source outline

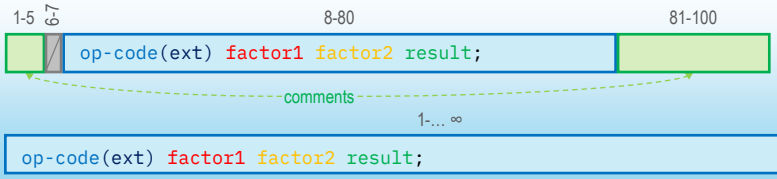
main section

- ctl-opt — control specifications (default *LIBL/RPGLEHSPEC QRPGLE/DFTLEHSPEC)
- dcl-pr / dcl-pi — prototypes / procedure interface
- dcl-f, dcl-s, dcl-ds, dcl-c, dcl-enum — global definitions (files, variables, data structures, arrays, constants, enumerations)
- exec sql — SQL precompiler options / SQL cursor declarations
- main source
- begsr — global subroutines

subprocedure section

- dcl-proc — procedure specification
- dcl-pi — procedure interface
- dcl-f, dcl-s, dcl-ds, dcl-c, dcl-enum — local definitions (files, variables, data structures, arrays, constants, enumerations)
- procedure body
- begsr — local subroutines

free-form statements



syntax rules

- case insensitive
- comment: //
- continuation character: +
- end instruction: ;
- variable naming: don't start with number
- built-in functions: %function-name(parm1:parm2:...)

indicators

- 0 - *off / 1 - *on
- *inxx (xx 1 to 99)
- *inlr last record
- *inkx key function
- op.code: eval

F1	F2	F3	F4
KA	KB	KC	KD
F5	F6	F7	F8
KE	KF	KG	KH
F9	F10	F11	F12
KI	KJ	KK	KL
F13	F14	F15	F16
KM	KN	KP	KQ
F17	F18	F19	F20
KR	KS	KT	KU
F21	F22	F23	F24
KV	KW	KX	KY

data types / keywords

	Tipo	Keyword	Length
alphanumeric (EBCDIC sequence)	character fixed length	char	1-16773104
	character varying length	varchar	1-16773100
	character UCS fixed length	ucs2	1-8386552
	character UCS varying length	varucs2	1-8386550
	graphic fixed length	graph	1-8386552
	graphic varying length	vargraph	1-8386550
numeric	binary	bindec	1-9
	float	float	4, 8
	integer	int	3, 5, 10, 20
	unsigned	uns	3, 5, 10, 20
	zoned decimal	zoned	63,63
	packed decimal	packed	63,63
date/time	date	date	
	time	time	
	timestamp	timestamp	26-32
other	boolean	ind	1
	pointer	pointer	16 bytes
	pointer to procedure	pointer(*proc)	16 bytes
	object	object	

logical operators

= <> > >= < <=
AND OR NOT IN

operation codes

code extender: (a), (d), (e), (h), (m), (n), (p), (r), (t), (z)

assignment operators

= += -= *= /= **=
op.code: clear, eval, evalr, reset

arrays

index from **1** to 16.773.104

definition: ... dim(max-entries | *var:maxentries | *auto:maxentries | *ctdata)

time: run-time / compile-time (CTDATA) / prerun-time

syntax: array-name(index|*|*next)

operator: in

operations code: for-each, sorta

BIF: %concatarr, %elem, %fields, %hival, %list, %lookupxx, %loval, %maxarr, %minarr, %split, %subarr, %tlookupxx, %xfoot

SQL data types (SQLTYPE())

	Tipo	Keyword	Length
binary	binary fixed length	binary	1-32766
	binary varying length	varbinary	1-32740
LOB	character Large Object	clob	1-16773100
	double byte large object	dbclob	1-8386550
	binary large object	blob	1-16773100
	LOB file reference	clob_file dbclob_file blob_file	
	LOB locator	clob_locator dbclob_locator blob_locator	
LOB XML	XML	xml_clob xml_dbclob xml_blob	1-16773100 1-8386550 1-16773100
	XML file reference	xml_clob_file xml_dbclob_file xml_blob_file	
	XML locator	xml-locator	
other	ROW ID	rowid	
	resultset locator	result_set_locator	

character variables

concatenation: +

op.code: clear, eval, evalr, reset

BIF: %char, %charcount, %check, %checkr, %concat, %left, %lower, %max, %min, %replace, %right, %scan, %scanr, %scanrpl, %split, %str, %subst, %trim, %triml, %trimr, %ucs2, %upper, %xlate

numeric variables

operators: + - * / **

op.code: clear, eval, reset

BIF: %abs, %dec, %dech, %div, %editc, %editw, %float, %hival, %int, %inth, %loval, %max, %min, %rem, %sqrt, %uns, %unsh

data structures

keyword definition: alias, based, const, ext, extfld, extname, inz, likeds, likerec, overlay, pos, prefix, qualified, samepos, template

op.code: clear, eval, eval-corr, reset

reference to subfield qualified ds: dsName.subfieldName

special data structures

- file information (INFDS)
- program status (PSDS)
- indicator (INDDS)

caption: reference / examples / articles

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structured operations

dou — *do until*: execute at least **once** performed **until** the expression **is true**; expression is evaluated **at the cycle end**

dow — *do while*: performed **while** the expression **is true**; expression is evaluated **at the cycle start**

dow *on — *endless loop*

```
dcl-s ForEverTrue ind inz(*on)
dow ForEverTrue
```

```
dcl-s i int(10)
for i=1
```

for: controls the number of times the group will be processed

for-each: process the items in the array or enumerated constants

BIF: %list, %subarr

iter — go to enddo

leave — go after enddo

enddo

endfor

if *cond1* — *cond1* true

elseif *cond2* — *cond2* true

else — all *cond* false

endif

select

when *cond1* — *cond1* true

when *cond2* — *cond2* true

other — all *cond* false

endsl

select *expr*

when-is *value*

when-in *array*

other — all *cond* false

endsl

operator: in

BIF: %list, %range

subroutines

begsr ← **exsr**

exit **leavesr**

endsr

*inzsr — initial subroutine

*pssr — error subroutine

static call

callp

return — return to caller

on-exit — execute when procedure ends

no recursivity in the same activation group

prototyped parameters

/copy **source prototype** dcl-pr /copy

caller — exact match — **called** dcl-pi

BIF: %addr, %omitted, %parmnum, %parms, %passed, %proc

max parm (program): 255

max parm (procedure): 399

API prototypes

API finder

Types of API: based-programs, service-program-based, ILE CEE, UNIX-type

API finder prototypes:

- QSYSINC/QRPGLESRC
- Easy400.net
- Scott Klement, da C a RPG
- Midrange
- iOpen Bob Cozzi

data areas

keyword definition: dtaara

op.code: in, out, unlock

BIF: %addr, %alloc

*LDA

variable info

BIF: %decpos, %len, %nullind, %size

XML, JSON

op.code: data-gen, data-into, xml-into, xml-sax

BIF: %data, %gen, %handler, %parser, %xml

object

BIF: %this

date and time

formats

keyword definition: datfmt

operator: +, -

op.code: eval, test

BIF: %char, %date, %days, %dec, %diff, %hours, %minutes, %months, %mseconds, %seconds, %subdt, %time, %timestamp, %years

constant prefix: d, t, z

user date special word: UDATE, UMONTH, UYEAR, UDAY, C*DATE, *DATE, *MONTH, *YEAR, *DAY

duration code: *years/*y, *months/*m, *days/*d, *hours/*h, *minutes/*mn, *seconds/*s, *mseconds/*ms

embedded SQL

syntax: **exec sql . . .;**

host variables: :VarName

used in clause: where, select, into, order by, set, values (insert), call

indicator variables: int(5)

support extended indicators: compilation *extind

SQL communication area: SQLCA

SQL descriptor area: SQLDA

Error handlers

Priority:

1. error extender (e)
2. monitor group
3. subroutine *pssr (file)

keyword f-spec: infsr

4. ILE condition handlers
5. subroutine *pssr (programma)
6. RPG default error handler

op.code: monitor

BIF: %error, %status

files

database | display | printer

keyword: alias, commit, extdesc, extfile, extmbr, infds, prefix, qualified, rename, template, usage, usropn

keyword for display/printer file: indds, oflind, printer, sfile, workstn

operations code

keyed input: chain, reade, readpe, setll, setgt

sequential input: read, readp

data manipulation: delete, update, write, unlock

commitment control: commit, rolbk

file: close, open

display file only: exfmt, readc

BIF: %eof, %equal, %error, %fields, %found, %kds, %open, %status

pointers

op.code: dealloc

BIF: %addr, %alloc, %paddr, %realloc

binder language

```
STRPGMEXP PGMLVL(*CURRENT) SIGNATURE('V1R1')
  EXPORT SYMBOL(p1)
  EXPORT SYMBOL(p2)
  ...
ENDPGMEXP
STRPGMEXP PGMLVL(*PRV) SIGNATURE('V1R0')
  EXPORT SYMBOL(p1)
ENDPGMEXP
```

Compiler directives

start at column >= 7 or >=1 (for all free). End semicolon not required

/COPY or /INCLUDE [library/file,member|"ifs_path"]: copy the external source member

defining condition:

/DEFINE or /UNDEFINE:

/IF [NOT] DEFINED(nome-direttiva)

…;

/ELSEIF

…;

/ELSE

…;

/ENDIF

/EOF: ignore the rest of source

figurative constants

*BLANK, *BLANKS = ' '

*ZERO, *ZEROS = 0

*ON = '1' / *OFF = '0'

*NULL = valore nullo

*LOVAL = valore minimo / *HIVAL = valore massimo

*ALL'x' = ripete 'x' per la lunghezza massima della variabile

message

op.code: snd-msg

BIF: %msg, %target

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