



Class Project (1 to 4 students)

Problem:

Implement a system that performs the operations in the table:

Operation code		Operation (Y)	Description
s1	s0		
0	0	$A * B$	Multiply A by B using parallel CSA and CPA
0	1	$A * B$	Multiply A by B using shift and add.
1	0	$A - B$	Simple subtraction
1	1	$5 * (A+B)$	Multiply the addition result by 5

Assuming all nMOS has ($W=4\lambda$, $L=2\lambda$) and all pMOS has ($W=8\lambda$, $L=2\lambda$).

The inputs and outputs are:

Inputs:

A 16-bit input A (a15: a0)

A 16-bit input B (b15: b0)

A 2-bit selector S (s1: s0)

A common VDD and a common GND lines

Any other necessary inputs (specify them)

Outputs:

A single 32-bit output Y (y31:y0)

Possible carry-out bit

Any other necessary outputs (specify them)

Requirement:

- Part 1: Verify the design using a logic design tool.
- Part 2: Implement your design using Magic VLSI layout tool to generate your project layout
<http://opencircuitdesign.com/magic/>
- Part 3: Test your design using *irsim* to simulate your project.
<http://opencircuitdesign.com/irsim/>

Deliverables:

1- One PDF that contains the following sections:

- Front page with group names and IDs.
- Introduction
- Problem statement and specifications
- Motivation
- Solution design using a logic design tool that you studied in the previous logic design courses
- Stick diagram for each component of your design. The building block components are enough.
- Testing strategy and results: they should show instructions to simulate and verify your design, by including Linux terminal commands for Magic and Irsim used to run your project with a few different inputs.

2- A compressed folder containing:

- Source code and layout.