A logic circuit has four inputs D, C, B, A, which represent two pairs of bits (D,C) and (B,A). Bits (B,A) are subtracted from bits (D,C) to give a result (F1,F0) and a bit S that indicates a negative result. (That is, the result is in sign/magnitude form) Below is a truth table for this problem:

**D C B A S F1 F0**

**0 0 0 0 0 0 0**

**0 0 0 1 1 0 1**

**0 0 1 0 1 1 0**

**0 0 1 1 1 1 1**

**0 1 0 0 0 0 1**

**0 1 0 1 0 0 0**

**0 1 1 0 1 0 1**

**0 1 1 1 1 1 0**

**1 0 0 0 0 1 0**

**1 0 0 1 0 0 1**

**1 0 1 0 0 0 0**

**1 0 1 1 1 0 1**

**1 1 0 0 0 1 1**

**1 1 0 1 0 1 0**

**1 1 1 0 0 0 1**

**1 1 1 1 0 0 0**

Construct three Karnaugh maps for the outputs and use them to obtain simplified sum-of-product expressions. Using Logisim to construct the resultant 2-bit subtractor circuit to demonstrate the correctness of your solution. Turn in your .circ file via Blackboard.