Boolean logic

"A TALE OF TWO GEORGES"

GEORGE BOOLE

- WROTE *Laws of Thought*
  - about how we think
  - Based around statements + if they're true or false
  - We can operate on these T/F variables

GEORGE STIBITZ

- "I bet I can use a bunch of fuckin relays to add numbers"
- STIBITZ MODEL K
  - He built it in his kitchen: hence model K
  - A/B are switches so T/F + 0/1 and the two lights turn off and on to be 0/1

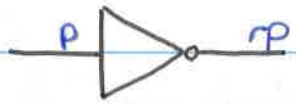
HOW TO AVOID BEING POISONED

```
if (wifeLovesMe && wifeMakesFood)
{
    me.eat(wifeFood);
    health = me.checkStatus();
    System.out.println(health + "is good");
}
else
{
    Fuckin die af
}
```

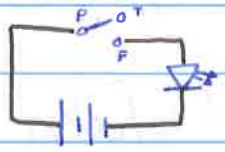
NOT

p	!p (not)
T	F
F	T

* ONLY SINGLE VARIABLE FUNCTION



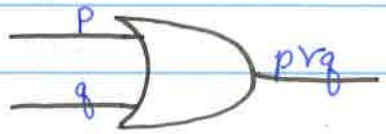
CIRCUIT




```
if (!p)
  Light=on;
```

OR

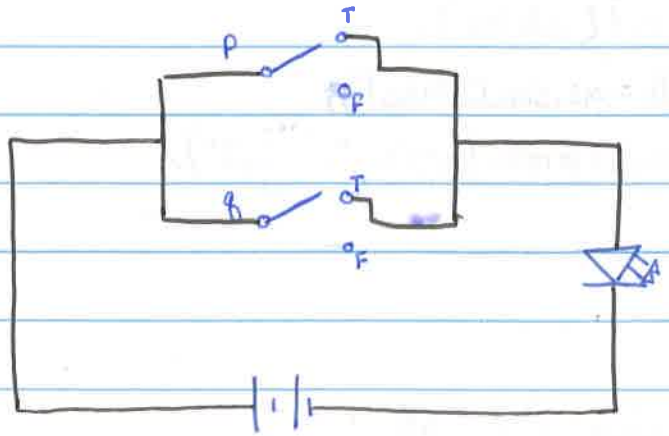
pq	p||q	pq	p||q
FF	F	00	0
FT	T	01	1
TF	T	10	1
TT	T	11	1



* OR IS INCLUSIVE *

```
if (p||q)
  light=on;
```

CIRCUIT:



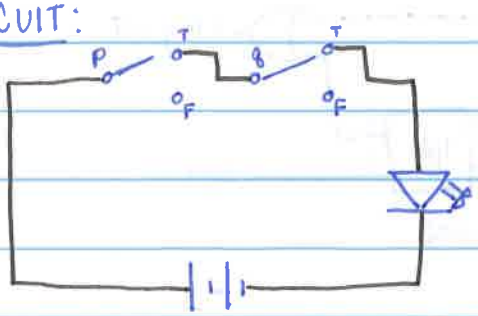
AND

pq	p∧q	pq	p∧q
FF	F	00	0
FT	F	01	0
TF	F	10	0
TT	T	11	1

* ONLY IF BOTH ARE TRUE


```
if(p&&q)
  Light =on;
```

CIRCUIT:



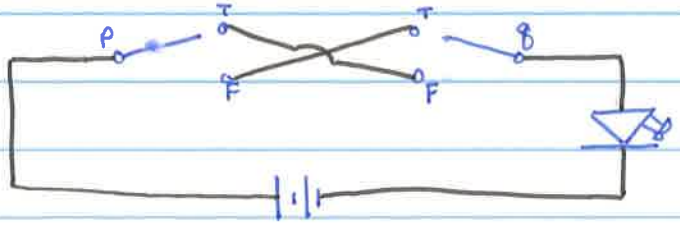
XOR

pq	p⊕q	pq	p⊕q
FF	F	00	0
FT	T	01	1
TF	T	10	1
TT	F	11	0

* EXCLUSIVE (NO TT) *

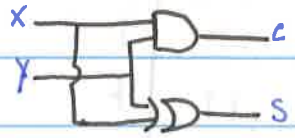
* USED IN HUNCH FOR REVERSING POLARITY ON LA

CIRCUIT:

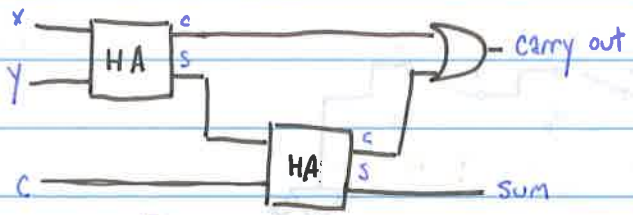


half adder

X	+	y	=	C	S
0	+	0	=	0	0
0	+	1	=	0	1
1	+	0	=	0	1
1	+	1	=	1	0



HALF ADDER



FULL ADDER

* USE MORE HALF ADDERS TO ADD MORE BITS *