Fourth Generation Languages 4GLs

A fourth generation (programming) language (4GL) is a grouping of programming languages that attempt to get closer than 3GLs to human language, form of thinking and conceptualization.

4GLs are designed to reduce the overall time, effort and cost of software development. The main domains and families of 4GLs are: database queries, report generators, data manipulation, analysis and reporting, screen painters and generators, GUI creators, mathematical optimization, web development and general purpose languages.

A number of different types of 4GLs exist:

- Table-driven (codeless) programming, usually running with a runtime framework and libraries. Instead of using code, the developer defines his logic by selecting an operation in a pre-defined list of memory or data table manipulation commands. In other words, instead of coding, the developer uses Table-driven algorithm programming (See also control tables that can be used for this purpose). A good example of this type of 4GL language is PowerBuilder. These types of tools can be used for business application development usually consisting in a package allowing for both business data manipulation and reporting, therefore they come with GUI screens and report editors. They usually offer integration with lower level DLLs generated from a typical 3GL for when the need arise for more hardware/OS specific operations.
- Report-generator programming languages take a description of the data format and the report to generate and from that they either generate the required report directly or they generate a program to generate the report. See also RPG
- Similarly, forms generators manage online interactions with the application system users or generate programs to do so.
- More ambitious 4GLs (sometimes termed fourth generation environments) attempt to automatically generate whole systems from the outputs of CASE tools, specifications of screens and reports, and possibly also the specification of some additional processing logic.
- Data management 4GLs such as SAS, SPSS and Stata provide sophisticated coding commands for

data manipulation, file reshaping, case selection and data documentation in the preparation of data for statistical analysis and reporting.

Some 4GLs have integrated tools which allow for the easy specification of all the required information:

- James Martin's version of Information Engineering systems development methodology was automated to allow the input of the results of system analysis and design in the form of data flow diagrams, entity relationship diagrams, and entity life history diagrams etc. from which hundreds of thousands of lines of COBOL would be generated overnight.
- More recently Oracle Corporation's Oracle Designer and Oracle Developer Suite 4GL products could be integrated to produce database definitions and the forms and reports programs.

Some fourth-generation languages are:

General use / versatile

- Perl
- Python
- Ruby
- DEC RALLY
- SheerPower4GL (Microsoft Windows only)
- SQLWindows/Team Developer
- Uniface
- Visual DataFlex (Microsoft Windows only)
- WinDev
- Unix Shell
- XBase++