COS126 Boolean Algebra Exercise

The well-known Fibonnacci numbers are 1, 1, 2, 3, 5, 8, 13, ...
Let the Boolean variables x, y, and z together represent a 3-bit non-negative binary number (that is, not in 2's-complement representation). Let z be the least significant bit (that is, write the number as xyz). Let F be a Boolean variable that indicates whether the number represented by x, y and z is a Fibonnacci number. (F = 1 if it is and 0 otherwise.)

1. Write out the Truth Table for the function F.

2. Write out the sum-of-products formula for F (with no simplifications).

3. Challenge: Simplify the formula.

4. Here is a combinational circuit of the sum-of-products expression for F using switch notation

	x y z	FIB
	0 0 0	0
1	0 0 1	1
2	0 1 0	1
3	0 1 1	1
	1 0 0	0
5	1 0 1	1
	1 1 0	0
	1 1 1	0

xyz

FIB

FIB