The MiniPIC24 project (General project)

Design a processor that will execute a subset of the PIC24E instruction set. The processor's resources are as follows::

- 6-bit program counter.
- Program memory with 32x24 organization.
- 16 general registers noted W0 - W15.
- Data memory with 16x16 organization + 3 special locations.

The following instructions must be implemented in all projects, these being **common** to all:

ADD Wb, Ws, Wd
SUB Wb, Ws, Wd
AND Wb, Ws, Wd
IOR Wb, Ws, Wd
MOV Wns,f
MOV f, Wns
BRA Expr

Besides the common part, every project will implement the specific instructions plus four flags. The flags will be implemented for **all instructions (**both common and specific) that modify them.

Requirement:

1. Documentation: a doc, docx or pdf file that will include:
    a. Block diagram of the processor that executes both common and specific instructions. The role of each block and the role of each control signal will be described. The role of other signals that you consider important will also be described.
    b. The OPCODE table for all instructions that must be implemented by the project (see table I from the Implementation Guidelines)
    c. The truth table of all signals generated by the control block, as in the CSO laboratory (last semester).
    d. A screenshot with the results of the execution of each test program (the simulation results).
2. Fill in the checklist that is uploaded in the Google classroom
3. Test program (or programs) for all specific instructions (one ROM file for each program).
4. The ISE project that contains the processor. All test sequences from the file **secvente_verif.pdf** as well as all programs defined previously must be executed. For each test sequence you will define a separate ROM file. When the project is presented, you may be asked to execute simulations for other sequences.

Requirements and Indications:

1. Test programs must run on the real PIC24 processor. The Microchip MPLAB IDE X simulator will be used for comparison.

2. **The project will be uploaded to the Google Class assignment that will be created for this purpose. You must respect the imposed deadline. Any delay will lead to the impossibility of presenting the project in the current session.**

3. **Uploading a different project than the assigned one will result in a grade below 5.**

4. The project consists of a **zip** archive and will contain:

    a. A document doc, docx or pdf with the requirements of the Part I. The document must specify the number of the project, the list of specific instructions that are implemented and the name of the student.

    b. The checklist filled with data

    c. The ISE project for simulation. Before embedding the project in the archive, run the command Project → Cleanup Project File in ISE. This action is necessary to reduce the size of the archive. **Then close the project**. Otherwise, the project cannot be opened on another computer.

    d. ROM files for every instruction sequence you executed.

5. For the complete instruction set of the PIC-24 processor see the document that is uploaded in the classroom.