

**Interlisp-D**

# The Medley Interlisp Project

<https://Interlisp.org>

Larry Masinter & friends

December 8, 2020

# Outline

- Introductions
- Major Features
- Interlisp History
- Interlisp Present and Future
- Demos
  - CLOS & Rooms
  - Lexical Functional Grammar (LFG)
  - Feature demos on demand

# Who are we? and what is the point?

- Presenters: Larry Masinter, Arun Welch, Ron Kaplan
  - Others as well
- Why? Different motives
  - Vintage computing, like restoring a vintage car
  - Part of a virtual museum collection for Computer History Museum
  - Continued development of research system that happens to use Interlisp
  - Publishing Open Data of programming tools research
  - Reach “escape velocity”
- Common goal: find & fix bugs

# Major Features

- “Residential” programming environment
  - Author, debug, correct in the live environment
  - Supporting “experimental” programming
  - Structure editor, DWIM, Masterscope, File package
- Lisp virtual machine
  - CAR, CDR, CONS type-safe opcodes
  - Lisp “all the way down” -- whole OS was in Lisp
- Easy interactive graphics (Smalltalk inspired)
- “Lisp Users” before “open source”

# Features (demo requests in Jitsi chat)

- **70s Interlisp-10**

History, Redo, Undo, Retry, Fix

DWIM (Do What I Mean error correction)

File package, Cleanup

TTY command structure editor

Record package

For / while / do (predecessor of LOOP)

Masterscope

- **80s Interlisp D**

dinfo, spy

Break package

Sedit structure editor

File browser

- TEdit WYSIWYG formatted text

- Sketch line art

- **Virtual Lisp Machine**

- CAR, CDR CONS opcodes

- BLOCKRECORD, DATATYPE

- BITBLT

- **Late 80s, Common Lisp and XCL**

Common lisp exec

The IL package

- **Modernizations for convenience**

Unicode, clipboard

Familiar key bindings\*

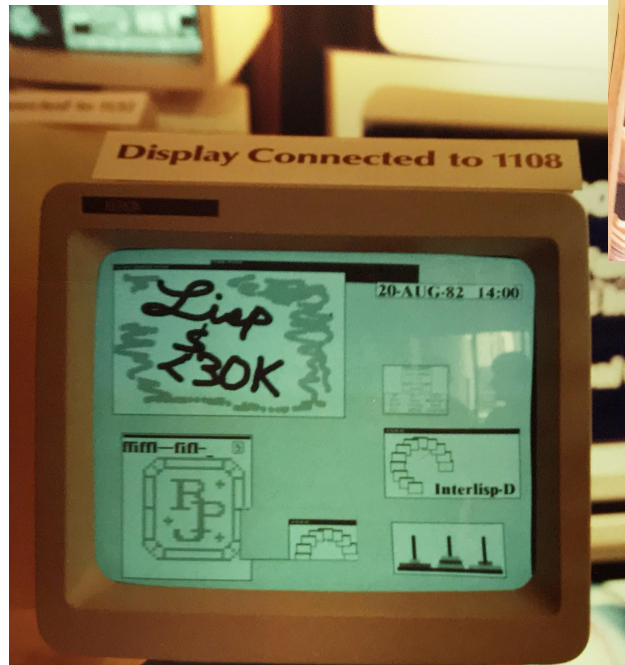
File naming conventions\*

- GitHub repositories

- Medley / maiko / history / web site

- GitHub Issues

# AAAI 1982



# Interlisp History, pre-1980

- 1958: John McCarthy, *Lisp*
- 1964: Peter Deutsch, *PDP-1 Lisp*
- 1966: W. Teitelman, PDP-10 36-bit machine
- 1967: BBN Lisp
- Early 1970's: DWIM, Record package, File package, Masterscope, History (Undo/redo), Break package debugger
- 1976: DLISP Window system
  - Lisp running on Tenex, remote display on Alto over original Ethernet
- 1979: Dorado research computer, Interlisp-D begins

# Interlisp History, 1980-

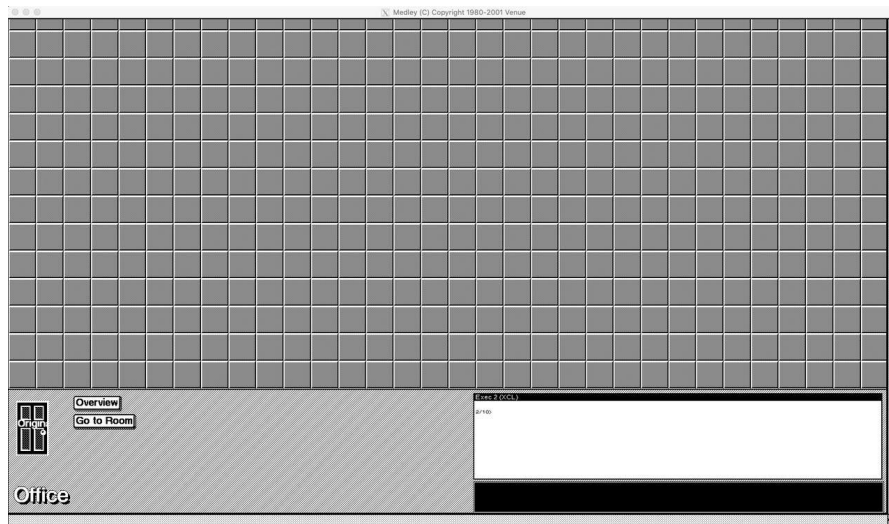
- 1980: FJCC launch of 1100 (Dolphin)
- 1982-1987: Successive releases, additional hardware (1108 Dandelion, “1109”, 1132 Dorado, ... Dove)
- 1987: Start adding Common Lisp (X3J13 cleanup)
- 1988: Medley release: support for SunOS: IRIX, AIX, HPUX, Ultrix, etc.
- 1989: Envos spin-out and then Venue
- 1992: Medley 2.0 with CLOS, MOP, adds support for DOS to previous list
- 1992: ACM Software Systems Award to the Interlisp team...
- 2020: Medley Interlisp Project begins



# Medley Interlisp present and future

- Virtual Machine (maiko) ports
  - macOS
  - 64-bit Linux x86\_64 and Aarch64 (Raspberry Pi)
- Issues mainly resolved
  - C standards (written for K&R)
  - Big-endian vs, little-endian, 32->64 bit
  - Watch out for Y2K
- Lisp system issues
  - Versioned file system, {device}<root>directories vs GitHub, relative paths
  - Text encodings EOL, XCCS (before Unicode)
- Interlisp.org & Computer History Museum

# Arun Welch



# Lexical Functional Grammar (LFG) Demo

Ron Kaplan

1 solution, 0.01 seconds, 26 tasks

**DEMO ENGLISH: 5 input windows**

3: The girl devours the banana (0.027 15)  
 3: The girl devours the banana (0.021 35)  
 3: The girl arrives (0.031 12)  
 3: The man loves her (0.02 13) (0.022 13)  
 3: The man Mary loves John devours the banana (0.049 33) (0.051 35)

**Exec (INTERLISP)**

NIL

4.4

**Rules using NP**

**DEMO ENGLISH**

DET => "DET is also a lexical category, for simple determiners"

NP: (↑ SPEC POSS)=1;  
 GEN.

NP => { (DET)  
 AP\*: 1<(↑ ADJ)  
 (1 SUBJ)=↑;  
 H  
 INP  
 { S': 1<(↑ RELMOD)  
 "semantic coreference to head"  
 #↑=↑(↑ HEAD)  
 #↑=↑(↑ HEAD)  
 [PP: (1 SUBJ)=↑  
 1<(↑ ADJ)]}}

**Lexemes using V**

**DEMO ENGLISH**

am V Bbe- (↑ SUBJ PERSON)=1  
 (↑ SUBJ NUM)=SG  
 Ø(TENSE PRESENT).

are V Bbe- ~[(↑ SUBJ NUM)=SG  
 (↑ SUBJ PERSON)=2]  
 Ø(TENSE PRESENT).

CHART +INVALID NODE NUMBERS

1 valid 5 c-structure, 0 invalid ones, 1 displayed

CS 1: S:37

```

graph TD
    S37 --> NP20[NP:20]
    S37 --> VP35[VP:35]
    NP20 --> DET12[DET:12]
    NP20 --> N14[N:14]
    DET12 --> the1[the]
    N14 --> girl1[girl]
    VP35 --> V6[V:6]
    VP35 --> NP35[NP:35]
    V6 --> devours[devours]
    NP35 --> DET8[DET:8]
    NP35 --> N10[N:10]
    DET8 --> the2[the]
    N10 --> banana[banana]
            
```

**Description of F-structure 1**

(f37 SUBJ)=f20  
 (f20 CASE)=NOM  
 f20=f2  
 (f2 SPEC)=THE  
 (f2 DEF)=+  
 f20=f4  
 (f4 PRED)=‘girl’  
 (f4 NUM)=SG  
 (f4 SPEC)  
 (f4 PERSON)=3  
 (f4 NUM)=SG  
 f37=f36  
 (f37 TENSE)  
 f36=f6  
 (f6 PRED)=‘devour’((f6 SUBJ)(f6 OBJ));  
 (f6 TENSE)=PRESENT  
 ~((f6 PARTICIPLE)  
 ~((f6 INF)  
 (f6 SUBJ NUM)=SG  
 (f6 SUBJ PERSON)=3  
 (f36 OBJ)=f35  
 (f35 CASE)=ACC  
 f35=f8

**F-structure 1:**

PRED	‘devour’([20:girl], [35:banana])
TENSE	PRESENT
20	PRED ‘girl’
SUBJ	4 CASE NOM, DEF +, NUM SG, PERSON 3, SPEC THE
2	
37	35 PRED ‘banana’
36	10 CASE ACC, DEF +, NUM SG, PERSON 3, SPEC THE
6	

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