

Report

register

r0: the number in x3100

r1: counter from 4 to 0

r2: the result

algorithm explanation

- reset and init
 - let the algorithm start at x3000
 - init the number in r1 and r2
 - load the number in x3100 to r0

```
`0011 0000 0000 0000    ;start at x3000`  
`0101 001 000 100000    ;reset r1`  
`0101 010 000 100000    ;reset r2`  
`0001 001 001 1 00100   ;r1 +4`  
`1010 000 000001111     ;LDI load x3100 number to r0`
```

- let it loop

```
0000 010 000001101      ;if r0==0,break  
0000 100 000000001      ;if r0<0,minus r1  
0000 001 000000101      ;if r0>0,continue
```

- if r0<1,do what

```
0001 001 001 1 11111    ;minus r1  
0000 010 000001000      ;if r1==0,break  
0001 000 000 000000     ;r0=r0<<1  
0001 000 000 1 00000    ;setcc  
0000 111 111111000      ;return
```

- r1 minus 1
- if r1=0,break and let r2 be 1

```
0001 010 010 1 00001    ;r2 +1
```

- r0 <<1

- if r0>1,do what

```
0001 000 000 000000     ;r0=r0<<1  
0101 001 000 100000    ;reset r1  
0001 001 001 1 00100   ;r1 +4  
0001 000 000 1 00000    ;setcc  
0000 111 111110011     ;return
```

- $r0 \ll 1$
 - $r1 = 4$
 - setCC to r0
- if $r0 = 1$, break, let r2 remains 0
- halt

```
1111 0000 0010 0101      ;HALT(trap25)
```

Questions

1. Discribe your algorithm

Answer: do $r0 \ll 1$ until finish ,if its first number is 1, $r0 < 0$,else $r0 > 0$;

At the same time,count r1 from 4 to 0,

if it can be 0,then this number contains 4 continuous 1s,

else when r0 is 0,this number doesn't contain.

2. How to realize $r0 \ll 1$?

Answer: $r0 = r0 + r0$.