Altera's MAX+PLUS II Development System

- Supports Altera MAX and FLEX devices
- Various methods of design entry, including schematic capture, waveform entry, and the AHDL and VHDL hardware description languages (HDLs)
- Documentation:
  - Brief overview in Salcic Section 3.4
  - Altera's "data sheet" overview (~20 pages) (link on class web page)
  - Altera's "Getting Started" manual (~ 350 pages) (link on class web page)
    - Detailed overview in Chapter 2, "A Perspective" (~80 pages)
      - Printout(s) in VLSI Design Lab
      - Online — link on class web page
        - Note placement of Linux xterminals immediately beside PCs
    - Chapter 3, "Tutorial"

Using the MAX+PLUS II Software

- 7.21 Student Edition in Salcic book
  - Runs on PCs
    - Windows 3.1, 95, NT 3.51 & 4.0
    - Documentation says it requires 32MB of memory, 35MB of disk space
  - Differences from commercial version:
    - Can't use non-Altera design entry tools
    - Only supports devices on UP1 Educ. Board
    - Can't generate output files other than for programming chips on UP1 Educ. Board
  - You can install at home, but must register with Altera (see Altera's web page) to get an authorization code to use it
    - Start installing, get Software Guard ID
    - Use form on web page to send it to Altera
    - Within 12 hours, should get Authorization Code from Altera by email
    - Input into MAX+PLUS II to enable it
  - To be installed on PCs in VLSI Design Lab

Using the MAX+PLUS II Software

- 8.0 = almost current "commercial" version
  - Installed on workstation vlsi.mcs.kent.edu
  - Accessible in VLSI Design Lab:
    - At vlsi's console
    - Through two Linux PC's acting as xterminals
  - Should be accessible on dept. xterminals
  - Will be installed on PCs in VLSI Design lab if necessary (not currently planned)
- Procedure for projects:
  - Work on projects:
    - at home,
    - in the VLSI Design Lab, or
    - on any dept. workstation or xterminal
  - Then:
    - come to the VLSI lab to download and test your design on a UP1 Education Board

Using the MAX+PLUS II Software on vlsi.mcs.kent.edu

- Everyone in this class has access to "vlsi"
  - HP C180, 384MB of memory
- To run MAX+PLUS II:
  - Either type this line before running MAX+PLUS II, or add this line to your ".cshrc" file so that it executes every time you log in:

    setenv LM_LICENSE_FILE /local/opt maxplus2/adm/license.altera
  - Run MAX+PLUS II by typing:

    /local/opt/maxplus2/bin/maxplus2
  - The first time it runs, it will copy the initialization file "maxplus2.ini" to your home directory
  - If you telnet from another workstation's console, you must tell it to give vlsi access to its display ("xhost +vlsi"), and set your DISPLAY variable on vlsi to point to that console ("setenv DISPLAY *machine*:0.0")

Altera MAX+PLUS II Overview

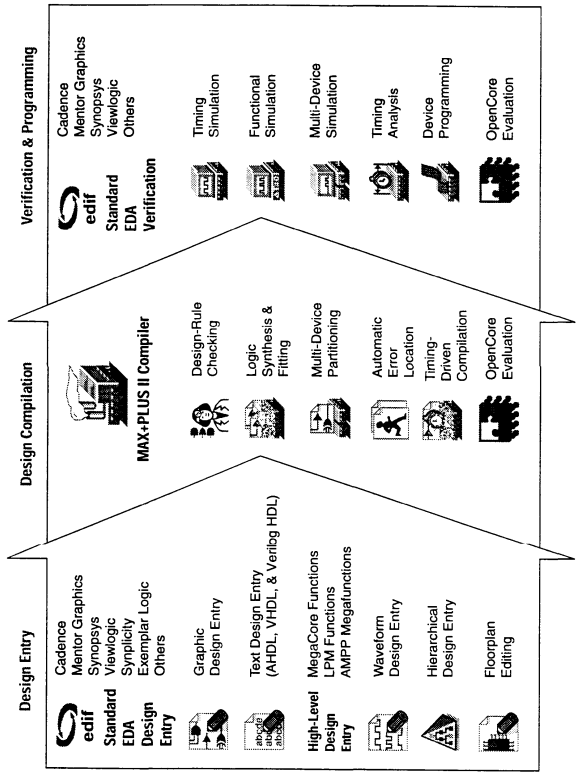

Figure from Altera technical literature

MAX+PLUS II Design Entry

- A design is organized into a project
  - Multiple levels of hierarchy
- Various methods of design entry
  - Graphic design entry
    - Symbol entry
  - Text design entry (AHDL, VHDL)
  - Waveform design entry
  - Floorplan editing
  - Hierarchical design entry
  - Netlists produced by other vendors' design entry tools (e.g., Viewlogic's Workview Office) can be used as input
  - Errors identified during compilation, simulation, and timing analysis are automatically located and highlighted in the appropriate file

Using Predesigned Components in MAX+PLUS II

- Various components available
  - "Old-style macrofunctions" = 74-style
    - Familiar, but not recommended since they aren't as optimized as components below
  - Primitives
    - Gates, flip-flops, buffers
  - Standardized LPM (Library of Parameterized Modules) functions
    - Gates, arithmetic, & storage components
  - Complex predesigned "megafunctions"
    - Controllers, DSPs, communications…
    - Others available from Altera's partners
      - Use non-savable "preview" to evaluate
        - » Buy post-synthesis netlist for $
        - » Buy HDL source for $$$
- For documentation on these components, see MAX+PLUS II online help, or info on Altera's web site (link on class web page) or the Altera Digital Library CDROM

Getting Help in MAX+PLUS II

- Help menu provides basic documentation
  - AHDL, VHDL (language, use with MPII)
  - Megafunctions / LPM (LPM grouped by function, then megafunctions)
  - Old-Style Macrofunctions (grouped by function, also available by number)
  - Primitives (grouped by function)
  - Devices and adapters (FLEX 10K, etc.)
  - Messages, glossary, info about this release, how to use help
- Help syntax
  - Most links are shown in green text
    - Underlined links jump to new help topics
    - Dotted-underlined links pop up a glossary entry
  - Blue links pop up an example, list of shortcuts, or illustration

Getting Help in MAX+PLUS II (cont.)

- Help menu also provides application-specific documentation (e.g., Graphics Editor Help) in a sub-menu
  - Introduction (how to get started)
  - Basic Tools (inputs/outputs, tools, toolbars, components, examples)
  - Commands (details on every command in the application, examples, illustrations)
  - Procedures (step-by-step instructions on how to perform various tasks in the application)
  - Golden Rules (essential tips and rules for using the application)
  - Shortcuts (keyboard, mouse button, and toolbar shortcuts for commands in the application)
  - Messages (explanation of error messages for the application)