```
        @2
        M=0
        @i
        M=0

(LOOP)
        @i
                D=M             // D=i
        @0
                D=D-M           // D=i-R0
        @END
                D;JGE           // if i-R0 >= 0 goto END

        @1
                D=M             // D=R1
        @2
                M=D+M           // R2=R2+R1
        @i
                M=M+1           // i=i+1
        @LOOP
                0;JMP           // Repeat
(END)
        @END
                0;JMP
```

File  View  Run  Help

Animate: Program flow    View: Screen    Format: Decimal
Slow    Fast

| ROM | Asm |
| --- | --- |
| 0 | @2 |
| 1 | M=0 |
| 2 | @16 |
| 3 | M=0 |
| 4 | @16 |
| 5 | D=M |
| 6 | @0 |
| 7 | D=D-M |
| 8 | @18 |
| 9 | D;JGE |
| 10 | @1 |
| 11 | D=M |
| 12 | @2 |
| 13 | M=D+M |
| 14 | @16 |
| 15 | M=M+1 |
| 16 | @4 |
| 17 | 0;JMP |
| 18 | @18 |
| 19 | 0;JMP |
| 20 | |
| 21 | |
| 22 | |
| 23 | |
| 24 | |
| 25 | |
| 26 | |
| 27 | |
| 28 | |

PC    18

| RAM | |
| --- | --- |
| 0 | 6 |
| 1 | 7 |
| 2 | 42 |
| 3 | 0 |
| 4 | 0 |
| 5 | 0 |
| 6 | 0 |
| 7 | 0 |
| 8 | 0 |
| 9 | 0 |
| 10 | 0 |
| 11 | 0 |
| 12 | 0 |
| 13 | 0 |
| 14 | 0 |
| 15 | 0 |
| 16 | 6 |
| 17 | 0 |
| 18 | 0 |
| 19 | 0 |
| 20 | 0 |
| 21 | 0 |
| 22 | 0 |
| 23 | 0 |
| 24 | 0 |
| 25 | 0 |
| 26 | 0 |
| 27 | 0 |
| 28 | 0 |

A    18

D    0

ALU
D Input :    0
M/A Input :    18
ALU output :    0

**End of script - Comparison ended successfully**

```
    @status
    M=-1                // 0xFFFF
    D=0
    @SETSCREEN
    0;JMP

(LOOP)
    @KBD
        D=M
    @SETSCREEN
        D;JEQ           // If no key detected, set screen to 0
        D=-1            // If key detected, set screen to 1

(SETSCREEN)
    @ARG
        M=D
    @status             // black = FFFF, white = 0
        D=D-M
    @LOOP
        D;JEQ           // Reset

    @ARG
        D=M
    @status
        M=D

    @SCREEN
        D=A
    @8192
        D=D+A
    @i
        M=D

(SETLOOP)
    @i
        D=M-1
        M=D             // i=i-1
    @LOOP
        D;JLT           // if i<0 then LOOP

    @status
        D=M
    @i
        A=M
        M=D        // M[address]=status
    @SETLOOP
        0;JMP
```

CPU Emulator (2.5) - C:\Users\dande\Documents\CS 220\HW04\fill/Fill.hack

File  View  Run  Help

Animate:  No animation
Slow        Fast
View:  Screen
Format:  Decimal

**ROM**  Asm

| 0 | @16 |
|---|---|
| 1 | M=-1 |
| 2 | D=0 |
| 3 | @10 |
| 4 | 0;JMP |
| 5 | @24576 |
| 6 | D=M |
| 7 | @10 |
| 8 | D;JEQ |
| 9 | D=-1 |
| 10 | @2 |
| 11 | M=D |
| 12 | @16 |
| 13 | D=D-M |
| 14 | @5 |
| 15 | D;JEQ |
| 16 | @2 |
| 17 | D=M |
| 18 | @16 |
| 19 | M=D |
| 20 | @16384 |
| 21 | D=A |
| 22 | @8192 |
| 23 | D=D+A |
| 24 | @17 |
| 25 | M=D |
| 26 | @17 |
| 27 | D=M-1 |
| 28 | M=D |

PC  6

**RAM**

| 2 | -1 |
|---|---|
| 3 | 0 |
| 4 | 0 |
| 5 | 0 |
| 6 | 0 |
| 7 | 0 |
| 8 | 0 |
| 9 | 0 |
| 10 | 0 |
| 11 | 0 |
| 12 | 0 |
| 13 | 0 |
| 14 | 0 |
| 15 | 0 |
| 16 | -1 |
| 17 | -2 |
| 18 | -1 |
| 19 | -1 |
| 20 | -1 |
| 21 | -1 |
| 22 | -1 |
| 23 | -1 |
| 24 | -1 |
| 25 | -1 |
| 26 | -1 |
| 27 | -1 |
| 28 | -1 |
| 29 | -1 |
| 30 | -1 |

A  24576

A

D  0

**ALU**

D Input :  0

M/A Input :  5

ALU output :  0