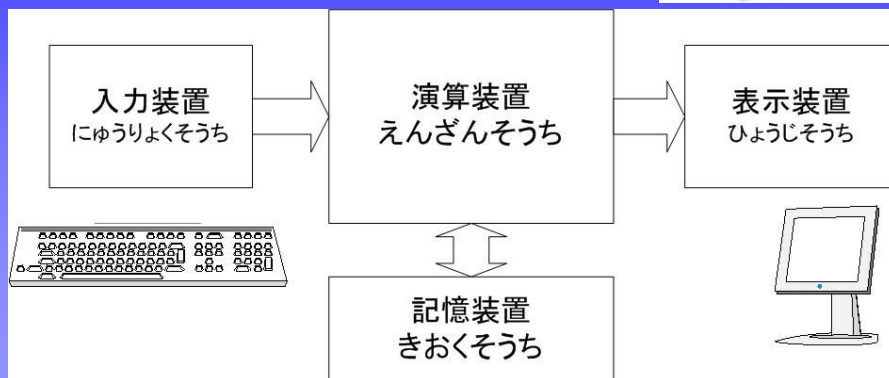


# コンピュータを作ろう

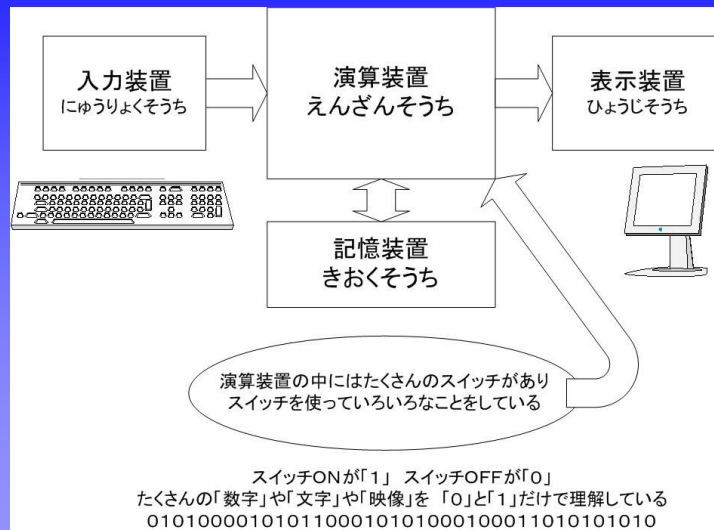
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## コンピュータの仕組み



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Pentium4には1秒間に10億回  
以上ONとOFFを繰り返すスイッチが  
何百万個も入っている。



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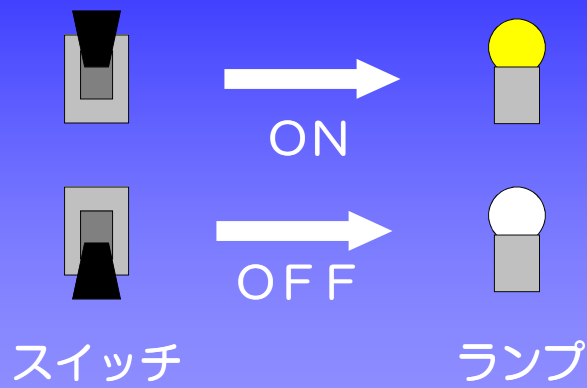
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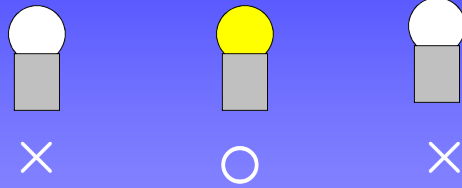
コンピュータはONとOFFだけの世界



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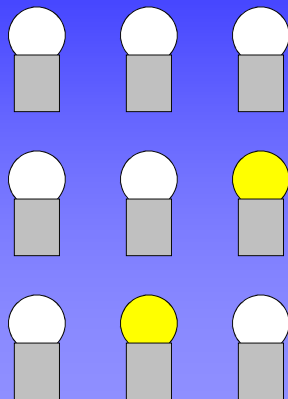
あるなしだけの表現



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何通り表現できる？



×	×	×
×	×	○
×	○	×
×	○	○
○	×	×
○	×	○
○	○	×
○	○	○

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数字にしてみよう

0	×	×	×
1	×	×	○
2	×	○	×
3	×	○	○
4	○	×	×
5	○	×	○
6	○	○	×
7	○	○	○

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あるなしだけで足し算をしてみよう

$1 + 2 = 3$

	×	×	○
	×	○	×
+	×	○	○

$2 + 2 = 4$

	×	○	×
	×	○	×
+	○	×	×

0	×	×	×
1	×	×	○
2	×	○	×
3	×	○	○
4	○	×	×
5	○	×	○
6	○	○	×
7	○	○	○

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計算は○と×の数をはんだん（判断）しているだけ

$$1+2=3$$

	×	×	○
	×	○	×
+	×	○	○

× と ○ なら ○ にする

○ と × も ○ にする

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計算は○と×の数をはんだん（判断）しているだけ

$$2+2=4$$

	×	○	×
	×	○	×
+	○	×	×

× と × なら × にする

○ と ○ も × にする

そして となり を ○ にする

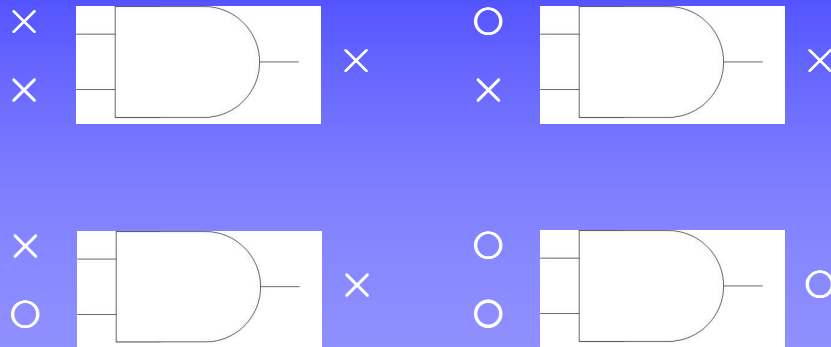
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アンド (AND) 判断スイッチ記号

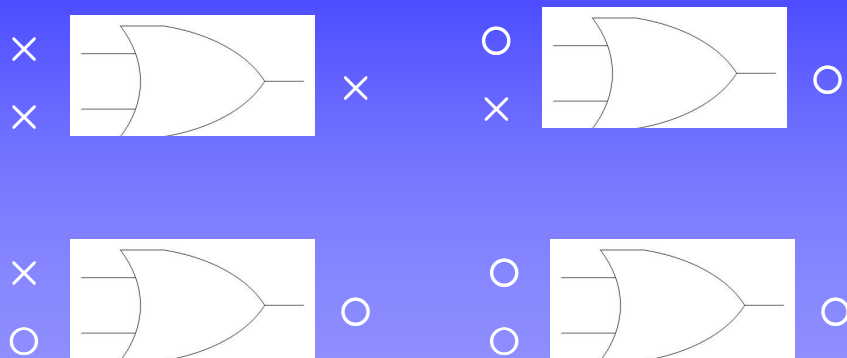


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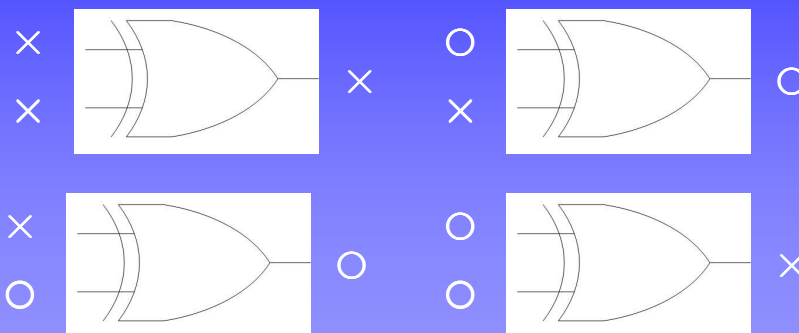
オア (OR) 判断スイッチ記号



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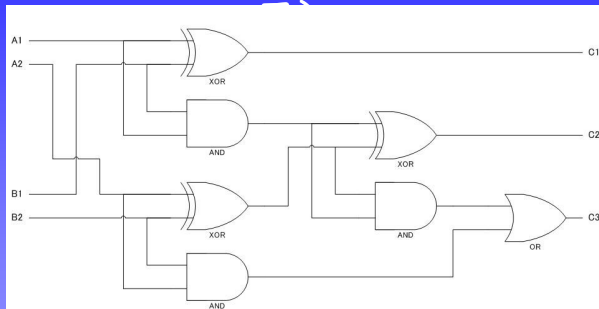
エクスオア (XOR) 判断スイッチ記号



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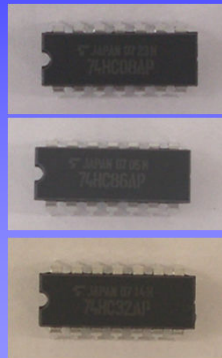
計算の判断回路 (はんだんかい)



A		x	o	+	1	A		o	x	+	2
B		o	x		2	B		o	x		2
C	x	o	o		=	3	C	o	x		x

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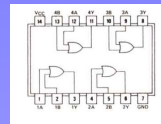
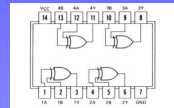
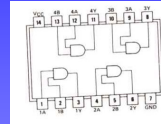
## アイシー（IC）の中の判断回路



74HC08

74HC86

74HC32



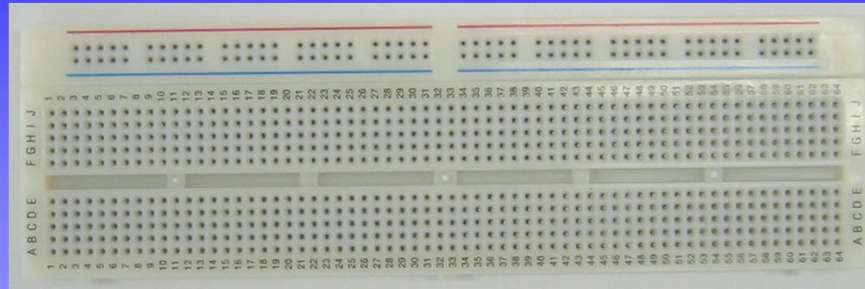
by Matsue Technical Office

それでは  
計算のできる  
コンピュータを  
作ってみよう

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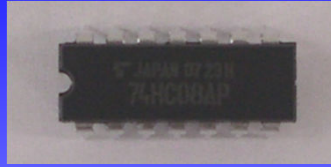


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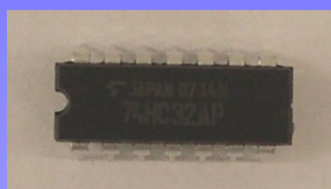
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74HC08AP



74HC86AP



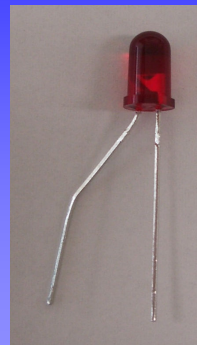
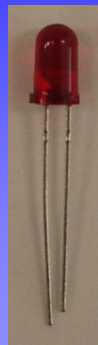
74HC32AP

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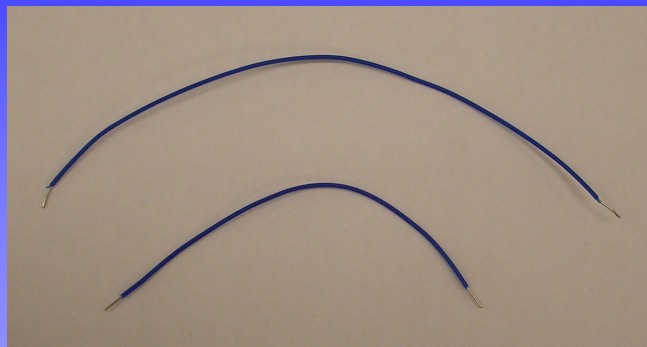


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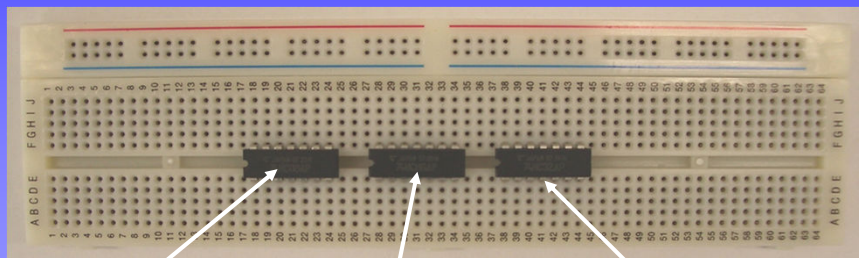
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74HC08AP F18

74HC86AP F28

74HC32AP F38



74HC08AP 74HC86AP 74HC32AP

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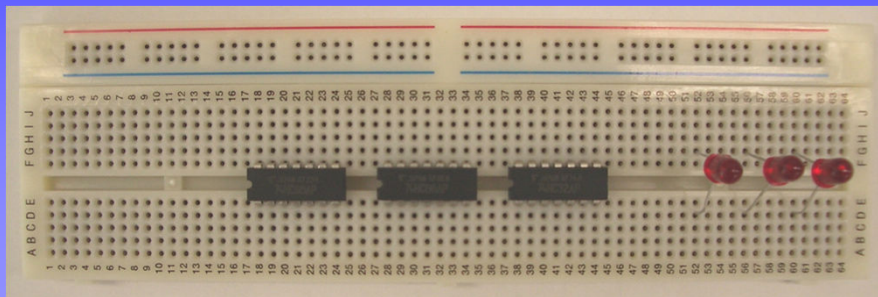
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LED G52-D52

G56-D56

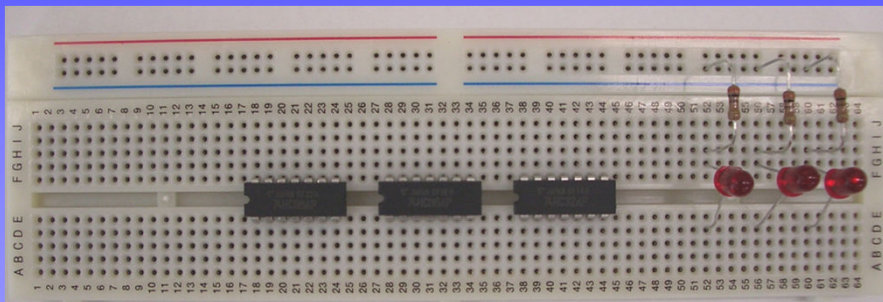
G60-D60



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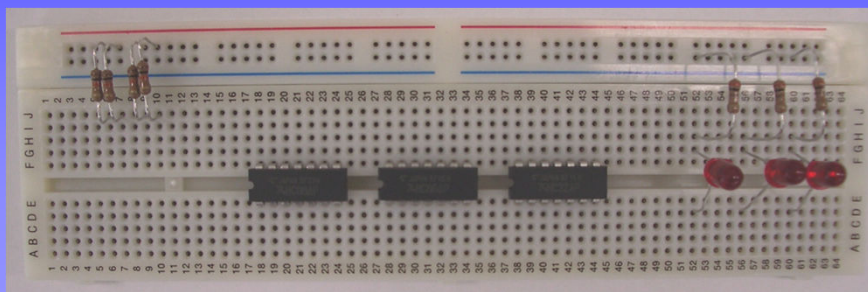
抵抗 青線側52-H52  
青線側56-H56  
青線側60-H60



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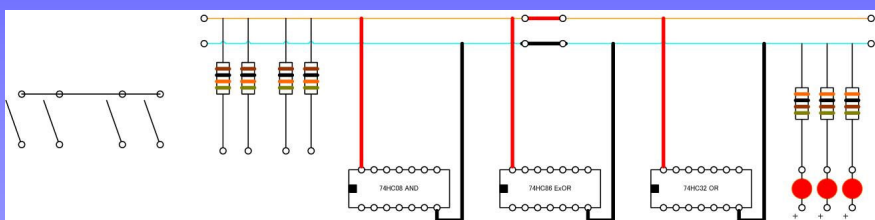
抵抗 赤線側6-J6  
赤線側7-J7  
赤線側9-J9  
赤線側10-J10



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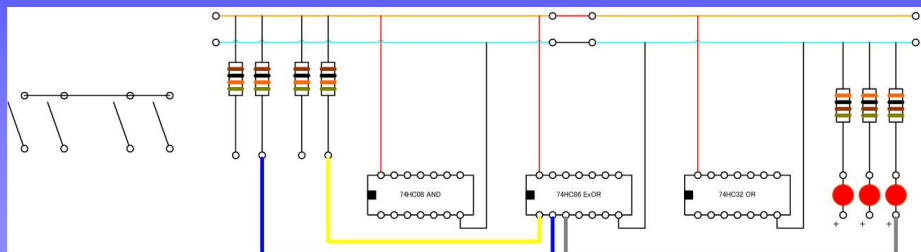
- |                |                |
|----------------|----------------|
| ① 黒長 A24-青線側24 | ② 赤短 J18-赤線側18 |
| 黒長 A34-青線側36   | 赤短 J28-赤線側28   |
| 黒短 A44-青線側44   | 赤短 J38-赤線側38   |
| 黒短 青線側30-青線側35 | 赤短 赤線側30-赤線側35 |



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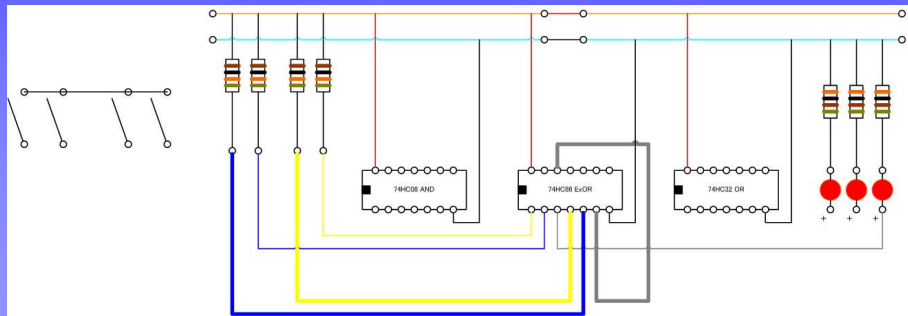
- |              |
|--------------|
| ② 黄長 H10-D28 |
| 青長 H 7-D29   |
| 白長 D30-C60   |



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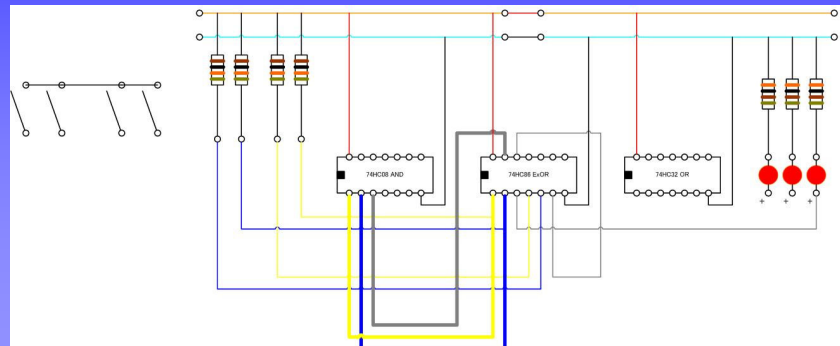
③ 黄長 H 9-D31  
青長 H 6-D32  
白短 D33-H30



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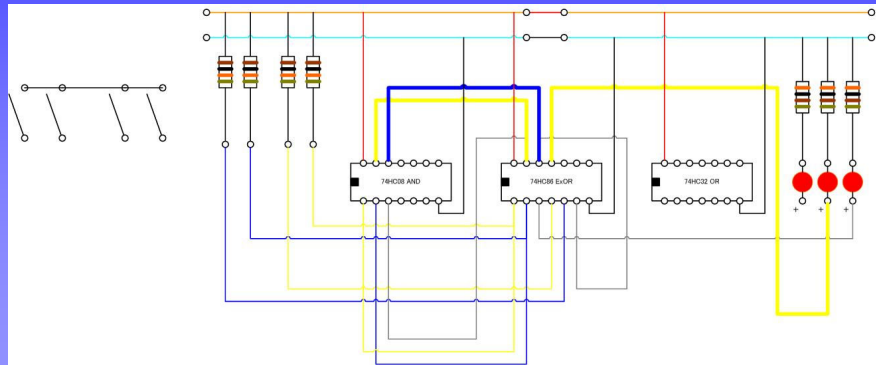
④ 黄短 C18-A28  
青短 C19-A29  
白短 C20-H29



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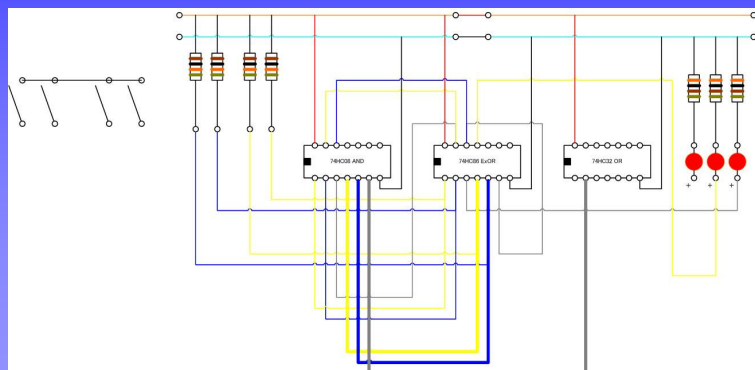
- ⑤ 黄短 J29-119
- 青短 J30-120
- 黄长 H31-C56



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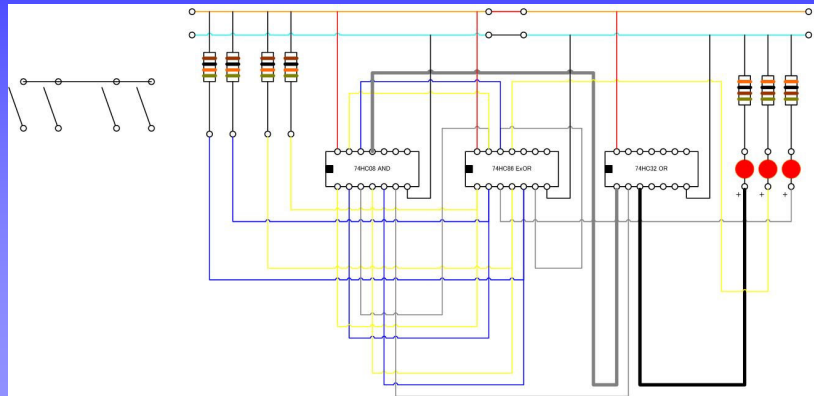
- ⑥ 黄短 A21-C31
- 青短 A22-C32
- 白短 A23-D38



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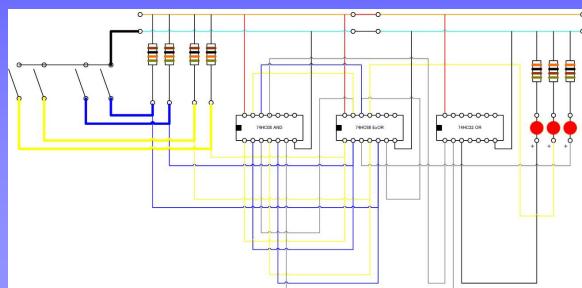
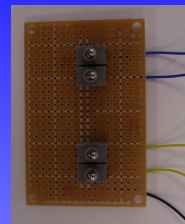
⑦ 白長 D39-121  
黒短 D40-C52



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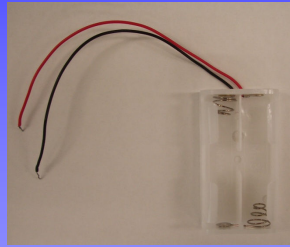
⑧ スイッチ 青 G 6  
青 G 7  
黄 G 9  
黄 G10  
黒 青線側3



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- ◎ 電池ボックス 赤 赤線側62  
黒 青線側62



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A		×	×	+	0
B		×	○	=	1
C					1

A		○	×	+	2
B		×	×	=	0
C					2

A		×	○	+	1
B		○	×	=	2
C					3

A		○	×	+	2
B		○	×	=	2
C					4

A		○	○	+	3
B		○	×	=	2
C					5

A		○	○	+	3
B		○	○	=	3
C					6

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