

The Icon Program Library; Version 9.0

Ralph E. Griswold

Department of Computer Science, The University of Arizona

1. Introduction

The Icon program library consists of Icon programs, procedures, documentation, and data. Version 9 of Icon is required for graphics and some other parts of the library of the library [1, 2].

Section 7 lists the contents of the library. More complete documentation is contained in comments in the program and procedure files. There also is separate documentation for some programs. See the hierarchy below.

2. Unloading the Library

Note: The complete library, when unloaded, requires about 5.5MB of disk space. In particular, some documents in PostScript form are quite large. If your disk space is limited, take this into consideration before starting to unload.

The library is designed to be unloaded in a hierarchy that contains separate directories for different kinds of material. Material that requires graphics [2] is in separate directories whose names begin with **g**. If Icon doesn't support graphics on your platform, you can ignore these directories.

The directory structure for this version of the library is

```
| --ipl-- | --data      data
          | --docs   documentation
          | --incl   include files
          | --packs  packages
          | --procs  procedures
          | --progs  programs
          | --gdata  as above, but for graphics
          | --gdocs
          | --gincl
          | --gpacks
          | --gprocs
          | --gprogs
```

The packages contain material that is too complex fit into other parts of the hierarchy or that does not conform to the library structure.

The library files are packaged in different ways for different platforms. See the installation instructions for your platform.

3. Link and Include Search Paths

Many of library programs link procedures. For example, `options()` is used by many programs for processing command-line options and is linked from “ucode” files obtained from translating `options.icn`.

Icon searches for ucode files first in the current directory and then in directories specified by the `IPATH` environment variable. `IPATH` consists of a sequence of blank-separated path names. The search is in the order of the names. For example, on a UNIX system running `csh`,

```
setenv IPATH "./procs /usr/icon/ilib"
```

results in a search for file names in link declarations first in the current directory, then in `./procs`, and finally in `/usr/icon/ilib`.

Files included by the preprocessor directive `$include` are searched for on `LPATH`. It has the same form as `IPATH`.

The method of setting `IPATH` and `LPATH` varies from system to system.

Since the current directory always is searched first, `IPATH` and `LPATH` need not be set if ucode and include files are placed in the same directory as the program files. See the next section.

4. Installing the Library

Installing the Icon program library consists of two steps: (1) translating the procedure files to produce ucode files and (2) translating and linking the programs.

Ucode files are produced by translating the procedure files with the `-c` option to `icont`, as in

```
icont -c options
```

which translates `options.icn`. The result is two ucode files named `options.u1` and `options.u2`. The `.u1` file contains the procedure’s code and the `.u2` file contains global information about the procedure. It is these files that a link declaration such as

```
link options
```

needs.

Scripts for translating the procedure files are provided with the distribution. Once the procedure files have been translated, the ucode files can be moved to any place that is accessible from `IPATH`.

The programs are translated and linked using `icont` without the `-c` option, as in

```
icont deal
```

which translates and links `deal.icn`, a program that produces randomly selected bridge hands. The result of translating and linking a program is an “icode” file. On some systems, the name of the icode file is the same as the name of the program file with the `.icn` suffix removed (for example, `deal`). On other systems, the icode file name has the suffix `.icx` in place of `.icn` (for example, `deal.icx`). Scripts for translating and linking the programs are provided with distributions for individual platforms. Instructions for building the programs contained in separate packages are included with those packages.

Some systems (UNIX, for example) support the direct execution of icode files. On such systems, an icode file can be run just by entering its name on the command line, as in

```
deal
```

On other systems, it is necessary to run `iconx` with the icode file as an argument, as in

```
iconx deal
```

(This also works on systems that support direct execution.) Note that the suffix (if any) need not be mentioned.

Many library programs take arguments and options from the command line. Options are identified by dashes. For example, in

deal -h 10

the -h 10 instructs deal to produce 10 hands.

Icode files can be moved to any location accessible from your PATH. Ucode and include files are needed only during linking. They need not be accessible when icode files are run.

5. Usage Notes

It is important to read the documentation at the beginning of programs and procedures in the library. It includes information about special requirements, limitations, known bugs, and so forth.

Some of the programs in the Icon program library are quite large and may require more memory than is available on some platforms.

6. Disclaimer

The material in the Icon program library is contributed by users. It is in the public domain and can be freely copied, although author information should be left intact and any modifications should be properly attributed.

Neither the Icon Project nor the authors of material in the Icon program library assume any responsibility as to its correctness or its suitability for any purpose. The responsibility for use of the Icon program library lies entirely with the user.

7. Content Listing

7.1 Programs — progs

adlcheck.icn	check for bad address list data
adlcount.icn	count address list entries
adlfiltr.icn	filter address list entries
adlfirst.icn	write first line of addresses
adllist.icn	list address list fields
adlsort.icn	sort address list entries
animal.icn	play “animal” guessing game
banner.icn	display banner
based.icn	do BASIC-style editing
bj.icn	play blackjack game
c2icn.icn	assist C-to-Icon porting
calc.icn	simulate desk calculator
callcnt.icn	count calls
colm.icn	arrange data into columns
comfiles.icn	list common files in two directories
concord.icn	produce concordance
conman.icn	convert units
countlst.icn	count items in a list
cross.icn	display intersection of words
crypt.icn	encrypt file

csgen.icn	generate context-sensitive sentences
cstrings.icn	print strings in C files
cvsum.icn	count conversion event tuples
cwd.icn	write current working directory
deal.icn	deal bridge hands
delam.icn	delaminate file
delamc.icn	delaminate file using tab characters
delta.icn	first difference of sequence
detex.icn	strip LaTeX commands
diffn.icn	show differences among files
diffsort.icn	reorder "diff" output
diffsum.icn	count lines affected by a diff
diffu.icn	show differences in files
diffword.icn	list different words
diskpack.icn	produce packing list for diskettes
dupfile.icn	find directories with same files
duplproc.icn	find duplicate declarations
edscrip.icn	produce script for ed(1)
empg.icn	make expression-evaluation programs
envelope.icn	address envelopes
evstream.icn	show events
evsum.icn	tabulate event codes
farb.icn	generate Farberisms
farb2.icn	generate Farberisms
filecvt.icn	convert line terminators
fileprnt.icn	display characters in file
filesect.icn	produce section of a file
filter.icn	skeleton for generic filter
findstr.icn	find embedded character strings
findtext.icn	stub for gettext.icn
fixhqx.icn	strip headers from BinHex files
fixpath.icn	replace path in a binary file
fnctab.icn	list function usage
fnctmpl.icn	produce function templates
format.icn	word wrap a range of text
fset.icn	do set operations on file specifications
fuzz.icn	perform fuzzy pattern matching
gcomp.icn	produce complement of file specification
gediff.icn	“diff” for use with ged
genqueen.icn	solve arbitrary-size n-queens problem

graphdem.icn	demonstrate simple bar graphics
grpsort.icn	sort groups of lines
hcal4unx.icn	Jewish/Civil calendar in UNIX
hebcalen.icn	combination Jewish/Civil calendar
hebeng.icn	print mixed Hebrew/English text
hr.icn	play horse-race game
huffstuf.icn	huffman coding
hufftab.icn	compute Huffman state transitions
ibar.icn	equalize comment bars in Icon programs
ibrow.icn	browse Icon files for declarations
icalc.icn	simulate infix desk calculator
icalls.icn	tabulate Icon calls
icn2c.icn	assist Icon-to-C porting
icontent.icn	list Icon procedures
icvt.icn	ASCII/EBCDIC program conversion
identgen.icn	meta-variant code generation
idepth.icn	report maximum recursion depth
idxtext.icn	creating indexed text-base
igrep.icn	string search similar to egrep
iheader.icn	list Icon program library headers
ihelp.icn	give on-line help for Icon
iidecode.icn	decode text in style of uuencode
iiencode.icn	encode text in the style of uuencode
ilnkxref.icn	produce Icon link cross reference
ilump.icn	lump linked Icon source files
imagetyp.icn	show types of image files
ineeds.icn	print modules required by an Icon program
interpe.icn	interpret Icon expressions
interpp.icn	interpret Icon programs
ipldoc.icn	collect library documentation
ipp.icn	preprocess Icon programs
iprint.icn	print Icon program
iprofile.icn	profile Icon procedure usage
ipsort.icn	sort Icon procedures
ipsplit.icn	split Icon program into files
ipxref.icn	cross reference Icon program
irunerr.icn	print Icon runtime errors
isrcline.icn	count code lines in Icon program
istrip.icn	strip comments from Icon program
itab.icn	entab an Icon program

itags.icn	create tags file for Icon programs
iundecl.icn	find undeclared Icon identifiers
iversion.icn	show icode version
iwriter.icn	write Icon code to write input
knapsack.icn	fill a container
krieg.icn	play kriegspiel
kross.icn	show intersections of strings
kwic.icn	produce keywords in context
labels.icn	format mailing labels
lam.icn	laminates files
latexidx.icn	process LaTeX idx file
lisp.icn	interpret LISP programs
literat.icn	manage literature information
loadmap.icn	show load map of UNIX object file
longest.icn	write longest line in a file
makepuzz.icn	make find-the-word puzzle
memsum.icn	tabulate memory allocation
missile.icn	play missile command game
miu.icn	generate strings from MIU system
mkpasswd.icn	make passwords
monkeys.icn	generate random text
morse.icn	convert string to Morse code
mr.icn	read mail
mtf3.icn	map tar file
newsr.c.icn	organize UNIX .newsr.c file
nim.icn	play the game of nim
nocr.icn	convert MS-DOS text files to UNIX
pack.icn	package multiple files
paginate.icn	insert formfeeds
papply.icn	apply procedure to lines of file
parens.icn	produce random balanced strings
pargen.icn	generate context-free parser
parse.icn	parse simple statements
parsex.icn	parse arithmetic expressions
patchu.icn	implement UNIX-like patch
pbkdump.icn	dump HP95 phone book file
polydemo.icn	demonstrate polynomial library
post.icn	post news
press.icn	archive files
profile.icn	profile Icon programs

proto.icn	show Icon syntactic forms
psrsplit.icn	separate psrecord.icn output pages
pt.icn	produce parse table generator
puzz.icn	create word search puzzle
qt.icn	announce time in English
queens.icn	generate solutions to the n-queens problem
ranstars.icn	display ‘‘star’’ field
recgen.icn	generate context-free recognizer
reply.icn	reply to news-articles or mail
repro.icn	self-reproduce
roffcmds.icn	list roff commands and macros
rsg.icn	generate randomly selected sentences
ruler.icn	write a character ruler
scramble.icn	scramble a document
setmerge.icn	combine sets of text items
shar.icn	create UNIX shell archive
shortest.icn	write shortest line in a file
shuffle.icn	shuffle lines in a file
sing.icn	sing The Twelve Days of Christmas
snake.icn	play the snake game
solit.icn	play solitaire
sortname.icn	order by last name
splitlit.icn	create string literal
strpsgml.icn	strip/translate SGML tags
tablc.icn	tabulate characters in a file
tablw.icn	tabulate words in a file
textcnt.icn	tabulate properties of text file
textcvf.icn	convert text file formats
tokgen.icn	token counting
toktab.icn	summarize Icon token counts
trim.icn	trim lines in a file
ttt.icn	play tic-tac-toe
turing.icn	simulate a Turing machine
unique.icn	delete identical adjacent lines
unpack.icn	unpackage files
utrim.icn	remove unneeded procs from ucode
verse.icn	generate bizarre verses
vnq.icn	display solutions to n-queens problem
when.icn	show file age
wshfdemo.icn	demonstrate weighted shuffle procedure

xtable.icn	show character code translations
yahtz.icn	play yahtzee
yescr.icn	convert UNIX files to DOS format
zipsort.icn	sort mailing labels by ZIP code

7.2 Programs — gprogs

autotile.icn	produce tile from XBM image
binpack.icn	demonstrate some bin packing algorithms
bitdemo.icn	demonstrate bitplanes
bme.icn	edit bitmap
calib.icn	calibrate color monitor
chernoff.icn	imitate a Chernoff face
coloralc.icn	test color allocation
colrbook.icn	show the named colors
colrname.icn	browse color names
colrpick.icn	pick RGB or HLS colors
concen.icn	play solitaire card game Concentration
design1.icn	draw geometric design
design2.icn	draw geometric design
design3.icn	draw geometric design
drip.icn	demonstrate color map animation
etch.icn	distributed Etch-A-Sketch
events.icn	report Icon window events
fev.icn	display text in fisheye view
flake.icn	draw a fractal snowflake
fract.icn	demonstrate fractal lines
fstarlab.icn	draw fractal stars
gallery.icn	display many .xpm files at once
gpptest.icn	test graphics procedures
gxplor.icn	explore graphics facilities
hb.icn	Hearts & Bones game
hsvpick.icn	pick RGB or HSV colors
hvc.icn	pick colors for Tek HVC space
img.icn	create images
julia1.icn	display the Julia set
kaleid.icn	produce kaleidoscope
keypunch.icn	simulate a keypunch
koch.icn	demonstrate Koch curves
linden.icn	generate sentences in 0L-systems
lorenz.icn	display Lorenz strange attractor

lsys.icn	experiment with Lindenmayer systems
mandel1.icn	display the Mandelbrot set
mandel2.icn	draw the Mandelbrot set
moire.icn	display Moire patterns
orbit.icn	display quadratic orbit
palcheck.icn	check palindromic sentences
palette.icn	display an Icon image palette
patfetch.icn	extract patterns from a file
penelope.icn	edit graphic patterns
pextract.icn	separate good and bad patterns
pgmtoims.icn	make an image from a PGM file
picktile.icn	pick a tile out of an image
pme.icn	edit pixmaps
prompt.icn	prompt in a window
randweb.icn	draw random web design
rolypoly.icn	draw “abstract” art
rstarlab.icn	draw regular stars
scroll.icn	scroll image
sensdemo.icn	demonstrate sensor routines
showtile.icn	display tiles
sier.icn	generalized Sierpinski’s triangle
sier1.icn	draw the Sierpinski triangle
sier2.icn	display the Sierpinski fractal
snapper.icn	display images
spiral.icn	draw polygonal spirals
spiro.icn	display spirograph lines
splat.icn	drop paint splatters in a window
subdemo.icn	show the turtle graphics subset
sym4mm.icn	draw symmetrically
textures.icn	show various 4x4 patterns
tgdemo.icn	demonstrate turtle graphics
travels.icn	animate the traveling salesman problem
trycolor.icn	investigate color specifications
tryfont.icn	demonstrate X font rankings
uix.icn	translate user interfaces
wheel.icn	show wheel of colors
xbm2pat.icn	convert XBM file to pattern specification
xformpat.icn	apply transformation to patterns
xgamma.icn	configure X color correction
xpmtoims.icn	make Icon images from XPM files

zoomtile.icn show a tile magnified

7.3 Procedures — procs

abkform.icn process HP95LX appointment books
adjuncts.icn gettext and idxtext
adlutils.icn process address lists
allof.icn conjunction control operation
ansi.icn ANSI-based terminal control
argparse.icn parse pseudo-command-line
array.icn n-dimensional arrays
ascinam.icn ASCII name of unprintable character
basename.icn produce base name of file
bincvt.icn convert binary data
binocoeff.icn binomial coefficient
bitint.icn convert integers and bit strings
bitstr.icn bits in Icon strings
bitstrm.icn read and write strings of bits in files
bkutil.icn HP95LX phone books and appointment books
bold.icn enbolden and underscore text
buffer.icn buffered input and output
calendat.icn get date from Julian Day Number
calls.icn calls as objects
capt.icn echo output
cat.icn concatenate strings
codeobj.icn encode and decode Icon data
codeval.icn encode and decode Icon values
collate.icn collate and decollate strings
colmize.icn arrange data into columns
colrmodl.icn convert between color models
commaize.icn add commas to real or integers
complete.icn complete partial input string
complex.icn perform complex arithmetic
currency.icn formatting currency
curves.icn generate points on plain curves
curves1.icn generate points on plain curves
curves2.icn generate points on plain curves
date.icn produce date
datetime.icn date manipulation
decipos.icn position decimal point
dif.icn check for differences

distance.icn	compute distance in n-dimensions
dopen.icn	open file on search path
dosfiles.icn	get MS-DOS file names
drawings.icn	drawing
drivedir.icn	get directories and drive
ebcdic.icn	convert between ASCII and EBCDIC
empgsup.icn	support empg
escape.icn	interpret Icon literal escapes
escapesq.icn	deal with character string escapes
everycat.icn	generating all concatenations
evinit.icn	event codes
evnames.icn	produce code/name table
evsyms.icn	produce code/symbol table
factorl.icn	computing factorials
factors.icn	factoring
fcopy.icn	copy a file
feval.icn	evaluate string as function call
filedim.icn	compute file dimensions
filename.icn	parse file names
filetext.icn	read text file into a list
findre.icn	find regular expression
fstars.icn	produce traces of fractal stars
fstartbl.icn	produce calls for fractal stars
ftype.icn	produce type for file
full13th.icn	full-moon Friday 13s
fullimag.icn	produce complete image of structured data
gauss.icn	compute Gaussian distributions
gcd.icn	compute greatest common denominator
gdisable.icn	disable graphics functions
gdl.icn	get directory lists
gen.icn	meta-variant code generation
gener.icn	generate miscellaneous sequences
getchlib.icn	getch for UNIX
getkeys.icn	get keys for a gettext file
getpaths.icn	generate elements in path environment variable
gettext.icn	gettext (simple text-based routines)
glabls.icn	produce graph ticks
gmean.icn	compute geometric mean
gobject.icn	geometrical objects
graphpak.icn	manipulating directed graphs

grecords.icn	graphics
gtrace.icn	process graphic traces
hexcvt.icn	hexadecimal conversion
hostname.icn	produce host name
hyperbol.icn	hyperbolic functions
ibench.icn	support Icon benchmarking
ichartp.icn	a simple chart parser
identgen.icn	meta-variant code generation
identity.icn	produce identities for Icon types
ifg.icn	tell if graphics are running
ifncls.icn	wrappers for function tracing
iftrace.icn	trace Icon function calls
image.icn	produce images of Icon values
inbits.icn	read variable-length characters
inserts.icn	build tables with duplicate keys
intstr.icn	create string from bits
iolib.icn	termLib support
ipause.icn	pause within an Icon program
iscreen.icn	screen functions
isort.icn	customizable sorting
ispf.icn	communicate between Icon and ISPF
iterfncls.icn	recursive functions using iteration
itlib.icn	termLib-type tools
itlibdos.icn	MS-DOS termLib-type tools
itokens.icn	tokenizing Icon code
ivalue.icn	convert string to Icon value
jolygs.icn	produce traces of “jolygons”
julian.icn	produce Julian Day Number
jumpque.icn	jump element to head of queue
labeler.icn	produce successive labels
large.icn	identify large integers
largint.icn	large integer arithmetic
lastname.icn	produce last name
lcomb.icn	generate lists of combinations
lcseval.icn	evaluate linear congruence parameters
lindgen.icn	rewriting OL-systems
lindrec.icn	L-systems
list2tab.icn	write list as tab-separated string
lmap.icn	map list elements
longstr.icn	match longest string

lpermute.icn	permute elements in a list
lrotate.icn	rotate list
lscan.icn	scanning for lists
lu.icn	LU manipulation
mapbit.icn	map string into bit representation
mapstr.icn	map() for strings
matchlib.icn	lexical matching
math.icn	perform mathematical computations
matrix.icn	matrix manipulation
mean.icn	compute means
memrfncs.icn	recursive functions using memory
minmax.icn	compute maximum and minimum
models.icn	model Icon functions
modlines.icn	produce trace of modular lines
morse.icn	convert string to Morse code
mset.icn	multi-sets
namepfx.icn	produce prefix portion of name
ngrams.icn	generate n-grams
noncase.icn	case-independent matching
numbers.icn	format and convert numbers
nxtprime.icn	find the next prime
object.icn	encode and decode Icon values
opnames.icn	produce opcode/names table
opsyms.icn	produce table to map opcodes to symbols
options.icn	get command-line options
orbits.icn	produce traces of orbits
outbits.icn	write variable-length characters
packunpk.icn	pack and unpack decimal strings
parscond.icn	condense parse tree
partit.icn	partition integer
pascltri.icn	compute a row of Pascal's Triangle
patch.icn	UNIX-like patch(1)
patterns.icn	SNOBOL4-style pattern matching
patword.icn	find letter patterns
pbkform.icn	process HP95 phone book files
pdae.icn	programmer-defined argument evaluation
pdco.icn	programmer-defined control operations
permute.icn	permutations, combinations, and such
phoname.icn	generate letters for phone numbers
plural.icn	produce plural of English noun

polystuf.icn	manipulating polynomials
pom.icn	compute phase of the moon
popen.icn	pipes
prime.icn	generate prime numbers
primel.icn	generate prime numbers from list
printcol.icn	format columnar data
printf.icn	printf-style formatting
prockind.icn	indicate kind of procedure
procname.icn	produce name of procedure
progary.icn	place program in a array
radcon.icn	radix conversion
randarea.icn	generate random points in areas
randfigs.icn	generate random figures
randomiz.icn	randomize the random number generator
randreal.icn	select random real number in range
randseq.icn	generate &random sequence
ranseq.icn	generate random integers over range
rational.icn	arithmetic on rational numbers
readline.icn	read and write lines in pieces
readtbl.icn	read user-created stripsgml table
real2int.icn	various real-to-integer conversions
rec2tab.icn	write record as string
recog.icn	recognition
recrfncs.icn	recursive functions
regexp.icn	regular-expression pattern matching
revadd.icn	generate reverse-summed integers
rewrap.icn	advanced line rewrap
rexx.icn	communicate between Icon and Rexx
rng.icn	generate random numbers
rpolys.icn	produce traces of regular polygons
rstars.icn	generate traces of regular stars
rstartbl.icn	produce calls for regular stars
saytime.icn	produce the time in English
scanmodl.icn	model string scanning
scanset.icn	setup for string scanning procedures
segment.icn	segment string
senten1.icn	generate sentences
sentence.icn	generate sentences in file
seqimage.icn	produce string image of Icon result sequence
showtbl.icn	show contents of a table

shquote.icn	quote word for UNIX-like shells
shuffle.icn	shuffle values
signed.icn	put bits into signed integer
slashbal.icn	balanced scanning with backslashes
slshupto.icn	upto() with backslash escaping
snapshot.icn	show snapshot of Icon string scanning
sortff.icn	sortf with multiple field arguments
soundex.icn	produce Soundex code for name
soundex1.icn	Soundex algorithm
speedo.icn	indcate percentage of completion
spirals.icn	produce traces of fractal stars
spokes.icn	draw spokes
statemap.icn	table of states and abbreviations
step.icn	generate in real increments
str2toks.icn	convert string to tokens
strings.icn	string utilities
strip.icn	strip characters from a string
stripcom.icn	strip comments from Icon line
stripunb.icn	strip unbalanced material
structs.icn	structure operations
symrand.icn	generate random points
tab2list.icn	put tab-separated strings in list
tab2rec.icn	put tab-separated strings in records
tblset.icn	set-theoretic table manipulation
tblutil.icn	table manipulation
tclass.icn	classify values as atomic or composite
tempname.icn	get temporary file name
title.icn	produce title portion of name
titleset.icn	produce set of titles
tokgen.icn	token counting
tuple.icn	process n-tuples
twists.icn	produce traces of “twists”
twt.icn	create two-way table
typecode.icn	produce letter code for Icon type
typesyms.icn	map type codes to event codes
unsigned.icn	put bits unsigned integer
usage.icn	service functions
varsub.icn	perform UNIX-shell-style substitution
version.icn	produce Icon version number
weighted.icn	shuffle list with randomness

wildcard.icn	UNIX-like wild-card pattern matching
word.icn	scan UNIX-style command line words
wordbyte.icn	manipulate words and bytes
wrap.icn	wrap output lines
xcode.icn	save and restore Icon data
xform.icn	transform points
ximage.icn	produce string image of structured data
xrotate.icn	rotate values in list or record

7.4 Include files — incl

evdefs.icn	event codes
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7.5 Procedures — gprocs

autopost.icn	activate PostScript recorder
barchart.icn	dynamically growing barchart
bitplane.icn	bitplane manipulation
button.icn	pushbutton sensors
cardbits.icn	constructing playing card images
clip.icn	clipboard operations
color.icn	dealing with colors
decay.icn	decaying-displays for windows
dialog.icn	dialogs
dialogs.icn	link to dialog
drawcard.icn	draw a playing card
drawlab.icn	draw figures
dsetup.icn	creating dialog boxes
enqueue.icn	queued events
evmux.icn	window event multiplexor
fetchpat.icn	fetch a pattern specification
gdisable.icn	disable graphics functions
glib.icn	graphics
gplib.icn	graphics tasks
gpxop.icn	graphics operations
graphics.icn	graphics
imagedim.icn	getting image dimensions
imscolor.icn	manipulating images
imsutils.icn	manipulate image specifications
imutils.icn	graphics utilities
imxform.icn	transform image matrices
joinpair.icn	connect pairs of points
linddraw.icn	draw L-System strings

lindinterp.icn	interpret and draw L-System strings
lssystem.icn	Lindenmayer systems support
optwindw.icn	open window with standard options
overlay.icn	overlay an image in a window
patutils.icn	manipulate patterns
patxform.icn	transform patterns in row form
psrecord.icn	PostScript record of window
putpixel.icn	write quantized, processed pixel
slider.icn	slider sensors
strpchart.icn	dynamic stripchart for windows
subturtle.icn	turtle-graphics (subset version)
turtle.icn	turtle-graphics interface
vbuttons.icn	buttons
vcoupler.icn	coupler variables
vdialog.icn	dialog boxes
vframe.icn	pane frame widgets
vgrid.icn	widget grids
widgets.icn	widgets
viface.icn	interfacing widgets
vmenu.icn	widget menus
vpane.icn	widget panes
vquery.icn	window queries
vradiobutton.icn	radio buttons
vscroll.icn	scrollbars
vsetup.icn	widget application setup
vslider.icn	sliders
vstd.icn	standard lookups
vstyle.icn	drawing buttons
vtext.icn	textual widgets
win.icn	open bare-bones window
window.icn	opening window
wipe.icn	wipe window area
wopen.icn	graphics input/output
xbfont.icn	X font selection
xcolor.icn	color
xcompat.icn	compatibility with 8.10 graphics
xgtrace.icn	draw traces of points
xio.icn	window I/O
xplane.icn	bitplane
xputpixel.icn	putpixel

xqueue.icn enqueue
xutils.icn graphics utilities

7.6 Include files — gincl

keysyms.icn event key symbols
xnames.icn graphic procedure names

7.7 Data — data

*.csg data for csg.icn
*.krs data for kross.icn
*.lbl data for labels.icn
*.rsg data for rsg.icn
*.tur data for turing.icn
*.txt plain text
chart.gmr data for ichartp.icn
conman.sav data for conman.icn
farber.sen “Farberisms”
header skeleton header for Icon program files
hebcalen.dat data read by hebcalen.dat
hebcalen.hlp help file for hebcalen.dat
hebcalpi.hlp data read by ProIcon version of hebcalen.dat
icon.wrd English words containing the substring “icon”
ihelp.dat data for ihelp.icn
linden.dat input to xlinden.dat
noci.wrd English words containing the substring “noci”
palin.sen Palindromic sentences
p*.gmr data for pt.icn
sample.grh sample data for graphpak.icn
termcap.dos termcap data for MS-DOS
termcap2.dos alternative termcap data for MS-DOS
verse.dat vocabulary for verse.icn

7.8 Data — gdata

*.iml lists of image strings
*.ims image strings in Icon code format
gpptest.gif GIF image from gpptest.icn
uix.dat data for testing XIB-to-VIB conversion
vibapp.icn sample VIB application
xibapp.icn sample XIB application
xnames.ed ed(1) script to convert 8.10 graphics function names to 9.0

7.9 Documentation — docs

address.doc	documentation for address procedures
gtrace.doc	documentation for graphic traces
hebcalen.hlp	documentation for hebcalen.icn
hebcampi.hlp	documentation for hebcampi.icn
iconmake.doc	Make skeleton for Icon
incl.kwc	keyword-in-context listing for incl
ipp.doc	supplementary documentation for ipp.icn
mr.man	manual page for mr.icn
post.1	manual page source for post.icn
polywalk.txt	description of polynomial programs
procs.kwc	keyword-in-context listing for procs
progs.kwc	keyword-in-context listing for progs
pt.man	manual page for pt.icn

7.10 Documentation — gdocs

gincl.kwc	keyword-in-context listing for gincl
gprocs.kwc	keyword-in-context listing for gprocs
gprogs.kwc	keyword-in-context listing for gprogs
penelope.ps	PostScript documentation for penelope.icn
vib.ps	PostScript documentation for interface builder
vidgets.ps	PostScript documentation for vidgets

7.11 Packages — packs

debug	Icon debugger
ftrace	function tracing
idol	Idol; object-oriented Icon written in Icon
loadfunc	C functions loaded dynamically

7.12 Packages — gpacks

ged	window-based editor
vdemo	widget demonstration programs
vib	graphics interface builder

8. Contributions to the Icon Program Library

New material for the Icon program library always is welcome. It must be prepared in the style exemplified by the material in this release. Adequate documentation is essential; it must be in the format used for present library — we do not have the resources to rewrite or reformat contributed documentation. Test data also must be provided — at least enough so that we can determine that the contributed program material is basically functional. In cases where test data is impractical because of the nature of the contribution, instructions for testing must be provided.

Program material can be submitted by electronic mail at one of the addresses given in the next section or on Macintosh or MS-DOS disks. Printed listings are not acceptable.

Contributions to the Icon program library must be free of any restrictions and may not carry copyright notices, even if accompanied by permission for unlimited copying.

The decision to include contributed material in the Icon program library rests entirely with the Icon Project. The Icon Project reserves the right to modify submissions to conform to library standards, to correct errors, and to make improvements. Contributors will be consulted in the case of substantial changes.

9. Feedback

If you encounter problems with material in the Icon program library, please let us know. If you can provide corrections or improvements to library material, please send them by electronic mail or on a diskette.

We can be reached as follows:

Icon Project
Department of Computer Science
Gould-Simpson Building
The University of Arizona
Tucson, AZ 85721
U.S.A.

(602) 621-8448 (voice)

(602) 621-4246 (fax)

icon-project@cs.arizona.edu (Internet)

... uunet!arizona!icon-project (uucp)

Acknowledgements

Dozens of persons have contributed material to this release of the Icon program library. See the program material itself for authorship information.

References

1. R. E. Griswold, C. L. Jeffery and G. M. Townsend, *Version 9.0 of the Icon Programming Language*, The Univ. of Arizona Icon Project Document IPD236, 1994.
2. C. L. Jeffery, G. M. Townsend and R. E. Griswold, *Graphics Facilities for the Icon Programming Language; Version 9.0*, The Univ. of Arizona Icon Project Document IPD255, 1994.