Problems

3.1. Write the entity declaration for a 2-bit equality comparator.

3.2. Write the entity declaration for the following architecture, assuming that all signals in the architecture are ports:

```
architecture write_entity of exercise2 is
begin
   mapper: process (addr) begin
      shadow_ram_sel <= '0';
      sram_sel <= '0';
      if addr >= x"0100" and addr < x"4000" then
         shadow_ram_sel <= '1';
      elsif addr >= x"8000" and addr < x"C000" then
         sram_sel <= '1';
      end if;

      promsel <= '0';
      if mem_mapped = '0' and bootup then
         prom_sel <= '1';
      end if;
  end process mapper;

mem_mapped <= shadow_ram_sel or sram_sel;
end write_entity;
```

3.3. Write an entity declaration for each of the TTL devices in Table 2-1.

3.4. Write an entity declaration for a 4-bit magnitude comparator. Name the output port `altb` for "a less than b."

3.5. Write four architecture bodies for the entity declaration of Problem 3.4: one using an `if-then-else` statement, one using Boolean equations, one using a `when-else` statement, and one using component instantiation statements and components similar to the `xnor2` and `and4` components of Listing 3-5. (Hint: the < symbol is used as a relational operator for "less than.")

3.6. Compile and synthesize to a CY7C371 the entity/architecture pairs for each of the first three descriptions that you generated in Problem 3.5. Open the report files and compare equations.