

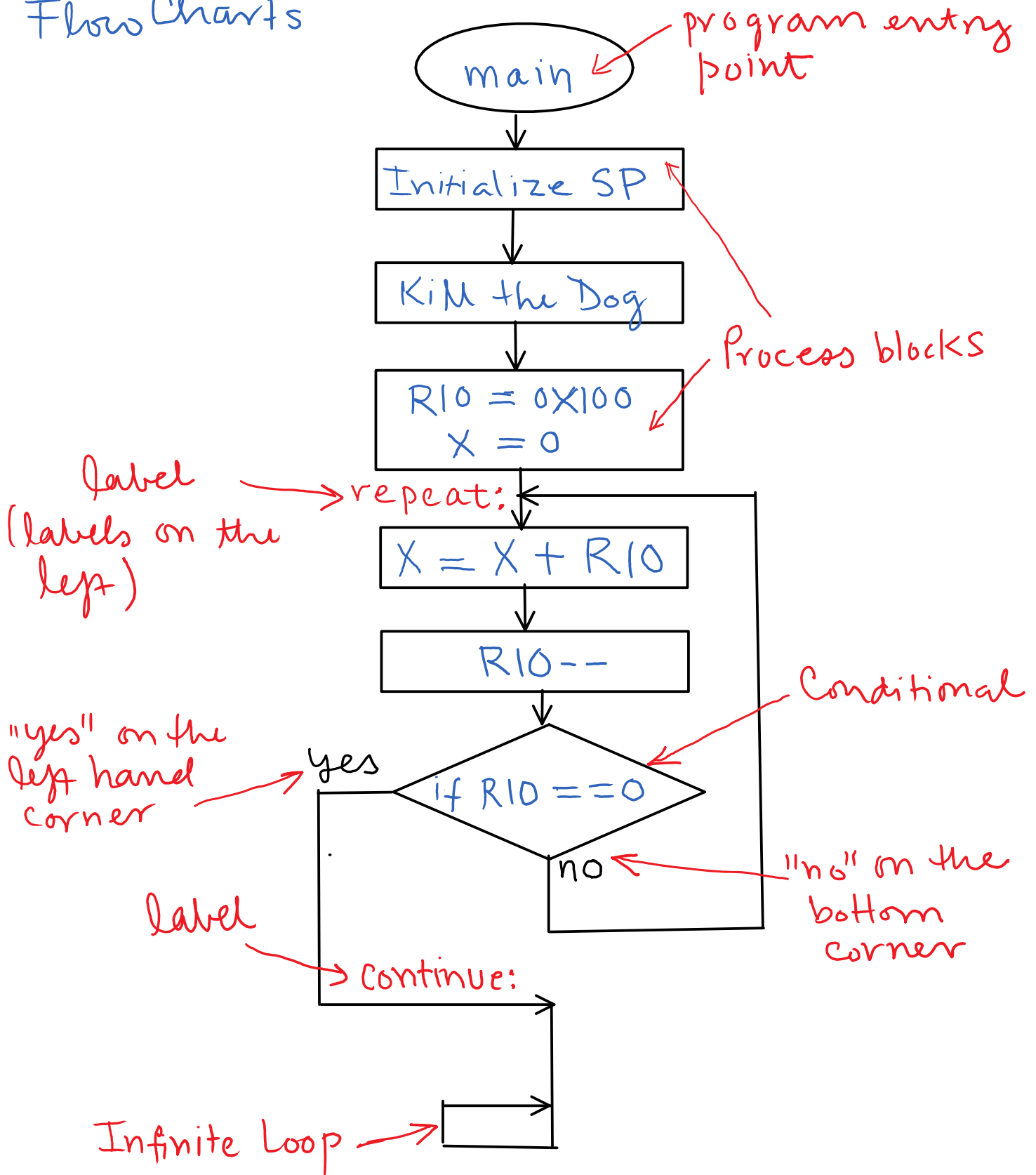
C like Pseudo Code

register
 $R10 = 0x100$ (put 0x100 in R10)
 assignment
 $X = 0x0$ (put 0x0 in X)
 variable

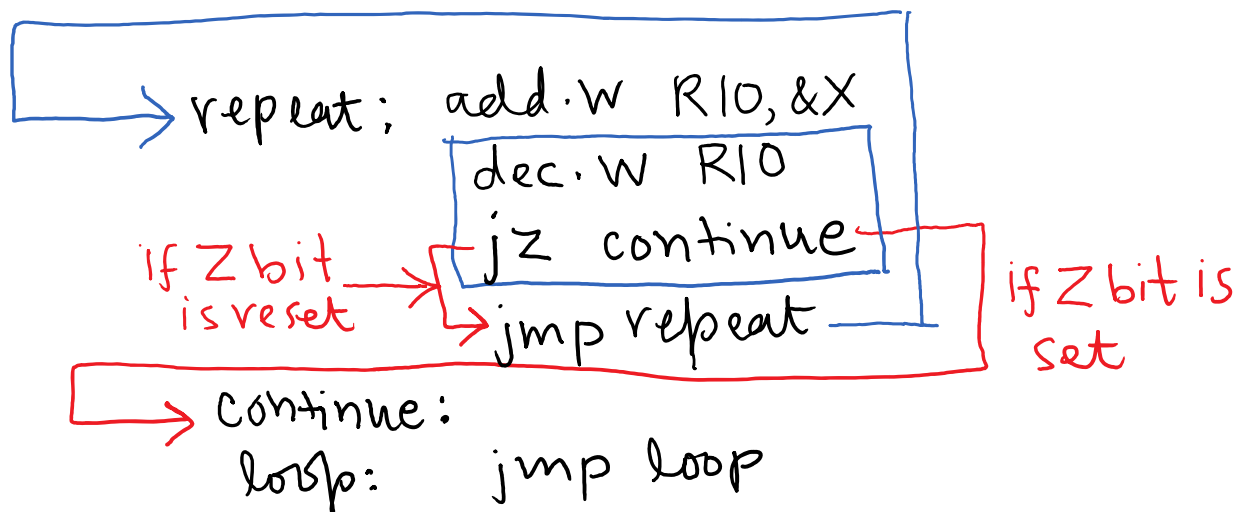
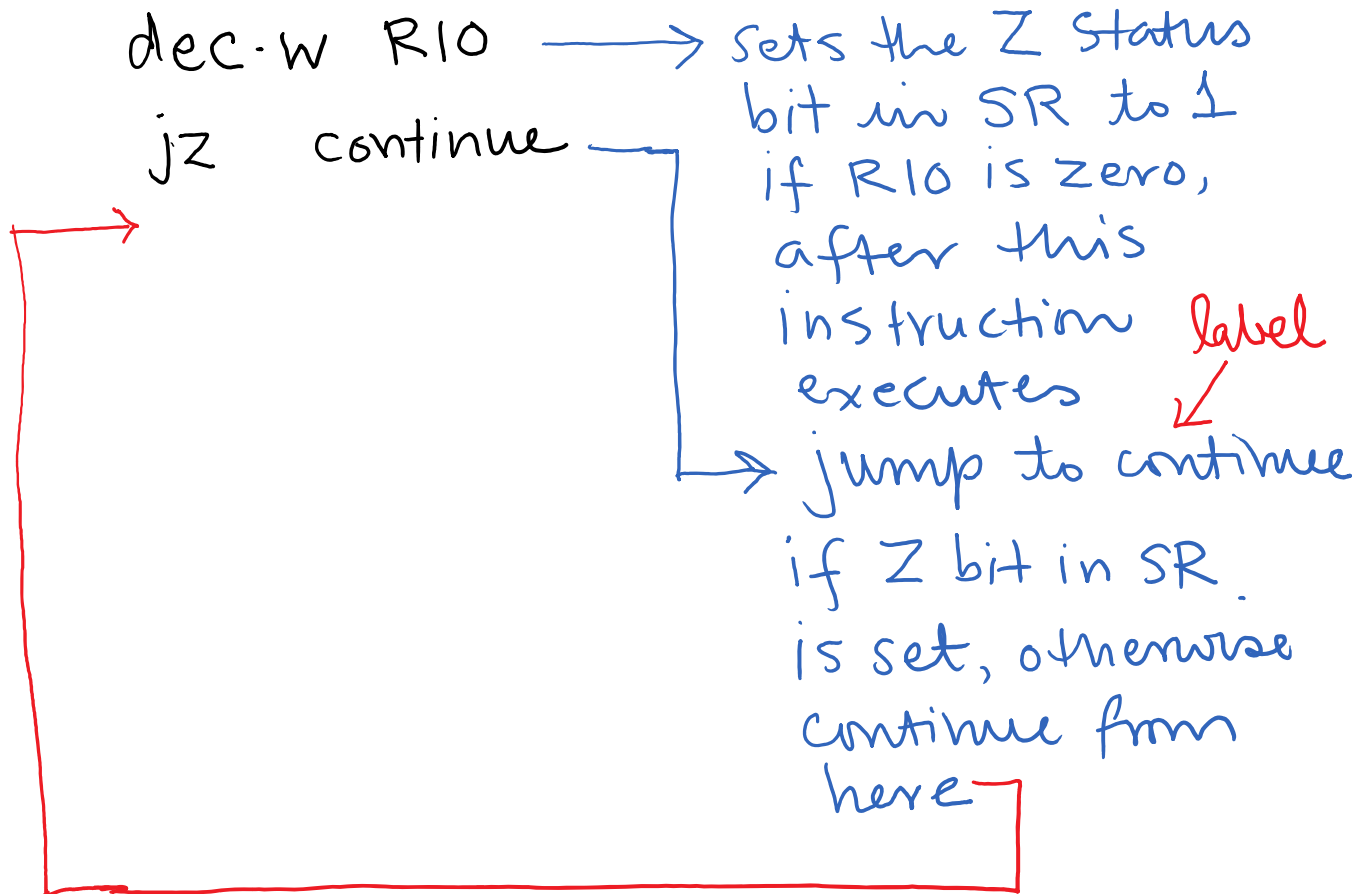
repeat: $X = X + R10$
 label
 $R10 = R10 - 1$ (or $R10--$, decrease R10 by 1)
 (note $R10 = R10 + 1$ would be $R10++$)
 if ($R10 == 0$) then
 {
 go to continue
 }
 else
 {
 go to repeat
 }
 label
 continue:
 label
 loop: go to loop
 label

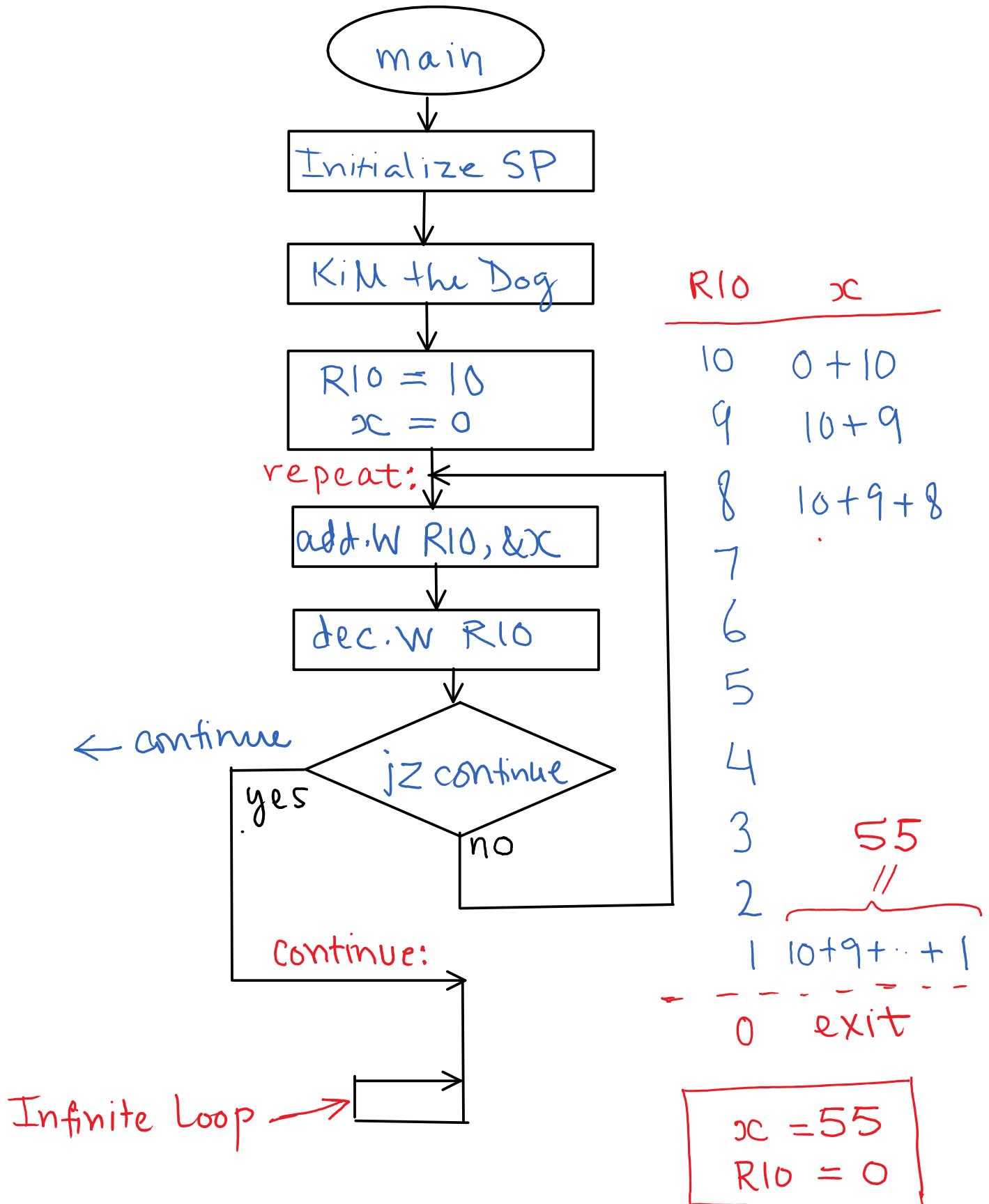
equality (i.e. $x == y$)
 not assignment

Flow Charts



Conditional Instruction

JZ: *Jump if Zero*



Program "Conditional 1"

; Main loop here

```
repeat:    mov.w    #10, R10
           add.w    R10, &x
           dec.w    R10

           jz       continue
           jmp      repeat
continue:
loop:      jmp      loop
```

Using TST instruction with
conditional (jmp) statements

TST.W dst (TST.B dst)

Status Bits

N: Set if destination is negative, reset if positive

Z: Set if destination contains zero, reset otherwise

C: Set

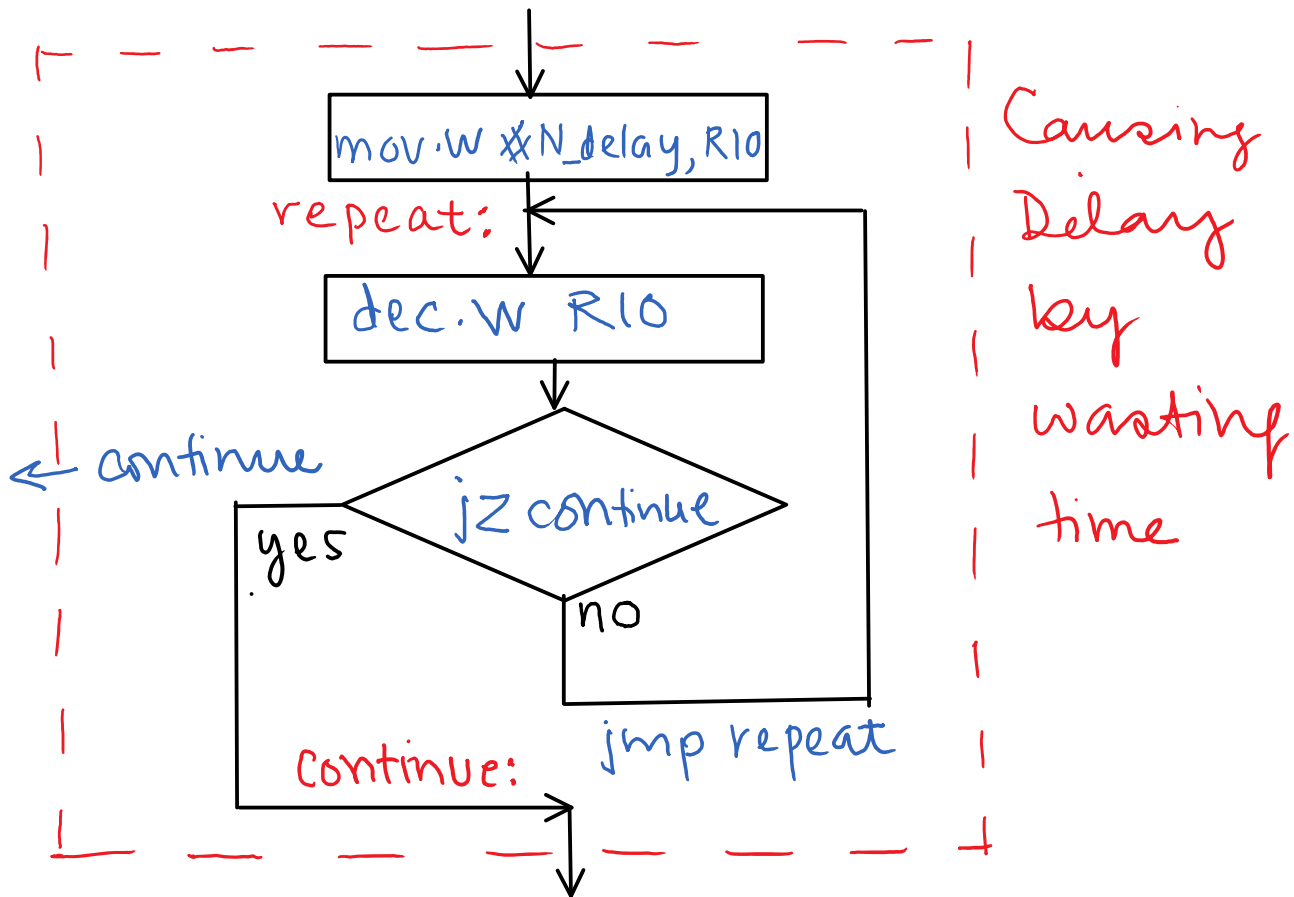
V: Reset

Example

TST.W R10
jz mylabel



jump to mylabel
if Z bit is set (R10 is 0)
otherwise continue
from here



operations	dec.w R10	1 clock cycle	} 5
	jz continue	2 clock cycles	
	jmp repeat	2 clock cycles	

are repeated $(N_delay - 1)$ number of times

operations	dec.w R10	1 clock cycle	} 3
	jz continue	2 clock cycles	

are repeated once assume $N_delay = 0xFFFF$

$$\text{Total time wasted} = \left(3 + \underbrace{5(N_delay - 1)}_{327,670} \right) T_{\text{clock}}$$

$$= 327673 \mu\text{s} \sim 0.3 \text{ sec delay}$$

$$\text{Total time wasted} = (3 + 5(N_{\text{delay}} - 1))T_{\text{clock}}$$

Determine N_{delay} if a 0.25 sec delay is desired

ignore (small) ignore (small)

$$\cancel{3} + 5(N_{\text{delay}} - \cancel{1})1\mu\text{s} = 0.25$$

$$N_{\text{delay}} = 50,000$$

Produce a delay of 0.5 sec

max $N_{\text{delay}} = 0xFFFF$ which
gives 0.3 sec delay.

Solution: put two delays of 0.25 sec
one after another.

program "Delay1"

N_delay: .set 50000

.

.

.

mov.w #N_delay, R10

repeat:

dec.w R10

jz continue

jmp repeat

continue:

loop: jmp loop

$N_delay = 50,000$

} 0.25 sec
delay

program "Delay 2"

N_delay: .set 50000

$N_delay = 50,000$

```

repeat1:      .
              .
              .
              mov.w  #N_delay, R10
              dec.w   R10
              jz      continue1
              jmp     repeat1

```

continue1:

```

repeat2:      mov.w  #N_delay, R10
              dec.w   R10
              jz      continue2
              jmp     repeat2

```

continue2:

loop: jmp loop

0.25 sec
delay

0.5 sec
delay

0.25 sec
delay