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;Codes for Distributive law using AVR Assembly language.
;Distributive las is expressed by X.(Y+Z) = X.Y+X.Z
;LHS = X.(Y+Z), RHS = X.Y+X.Z

.include "/home/administrator/m328Pdef.inc"

        ldi r17, 0b11000111         ;identifying input pins 11,12,13 for inputs X, Y, Z
        out DDRB,r17                  ;declaring pins as input
        ldi r17, 0b00111001 ;

        out PORTB,r17                 ;activating internal pullup for pins 11,12,13 and assigning pin 8 for
output for LHS in PORTB
        in r17,PINB

        ldi r16, 0b00000100         ;identifying output pin 2 and assignin pin 2 for RHS in PORTD
        out DDRD,r16                  ;declaring pins as output

;Assigning six registers; 3 forLHS and 3 for RHS
;Copying data bits from input register r17 to six registers assigned for LHS and RHS

mov r18,r17  ; for X of LHS
mov r19,r17  ; for Y of LHS
mov r20,r17  ; for Z of LHS

mov r21,r17  ; for X of RHS
mov r22,r17  ; for Y of RHS
mov r23,r17  ; for Z of RHS

; For LHS

        ; to shift X to 1st cell of R18

        lsr r18
        lsr r18
        lsr r18; this is input X; 1st cell of R18

        ; to shift Y to 1st cell of R19
        lsr r19
        lsr r19
        lsr r19
        lsr r19; this is input Y; 1st cell of R19

        ; to shift Z to 1st cell of R20
        lsr r20
        lsr r20
        lsr r20
        lsr r20
        lsr r20; this is input Z; 1st cell of R20



        ; performing operation for LHS= = X.(Y+Z)
                or r19,r20
                and r18,r19
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out PORTB,r18        ;writing output to pin 8 for LHS= = X.(Y+Z)

; For RHS

        lsr r21 ; this is equal to input X
        mov r24,r21

        lsr r22
        lsr r22; this is equal to Y

        lsr r23
        lsr r23
        lsr r23;this is equal to Z

        ; performing operation for RHS= = X.Y+X.Z
                and r21,r22
                and r24,r23
                or r21,r24

out PORTD,r21        ;writing output to pin 2 for RHS= = X.Y+X.Z

Start:
        rjmp Start
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