1. (4 points) What is the 2s complement of the binary value 0101 0100? Write this as a hex value as well.

Draw a circuit using simple gates only (e.g. and, or, inverter) that implements the logic equations $X = A \cdot B + C'$, $Y = (A + B') \cdot X'$
2. (6 points) If our simple processor begins execution with the first instruction shown below, what value will be in the accumulator after the second instruction is executed? (The list of instructions is given below.)

<table>
<thead>
<tr>
<th>addr</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0079</td>
<td>207a</td>
</tr>
<tr>
<td>007a</td>
<td>d079</td>
</tr>
<tr>
<td>007b</td>
<td>91b2</td>
</tr>
</tbody>
</table>

What value will be in the program counter after the third instruction is executed?

0000  halt execution
0001  negate the value in the ACC
1xxx  change the value of the ACC to xxx
2xxx  load the contents of memory location xxx into the ACC
3xxx  load the ACC from the memory location whose address is stored in memory location xxx
4xxx  store the value in the ACC in memory location xxx
5xxx  store the value in the ACC in the memory location whose address is stored in memory location xxx
6xxx  change the value of the PC to xxx
7xxx  change the value of the PC to xxx if ACC = 0
8xxx  change the value of the PC to xxx if ACC > 0
9xxx  change the value of the PC to xxx if ACC < 0
aXXX  add the value in memory location xxx to the ACC
dXXX  add the value in memory location xxx to the ACC