Automated Circuit To MAGIC VLSI Layout Engine Using Open Source EDA Tools

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***Abstract*—Circuit design and layout designing are most significant design flow steps in VLSI . Circuit and layout design are both manual design process which is one of most time wasting process.In this paper, we will see how to overcome this problem using open source eda tools and programming languages.Circuit simulation is carried out by some EDA tools like e-sim,Multisim,etc. & VLSI layout can be design using softwares like MAGIC,microwind.The problem in the VLSI design is there is no any software available which can automatically read circuit and design layout or sub parts of layouts like stick diagrams.Circuit simulation is one of the essential step in designing but VLSI layout designing can be implemented through simulated circuit and programming languages like TCL/C/C++/Python/Perl.The process can be called as automatic circuit to VLSI layout engine which will automatically read circuit and according to that layout operations will be performed.The idea is explained in this paper where flow of implementation is discussed.Basically using an open source EDA tools we can simulate and design circuit , the following circuit will be read by programming languages such as python and according to the phases of circuits it will design a stick diagram and using draw methods of python library layout of the circuit can be design.This layout will consists of all essential parts like contact,n-diffusion,p-diffusion,metal layer. [2]**

***Keywords Terms*—EDA(Electonics Design Automation),PCB(Printed Circuit Board),Stick diagram,Turtle graphics**

I. INTRODUCTION

VLSI -Very large scale integration is one of the most important electronics field where we design circuits ,its layout,system with better performance.To design VLSI based system the flow includes design specifications,architectural design, functional and logic design.Also circuit designing,simulation layout design,physical design,sysnthesis and fabrication are design flow steps of VLSI.The purpose of circuit simulation and design is to develop a circuit reperesentation based on its logic states.The circuit diagrams includes cells,gates,transistors,source,ground,etc.This circuit is used to design layout of circuit.Basically, layout is geometrical representation of circuit which represents each logic element/component into its geometrical configuration.This designing of layout includes stick diagram and λ-rule.The layout design process is one of the complex and important design because next step i.e fabrication depends on layout design.There are various open source EDA tools available for circuit design and simulation for example e-Sim ,Multisim.

For designing of layout tools such as MAGIC,microwind are used.

In this following paper we will see about,what are current methods to design circuit and simulate it, also for layout designing.We will discuss effective method of automatic circuit to VLSI layout engine.

II. EDA TOOLS : E-SIM & MAGIC

EDA is electronics design automation tools used in circuit designing & simulation,synthesis, layout designing,etc.There are many open source EDA tools available like e-Sim,NgSpice,KiCAD ,MAGIC circuit designing and layout designing.

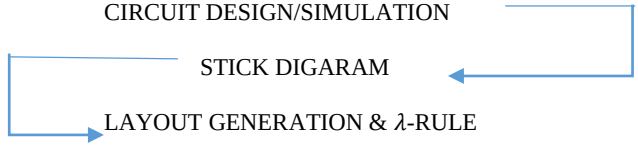
Specifically for the given project we required circuit designing tool from that we can read circuit and make its layout automatically.

e-Sim is open source tool for designing circuit,analysis,simulation and PCB design.Here we can draw circuit using e-sim and this circuit can be used for layout generation automatically using software languages such as p ython,perl,TCL.MAGIC tool is open source tools basically used for layout gen eration.Here the problem with both the tools is that , e-sim can only deal with circuit simulation and dsdesigning while MAGIC can only deal with layout designing.There is no shakehand in between both of this softwares.

III. STICK DIAGRAM & λ-RULE

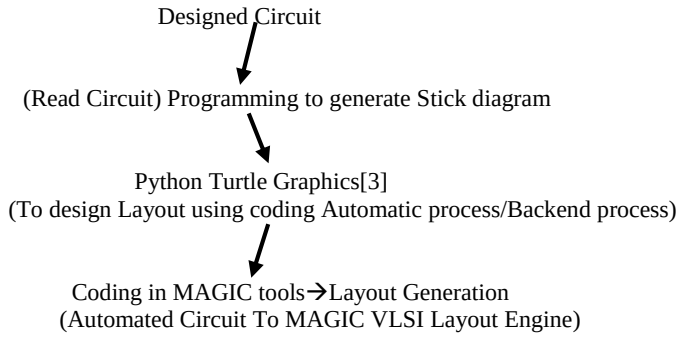
A stick diagram is kind of representation used to plan layout of circuit components, it uses sticks to represents different regions like supply voltage , ground PMOS,NMOS,etc.It is middle step lies between circuit design and layout. λ-Rule are set of rules designed for width,spacing between elements,rules for active area in layout designing.

Overall steps are:



IV. IDEA FOR IMPLEMENTATION

To implement automatic circuit of MAGIC VLSI Layout Engine we will make use of EDA tool e-SIM & programming language Python.Here we will use python turtle graphics to draw our VLSI layout automatically in backend using given circuit.The circuit can be input for python program, the program will be designed such as it will read circuit components and efficiently it will draw layout.In backend color coding,spacing i.e . λ-rule will be added to meet correct specification.The art of layout may include eulers path and stick diagram[4].This tools will be able to desgn layout without any manual help i.e it will work independently, hence required time for layout design manually can be decreased.The process algorithm involves:



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