IC Design

DESIGN FLOW
Hierarchical design methods are used to manage complexity in integrated circuit design. Design starts with a high level view of the system that is decomposed into smaller functional blocks and possibly further decomposed into yet smaller blocks until each small block represents a circuit for which a physical design, i.e. layout, will be done. Construction is then from the bottom up meaning that the smallest blocks called leaf cells are laid out and tested. The smaller blocks are then combined into larger blocks and so forth until the whole circuit is constructed.

Here is a design flow for what is called full-custom design:

!   Initial design
  - Functional specification
  - Performance specification
!   Block diagram representation of the system
!   Decomposition into smaller blocks documented with block diagrams or logic diagrams
!   Create floor plan for overall design
!   Create schematics for leaf cells
  - Simulate leaf cell
  - Create a symbol for the cell
  - Create viewpoints for downstream applications
  - Create a netlist
!   Layout leaf cell
  - Check for layout rule violations (DRC)
  - Check layout against schematic (LVS)
  - Extract parasitics and back annotate the design
  - Verify circuit operation including layout parasitics via simulation
!   Layout logic blocks using leaf cells
  - Check for layout violations
  - Check layout against schematic
  - Simulate

!   Continue the above sequence until the complete system is in one top-level block
!   Generate the pad frame
!   Install the top-level block into the pad frame
!   Simulate complete system
!   Tape-out!! i.e. create a file(s) that will be sent for fabrication