RELEASE: 49)



```
>VERSION
```

```
Sherlock: The Riddle of the Crown Jewels  
Copyright 1987 Infocom, Inc.  
Sherlock: The Riddle of the Crown Jewels is a trademark of Infocom, Inc.  
Release 21 Interpreter 2 Version F Serial Number 871214
```

# EXTRACTING AN XZIP (z5) FROM AN INFOCOM DISK

```
$ head --bytes 16384 beyondzork_s1.dsk > info5a.bin
```

```
$ head --bytes 16384 SherlockRiddleOfTheCrownJewels-  
S1.dsk > info5f.bin
```



# DEMO 1

- DOWNLOAD .DSK IMAGES OF ZIP (v3) & XZIP (v5) TITLES
- EXTRACT ZIP/XZIP SEGMENT FROM .DSK FILE

# INGREDIENT 2<sub>a</sub>: Z-CODE

INFORM COMPILER

# OUR BUILD PROCESS

**INF SOURCE FILE + LIBS**



**INFORM COMPILER**



**Z-CODE (STORY FILE)**

# INFORM COMPILER

- CURRENT VERSION IS INFORM7
- INFORM 6.1.5 – LAST TO SUPPORT ZIP(v3)
- INFORM 6.1.5 – AVAILABLE AS SOURCE CODE UNDER THE OLD FILES SECTION AT THE IF-ARCHIVE
- SOME MINOR FIXES TO COMPILE UNDER GNU C-COMPILER

# DEMO 2

- DOWNLOAD `inform615_source.zip` FROM [HTTP://WWW.IF-ARCHIVE.ORG](http://www.if-archive.org)
- UNCOMPRESS THE `.zip` FILE
- CORRECT FILENAME EXTENSIONS ( `.c` & `.h` )
- COMPILE USING `CC`
- TEST BY BUILDING A SIMPLE `HELLO` PROGRAM
- TEASER CREATION OF `.DSK` FILE

# INGREDIENT $2_b$ : Z-CODE

INFORM LIBRARIES

# INFORM LIBRARY

COLLECTION OF FILES THAT:

- IMPLEMENTS THE **PARSER**
- DEFINES A DEFAULT LIST OF **VERBS**
- DEFINES THE **GRAMMAR**

# MINFORM LIBRARY

- FORK OF INFORM 6/2 LIBRARY
- MINIMIZED SET OF FEATURES FOR TARGETING LOWER MEMORY COMPUTERS
- REMOVES SOME COMMANDS LIKE “TAKE ALL”
- RESULTS IN Z-CODE THAT IS ABOUT 20K SMALLER



# DEMO 3

- DOWNLOAD & UNARCHIVE `minform.zip`
- CORRECT SOME FILENAMES FOR UNIX
- COMPILE THE INCLUDED `MINFORM` EXAMPLE USING `INFORM`
- TEST EXAMPLE

# INFORM LIBRARY 6/3

- WORKS WITH INFORM 6.1.5
- FULL-FEATURED
- MAYBE A BETTER CHOICE WHEN USING XZIP (v5).

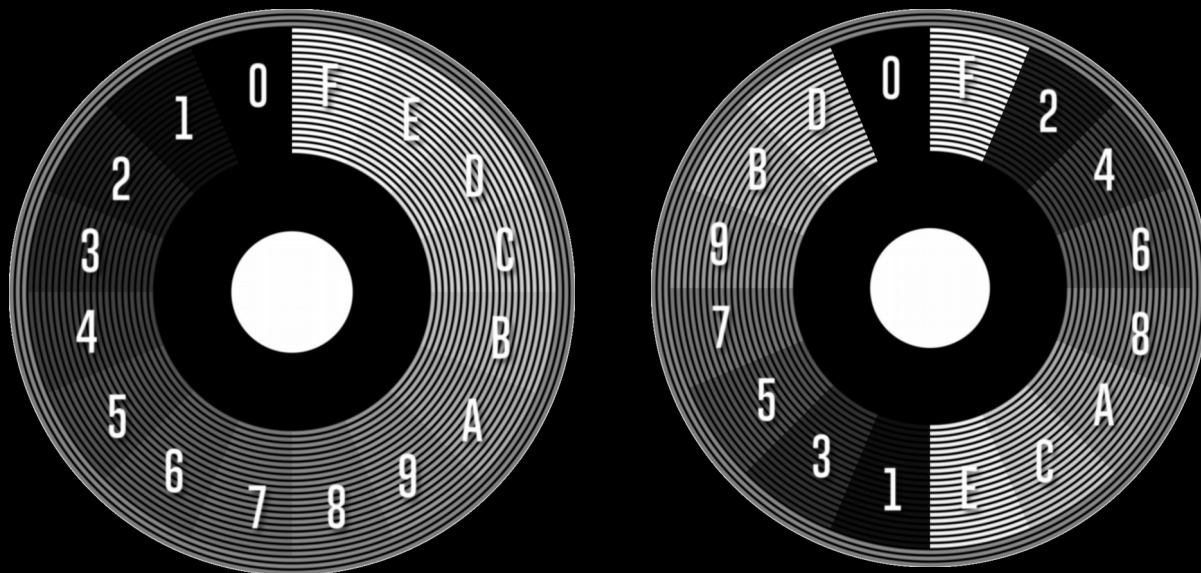
# DEMO 4

- DOWNLOAD & UNARCHIVE `inform_library63.zip`
- CORRECT FILENAMES FOR UNIX
- DOWNLOAD SOURCE FOR `Advent.inf`
- COMPILE ADVENT
- TEST ADVENT

## INGREDIENT 3:

# SECTOR INTERLEAVING TOOL

- **INTERL(z3)** BASED ON STEVE NICKOLAS' DOS INTERL
  - CREATES A SINGLE .DSK FILE GIVEN A ZIP (v3) & Z-CODE
- **INTERLz5** CREATED BY STEVE NICKOLAS IN DEC 2016
  - CREATES 1 OR 2 DISK IMAGES (16 SECTOR & 18 SECTOR)



# DEMO 5

- DOWNLOAD INTERL(Z3) USING GIT
- BUILD & INSTALL INTERL(Z3)
- CREATE .DSK USING EARLIER MINFORM EXAMPLE
- BOOT .DSK IMAGE

# DEMO 6

- DOWNLOAD & UNARCHIVE INTERLZ5
- BUILD & INSTALL INTERLZ5
- CREATE .DSK & .NIB USING ADVENT EXAMPLE
- BOOT ADVENT EXAMPLE

# MAKEFILE – ZIP (v3)

```
minform.dsk: info3m.bin minform.z3
```

```
    interlz3 info3m.bin minform.z3 minform.dsk
```

```
    wine ~/owncloud/bin/Applewin.exe
```

```
minform.z3: minform.inf
```

```
    inform -v3 minform.inf
```

# MAKEFILE – XZIP (v5)

```
advent.dsk: info5a.bin advent.z5
```

```
    interlz5 info5a.bin advent.z5 advent.dsk
```

```
    wine ~/owncloud/bin/Applewin.exe
```

```
advent.z5: Advent.inf
```

```
    inform -v5 Advent.inf
```



# DEMO 7

- CREATE A .DSK OF ANDREW PLOTKIN'S  
*A CHANGE IN THE WEATHER.*