Embedded Systems: Assignment5

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Use the counter 0 (16 bit counter) to synthesise a complete note. The note is available in terms of frequencies and time. Note is played as audio at that frequency and the given duration. The data is stored in a data RAM in 200 locations (F1, 100Hz, F2, 75, ...) as 100 frequencies and 100 times durations. Write a code to read all these data and the note has to be played in a music system. Use the counter in PWM mode and generate the sinusoidal frequencies to generate the filtered output.

Code-:

```
.ORG 0x00

LDI R16, 0xFF

OUT DDRD, R16

Loop:

LDI YH, HIGH(f<<1)

LDI YL, LOW(f<<1)

LDI ZH, HIGH(t<<1)

LDI ZL, LOW(t<<1)

LPM R15, (duty_cycle<<1)

Loop1:

        LD R16, Y+

        LD R17, Z+

        MUL R16, R17

        MOVW R16, R0

        ROL R16

        ROR R15

        ROL R16

        ROR R15

        ROL R16
```

```
        ROR R15
        MOV R18, R15

Loop3:
        LDI R21, 0x00
                Loop4:
                   LDI R19, 0b01000001
                   LDI R20,0b00001000
                 OUT TCCR0A, R19
                OUT TCCR0B, R20
                 OUT OCR0A, R15
                        Repeat:
                        CPI TOV0, 0
                        BRNE Repeat
                        INC R21
                        CPI R21, 8
                        BRNE Loop4
                IN R16, TCNT0
                CP R16, R18
                BRNE Loop3
        CP R22,10
        BRNE Loop1
        SUBI YL,9
        SUBI ZL,9
JMP Loop
```

Sine Generator