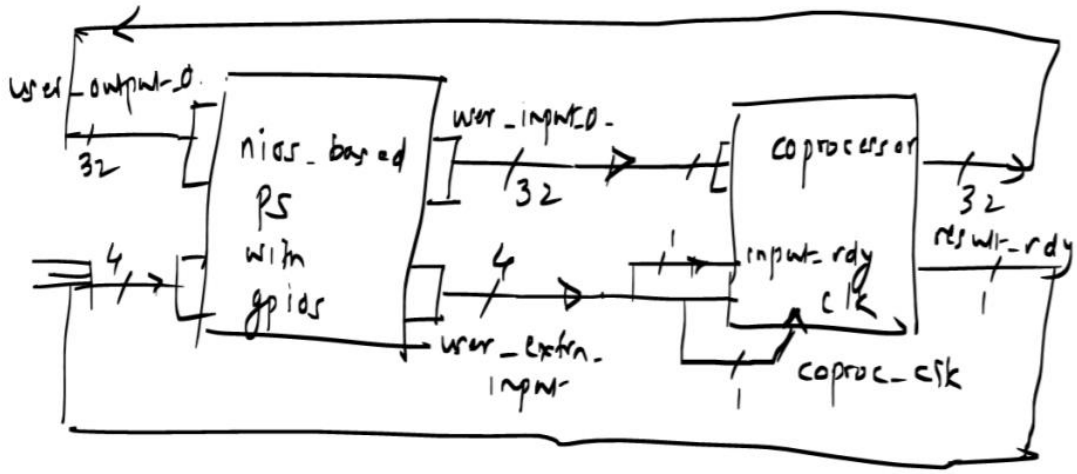
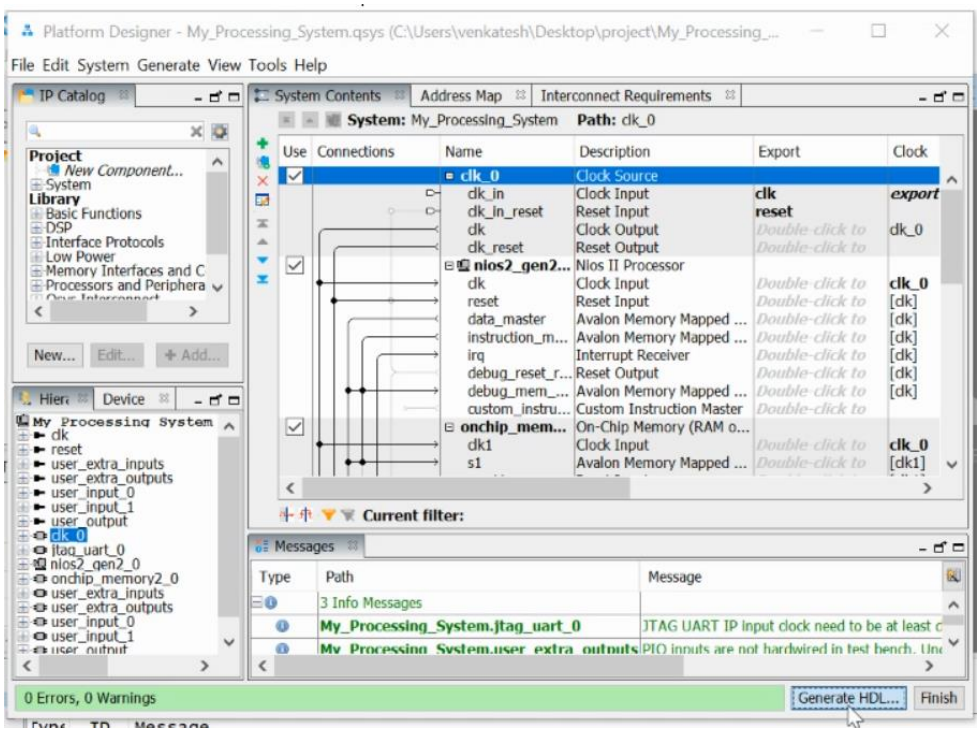
IMPLEMENTATION OF IRIS FLOWER CLASSIFICATION ON DE0 NANO BOARD

NIOS based processor system block diagram:-

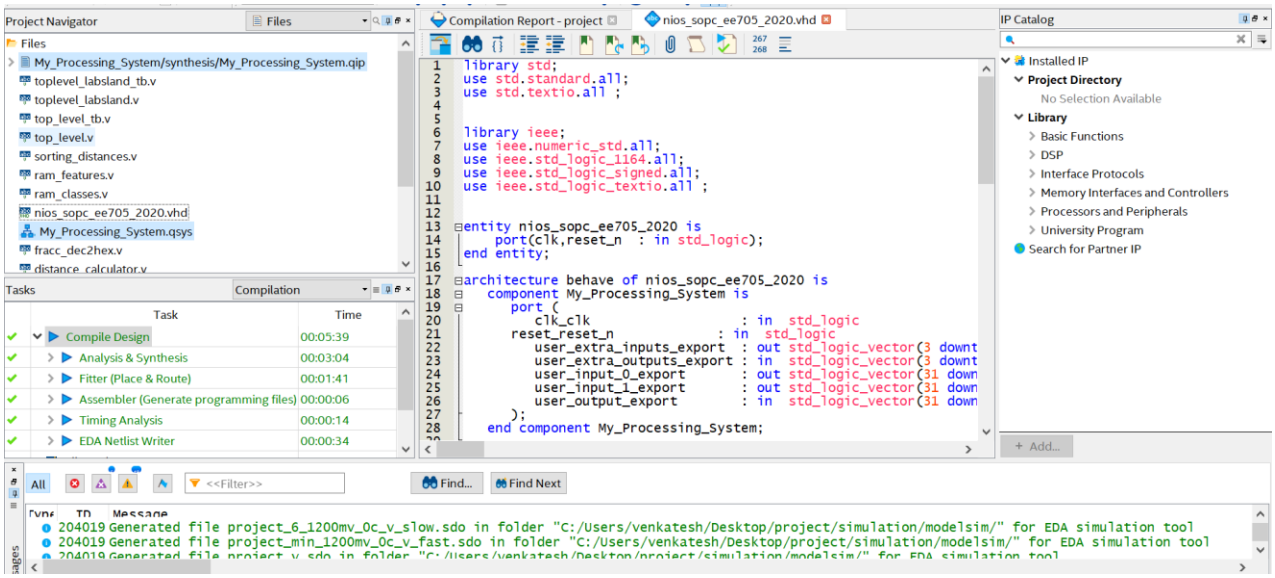


-----Reference taken from EE705 spring 2019 course

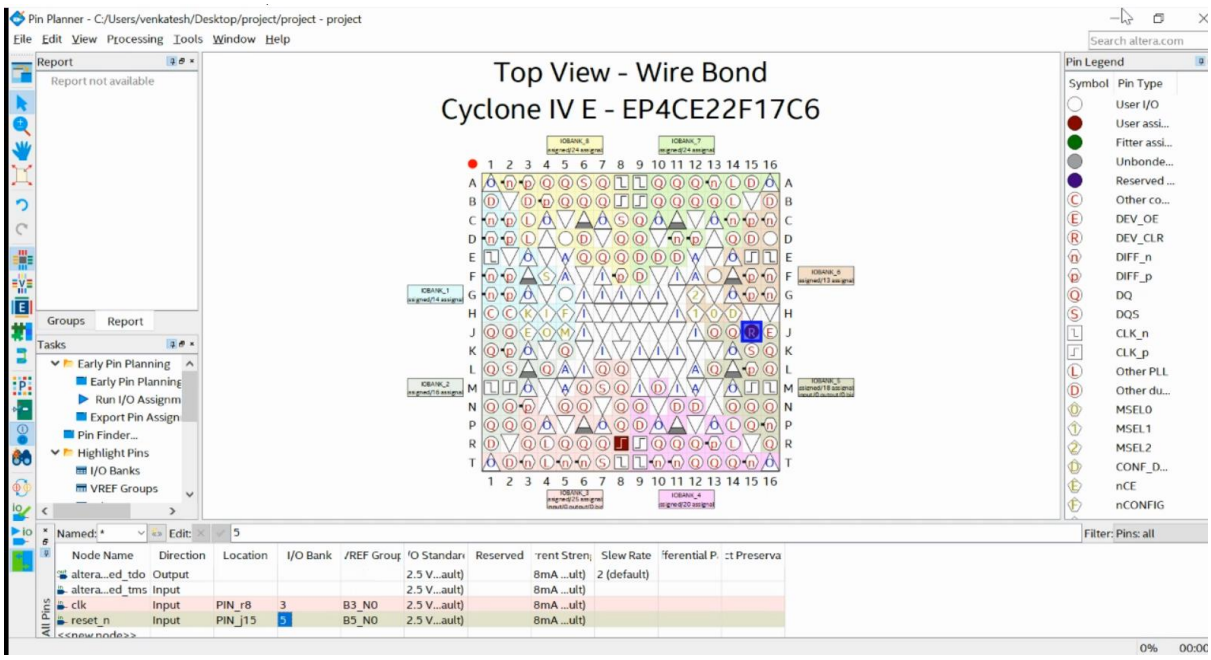
- The Co processor in the above figure is the top level module of our design and the NIOS based PS with GPIOs is the interfacing module to send test inputs from NIOS CPU to the design.



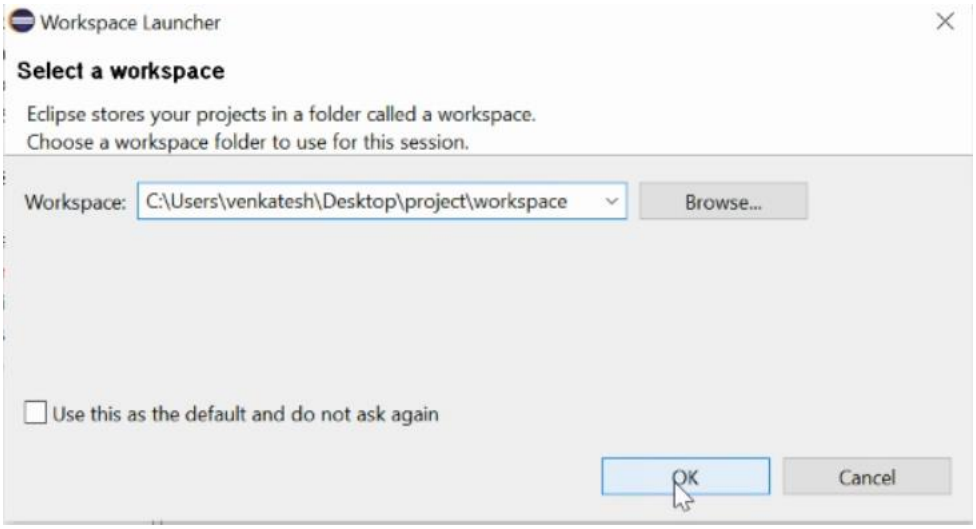
- To use GPIOs, NIOS CPU and JTAG, .qip file is generated using platform designer with the .qsys file as input. Now add the generated .qip file to the project directory.



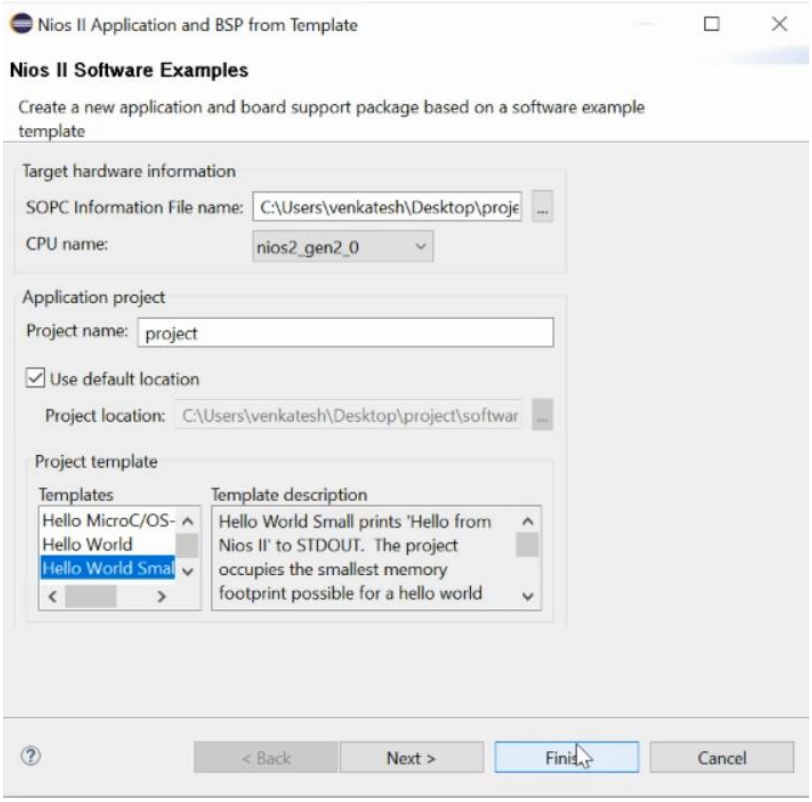
- Now, set the NIOS_SOPC_EE_705 as top level and perform Analysis & Synthesis.
- Now assign IO pins in pin planning as follows:
  1. CLK – PIN_R8
  2. RESET_N – PIN_J15



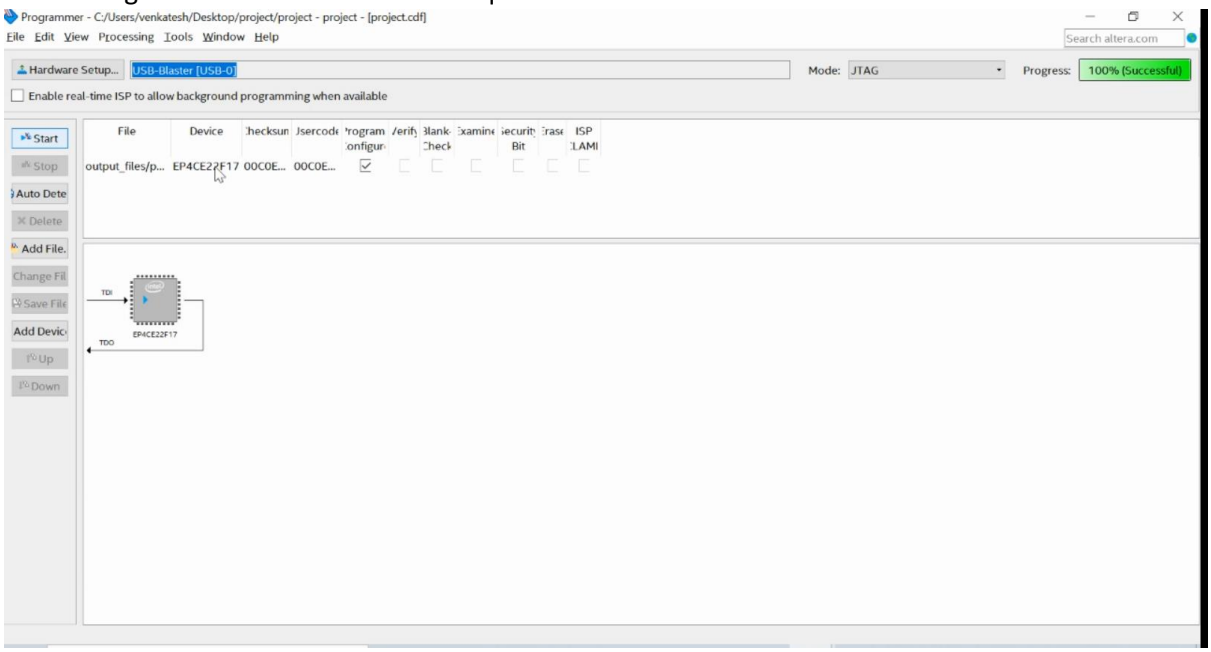
- Now Compile the whole design.
- Open the Eclipse SDK tool via 'Tools > Nios II Software build tools for Eclipse'.



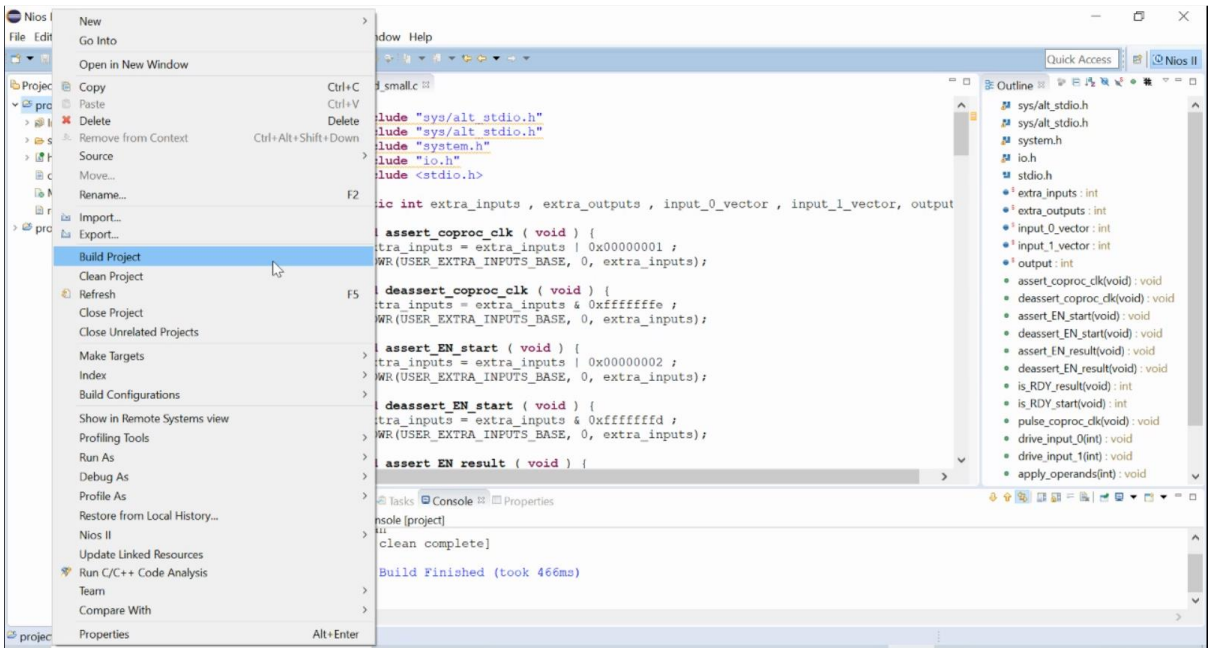
- Before opening Eclipse, a dialogue box will prompt you to select a workspace. Create a new workspace by clicking ‘Browse’ and creating a new folder in your Quartus project directory. Click ‘Ok’ to open Eclipse SDK.
- On opening Eclipse, Go to ‘New > NIOS II Application and BSP from template’.
- In the wizard, we need to provide the ‘sopc’ file generated by the Platform Designer. Provide a suitable name to the project. Further, the ‘Hello World Small’ template code should be used. Click ‘Next’ Ensure that the option of ‘Use default location’ is ticked. Click ‘Finish’ to complete the project creation.



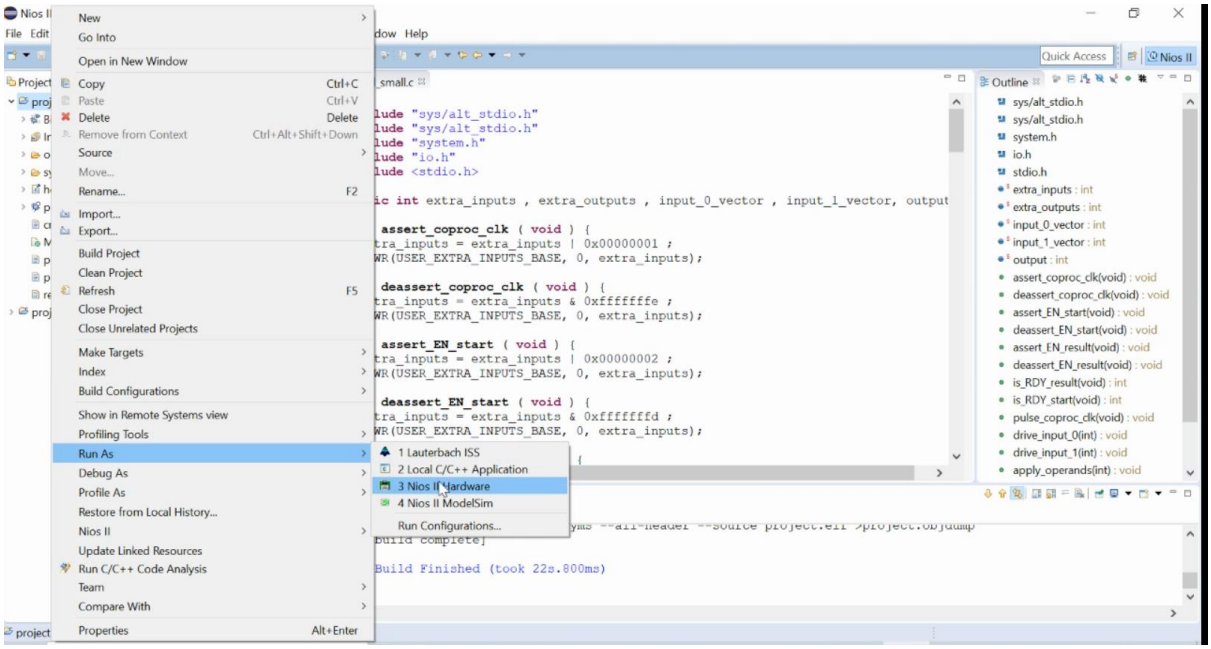
- Open ‘hello_world_small.c’ from the Project Explorer.
- Now, Copy paste the code of our ‘hello_world_small.c’ into the current file. This code is to be used for sending the test inputs to the design under test and take out the outputs from it. This is done by using IO write (IOWR) and IO read (IORD) commands which require base addresses of the inputs and outputs.
- Go to Programmer from Tools menu in quartus and connect DE0 nano board to PC.



- Now, build the project as shown below by right clicking on the project name in project explorer in Eclipse.



- Upon successful build, proceed to Run the project as ‘NIOS II Hardware’. If the dialogue box appears with the error, click on ‘Refresh Connections’ under the ‘Target Connection’ tab. The USB Blaster connection should occur. Then, tick both the tick boxes under the ‘System ID checks’ section. Click on ‘Apply’ and then ‘Run’.



- Now, results will appear on Console