FPGA Lab Exercise for SERC HEP School

Aim: To study the Concept of configuring a FPGA to implement different digital circuits by writing simple HDL programs (both Verilog and VHDL) and testing the same using the DE2 Altera FPGA Board.

Prerequisites : The Altera Quartus Tool installed on the host machine that is going to be interfaced with the Board, the pin assignments file (will be given) ,The Board manual for reference (softcopy will be provided),knowledge of the HDL (either VHDL/Verilog syntax –sample file given and demonstrated too)

The instructions to use the Quartus tool is as follows :

1. From the File Menu choose > New Project Wizard
2. > Define Path > Enter Project Name (eg. "abc") .
3. Fill Top Level Design Entity Name as "Project Name_top" (eg. "abc_top") > Next .
4. No files to be added > Next .
5. Family and Device Settings . Family > Cyclone II .
6. Select EP2C35F672C6 > Next.
7. No changes to be made in EDA settings > Next > Finish.
8. Create New File - File > New.
9. Select VHDL or Verilog HDL.
10. Save file in the same location in which the Project is created.
11. If another old file is opened instead , in Project Menu , clock on Add Current File to Project or Add/Remove Files in Project.
12. Write the Code in the Text Editor and Save.

13. The Module (Entity) name must be the same as the Name of the File.

14. In the Project Navigator , click on the Files Tab and right click on File and ' Set as Top Level Entity'

15. Processing > Start Compilation

16. After Compilation is over, assign pins in the Assignment Editor.

17. Assignments > Assignment Editor

18. In Assignment Editor , change category to Pins.

19. Select Variables in the 'To' column.

20. In 'Location , select respective Pin Nos.

21. Compile again.

22. After the compiling is over (Till the "Assembler" stage) ,choose option Tools > Programmer

23. Mode - JTAG

24. Add File > Add the file_name.sof file last created.

25. Click on Start.

26. Test the implemented logic on the Board using the switches and the LEDS,Seven Seg Displays.

The Exercise will be therefore to implement different simple digital circuits AND, OR, Counter, Adder, Multiplexer and so on.