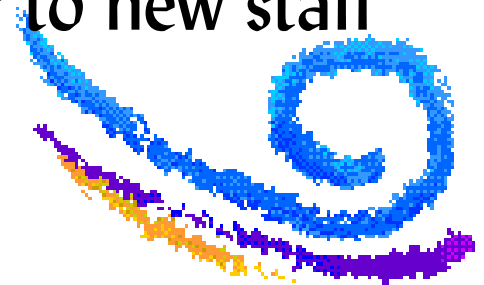


New Tricks for Old Dogs

**Modern IBM Mainframes - Programming
Languages**

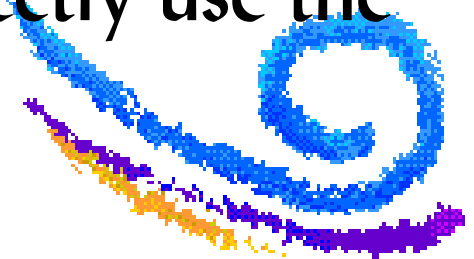
Programming Languages

- ▶ All current compilers now use a common run time environment - Language Environment
- ▶ Facilitates mixing languages in applications
 - Keep and extend COBOL and PL/I applications - familiar to experienced staff
 - Add C/C++ and Java into the mix - familiar to new staff



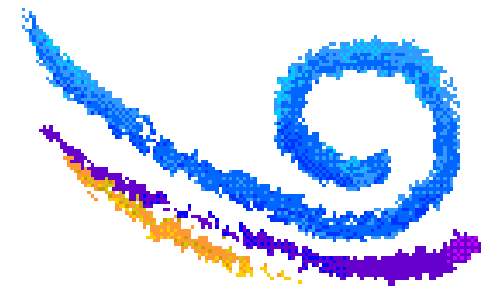
Programming Languages, continued

- ▶ Assembler language programs can remain as is
 - Old code still works
- ▶ Or you can modify Assembler programs to make them LE-conforming
 - Easier inter-language communication
 - Richer set of callable services available
- ▶ Assembler language programs can also directly use the new hardware instructions



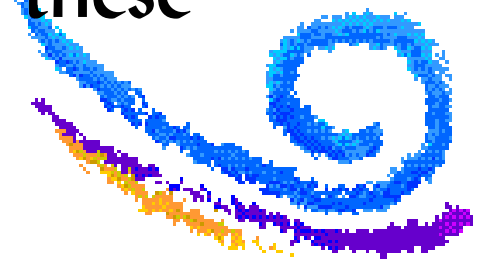
Programming Languages, continued

- ▶ Programs compiled using current compilers, and LE-conforming Assembler, have access to
 - C functions - no need to call a C subroutine
 - Language Environment services
 - UNIX kernel services, including socket programming
 - TSO commands
 - REXX variables



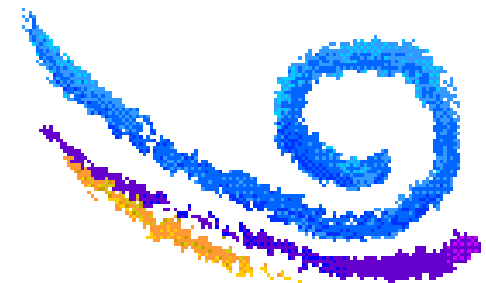
Programming Languages, continued

- ▶ DLLs - Dynamic Link Libraries
 - Dynamic linkage different from classic dynamic linkage
 - Allows packaging of many functions and variables in a single loadable object
- ▶ COBOL, PL/I, C/C++, even Assembler, can now access DLL routines
- ▶ DLL routines may also be written in any of these languages



Programming Languages, continued

- ▶ XML - eXtensible Markup Language
 - International standard for creating self-describing documents
 - Basis for future Web-oriented services
- ▶ Under z/OS: current COBOL, PL/I, C/C++, and Java have support for XML handling
 - Native XML PARSE language constructs
 - XML Toolkit



Programming Languages, continued

- ▶ Unicode - single encoding for all human languages
- ▶ Standard encoding scheme for HTML 4.1, XML
- ▶ Three separate encoding formats
 - UTF-32 - four bytes per character
 - UTF-16 - two bytes per character, some use four
 - UTF-8 - one, two, three, or four bytes per character
- ▶ All three supported in Assembler; UTF-16 support in COBOL, PL/I, C/C++, Java





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