

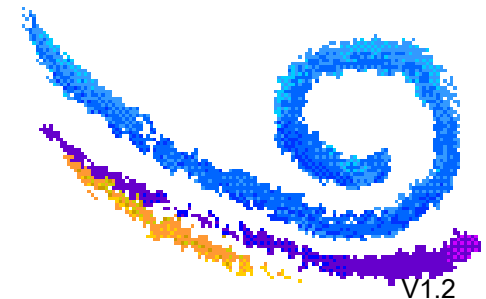
# COBOL Changes

**Data types allowed in COBOL programs**

# All Data Items Must Be Described

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- ▶ Two clauses are relevant to the description:
  - USAGE IS clause
    - Strangely enough, both the words USAGE and IS are optional - the compiler looks for the actual allowed data types
  - PICTURE clause
    - Required for some usages; for others, it is not allowed



# USAGE Types

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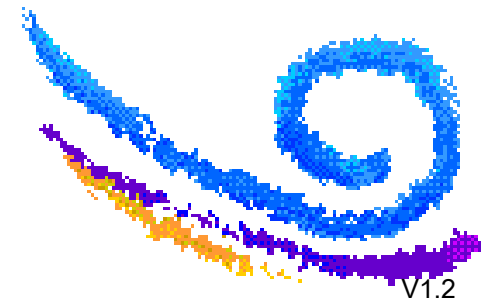
## ► Here is the complete list of reserved words for USAGE:

BINARY	- same as COMP and COMP-4; binary integer (COBOL II)
COMP	- binary integer data
COMP-1	- single precision floating point
COMP-2	- double precision floating point
COMP-3	- packed decimal data
COMP-4	- binary integer data
NOTE: binary, comp, comp-4 are all the same; values in these kinds of fields may be truncated, based on compiler options and the particular work being done	
COMP-5	- binary integer, but never truncated (COBOL for OS/390 (V2R2) )
PACKED-DECIMAL	- same as comp-3 (COBOL II)
INDEX	- binary value: displacement into a table
DISPLAY	- character string; single byte characters
DISPLAY-1	- character string; double byte characters
NATIONAL	- character string; UTF-16 (Unicode) (Enterprise COBOL (V1R3) )
POINTER	- address of data item
PROCEDURE-POINTER	- address of program entry point (8 bytes) (COBOL/370 (V1R1) )
FUNCTION-POINTER	- address of program entry point (4 bytes) (Enterprise COBOL (V3R1) )
OBJECT-REFERENCE	- handle for accessing a class in OO COBOL (COBOL for MVS (V1R2) )

# PICTURE Clause

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- ▶ A PICTURE (or simply PIC) clause is required for these data types:
  - Numeric data
    - Binary, comp, comp-4, comp-5
    - Comp-3, packed-decimal
  - String data
    - Display
    - Display-1
    - National



# PICTURE Clause, continued

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- ▶ A data item may have a PIC clause with no USAGE
  - In that case, the implied USAGE is
    - DISPLAY if the PIC has no G nor N items
    - DISPLAY-1 if the PIC has G items, or N items if the compiler option NSYMBOL is DBCS
    - NATIONAL if the PIC has N items and the compiler option NSYMBOL is NATIONAL (the default)



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