Hazarath 2021bcs0175

# LAB 5

## Simulation of RTC using 8085 MP

Q1. 12 hour clock

Code:

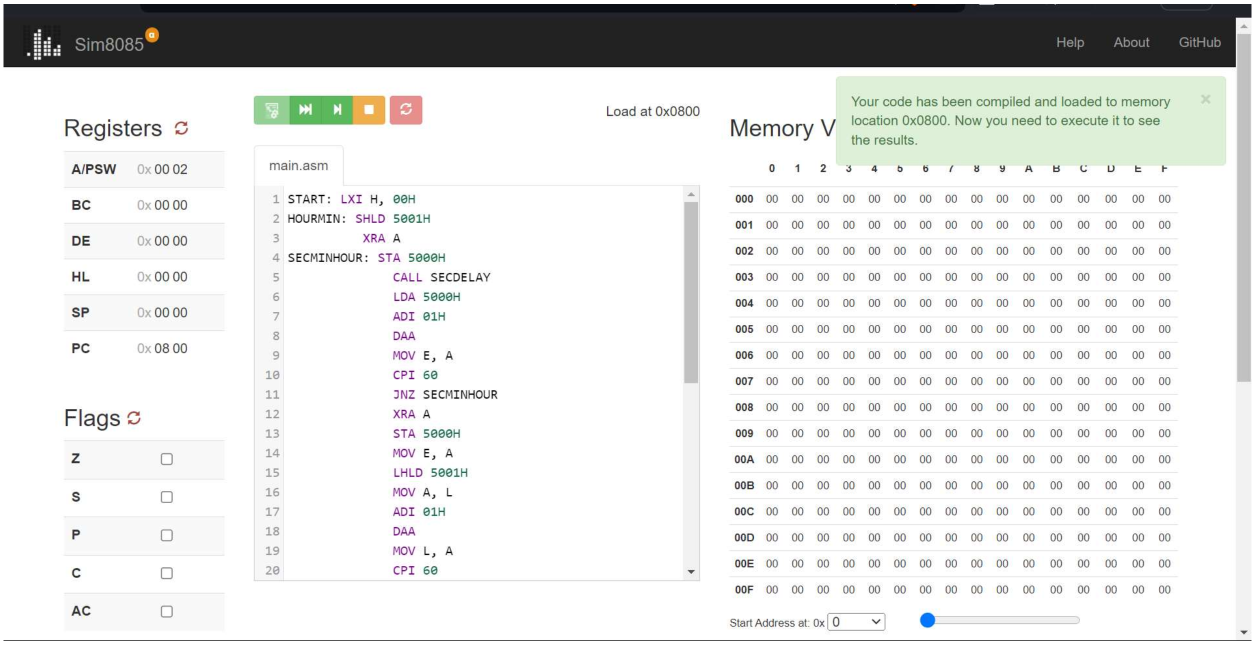
```
START: LXI H, 00H
HOURMIN: SHLD 5001H
         XRA A
SECMINHOUR: STA 5000H
             CALL SECDELAY
      LDA 5000H
      ADI 01H
      DAA
      MOV E, A
      CPI 60
      JNZ SECMINHOUR
      XRA A
      STA 5000H
      MOV E, A
      LHLD 5001H
      MOV A, L
      ADI 01H
```

```
          DAA
          MOV L, A
          CPI 60
          JNZ HOURMIN
          XRA A
          STA 5001H
          MOV L,A
          MOV A, H
          ADI 01H
          DAA
          MOV H, A
          CPI 12
          JNZ HOURMIN
          JMP START
SECDELAY: MVI D, 02H
OUTERLOOP: LXI B, FFFFH
INNERLOOP: DCX B
                    MOV A, B
         ORA C
         JNZ INNERLOOP
         DCR D
```

```
        JNZ OUTERLOOP
        RET
```

Output:

Compile



Your code has been compiled and loaded to memory location 0x0800. Now you need to execute it to see the results.

Load at 0x0800

main.asm

```
START: LXI H, 00H
HOURMIN: SHLD 5001H
          XRA A
SECMINHOUR: STA 5000H
              CALL SECDELAY
              LDA 5000H
              ADI 01H
              DAA
              MOV E, A
              CPI 60
              JNZ SECMINHOUR
              XRA A
              STA 5000H
              MOV E, A
              LHLD 5001H
              MOV A, L
              ADI 01H
              DAA
              MOV L, A
              CPI 60
```

Registers

| | |
|---|---|
| A/PSW | 0x 00 02 |
| BC | 0x 00 00 |
| DE | 0x 00 00 |
| HL | 0x 00 00 |
| SP | 0x 00 00 |
| PC | 0x 08 00 |

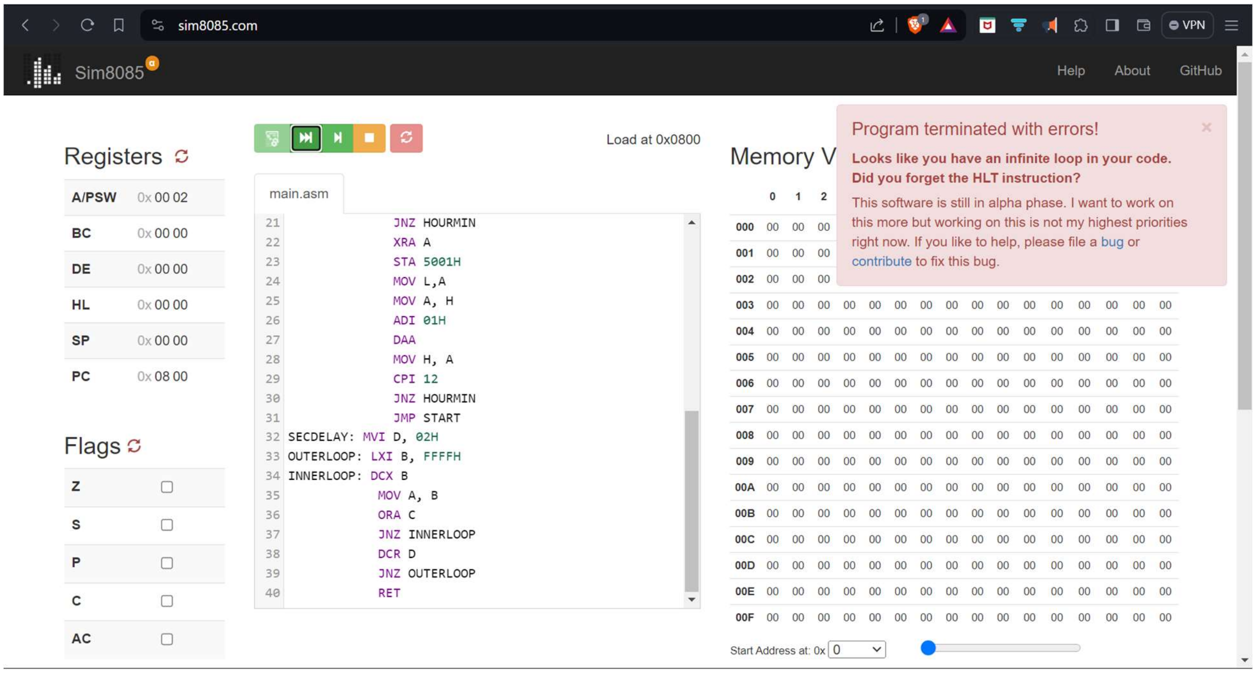
Flags

| | |
|---|---|
| Z | □ |
| S | □ |
| P | □ |
| C | □ |
| AC | □ |

Memory V

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 001 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 002 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 003 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 004 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 005 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 006 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 007 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 008 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 009 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00A | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00B | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00C | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00D | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00E | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00F | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |

Start Address at: 0x 0



Program terminated with errors!

**Looks like you have an infinite loop in your code. Did you forget the HLT instruction?**

This software is still in alpha phase. I want to work on this more but working on this is not my highest priorities right now. If you like to help, please file a bug or contribute to fix this bug.

Load at 0x0800

main.asm

```
              JNZ HOURMIN
              XRA A
              STA 5001H
              MOV L,A
              MOV A, H
              ADI 01H
              DAA
              MOV H, A
              CPI 12
              JNZ HOURMIN
              JMP START
SECDELAY: MVI D, 02H
OUTERLOOP: LXI B, FFFFH
INNERLOOP: DCX B
            MOV A, B
            ORA C
            JNZ INNERLOOP
            DCR D
            JNZ OUTERLOOP
            RET
```

Registers

| | |
|---|---|
| A/PSW | 0x 00 02 |
| BC | 0x 00 00 |
| DE | 0x 00 00 |
| HL | 0x 00 00 |
| SP | 0x 00 00 |
| PC | 0x 08 00 |

Flags

| | |
|---|---|
| Z | □ |
| S | □ |
| P | □ |
| C | □ |
| AC | □ |

Memory V

| | 0 | 1 | 2 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 00 | 00 | 00 | | | | | | | | | | | | | |
| 001 | 00 | 00 | 00 | | | | | | | | | | | | | |
| 002 | 00 | 00 | 00 | | | | | | | | | | | | | |
| 003 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 004 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 005 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 006 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 007 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 008 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 009 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00A | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00B | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00C | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00D | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00E | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00F | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |

Start Address at: 0x 0

Q2. 24 hour clock

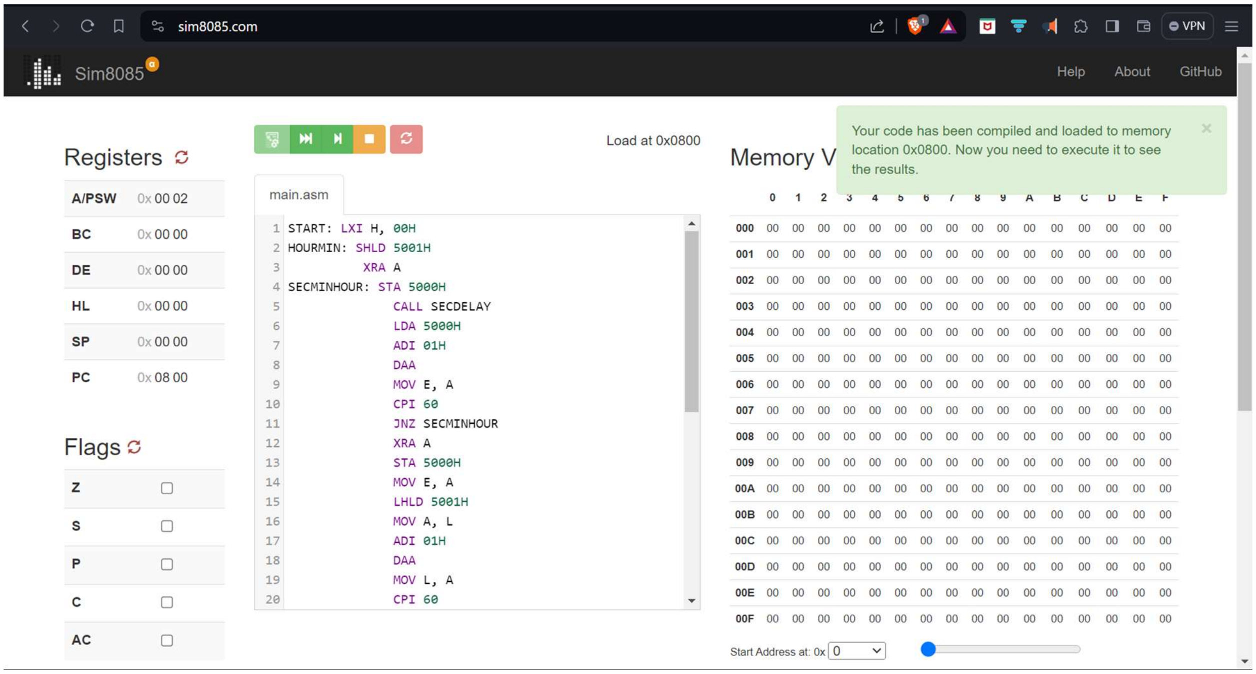
Code:

```
START: LXI H, 00H
HOURMIN: SHLD 5001H
                XRA A
SECMINHOUR: STA 5000H
                       CALL SECDELAY
           LDA 5000H
           ADI 01H
           DAA
           MOV E, A
           CPI 60
           JNZ SECMINHOUR
           XRA A
           STA 5000H
           MOV E, A
           LHLD 5001H
           MOV A, L
           ADI 01H
           DAA
```

```
        MOV L, A
        CPI 60
        JNZ HOURMIN
        XRA A
        STA 5001H
        MOV L,A
        MOV A, H
        ADI 01H
        DAA
        MOV H, A
        CPI 24
        JNZ HOURMIN
        JMP START
SECDELAY: MVI D, 02H
OUTERLOOP: LXI B, FFFFH
INNERLOOP: DCX B
                MOV A, B
       ORA C
       JNZ INNERLOOP
       DCR D
       JNZ OUTERLOOP
```

RET

Output:



sim8085.com

Sim8085 Help About GitHub

Registers

| | |
|---|---|
| A/PSW | 0x 00 02 |
| BC | 0x 00 00 |
| DE | 0x 00 00 |
| HL | 0x 00 00 |
| SP | 0x 00 00 |
| PC | 0x 08 00 |

Flags

| | |
|---|---|
| Z | □ |
| S | □ |
| P | □ |
| C | □ |
| AC | □ |

Load at 0x0800

main.asm

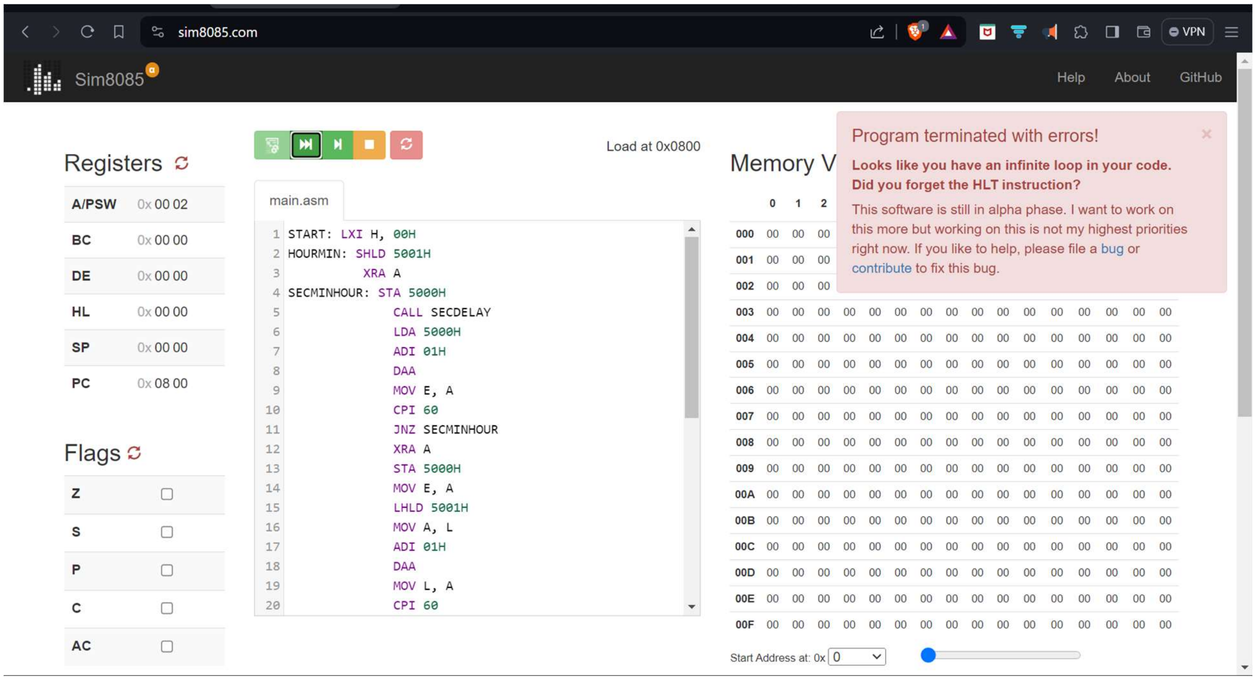
```
START: LXI H, 00H
HOURMIN: SHLD 5001H
          XRA A
SECMINHOUR: STA 5000H
              CALL SECDELAY
              LDA 5000H
              ADI 01H
              DAA
              MOV E, A
              CPI 60
              JNZ SECMINHOUR
              XRA A
              STA 5000H
              MOV E, A
              LHLD 5001H
              MOV A, L
              ADI 01H
              DAA
              MOV L, A
              CPI 60
```

Your code has been compiled and loaded to memory location 0x0800. Now you need to execute it to see the results.

Memory V

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 001 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 002 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 003 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 004 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 005 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 006 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 007 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 008 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 009 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00A | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00B | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00C | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00D | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00E | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00F | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |

Start Address at: 0x 0



sim8085.com

Sim8085 Help About GitHub

Registers

| | |
|---|---|
| A/PSW | 0x 00 02 |
| BC | 0x 00 00 |
| DE | 0x 00 00 |
| HL | 0x 00 00 |
| SP | 0x 00 00 |
| PC | 0x 08 00 |

Flags

| | |
|---|---|
| Z | □ |
| S | □ |
| P | □ |
| C | □ |
| AC | □ |

Load at 0x0800

main.asm

```
START: LXI H, 00H
HOURMIN: SHLD 5001H
          XRA A
SECMINHOUR: STA 5000H
              CALL SECDELAY
              LDA 5000H
              ADI 01H
              DAA
              MOV E, A
              CPI 60
              JNZ SECMINHOUR
              XRA A
              STA 5000H
              MOV E, A
              LHLD 5001H
              MOV A, L
              ADI 01H
              DAA
              MOV L, A
              CPI 60
```

Program terminated with errors!

**Looks like you have an infinite loop in your code. Did you forget the HLT instruction?**

This software is still in alpha phase. I want to work on this more but working on this is not my highest priorities right now. If you like to help, please file a bug or contribute to fix this bug.

Memory V

| | 0 | 1 | 2 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 00 | 00 | 00 | | | | | | | | | | | | | |
| 001 | 00 | 00 | 00 | | | | | | | | | | | | | |
| 002 | 00 | 00 | 00 | | | | | | | | | | | | | |
| 003 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 004 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 005 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 006 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 007 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 008 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 009 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00A | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00B | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00C | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00D | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00E | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 00F | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |

Start Address at: 0x 0

# Microprocessors

2021BCS0175
Y.Hazarathayya

## LAB-5

Q)

```
START:          LXI H, 000H
Hour_min:       SHLD  5001H
                XRA   A

sec_min_hour:   STA   5000H
                Call  sec_delay
                LDA   5000H
                ADI   01H
                DAA
                MOV E, A
                CPI   60
                JNZ   sec_min_hour
                XRA   A
                STA   5000H
                MOV   E, A
                LHLD  5001H
                MOV A, L
                ADI   01H
                DAA
                MOV   L, A
                CPI   60
                JNZ   Hour_min
                XRA   A
                STA   5000H
                Mov   ~~AH~~ L, A
                mov   A, H
                ADI   01H
                DAA
                mov   H, A
                CPI   24
                JNZ   Hour min
                JMP   START

sec_delay:      MVI   D, 01H
outer_loop:     LXI   B, FFFFH
```

```
Inner-loop :    DCX   B
                MOV   A,B
                ORA   C
                JNZ   Inner-loop
                DCR   D
                JNZ   outer-loop
                RET
```

12 Hour clock :

```
AM-PM:          MVI   D, 00H
START           LXI   H, 0000H
                MOV   A,D
                CMA
                ANI   01H
                STA   5003H
                MOV   D,A
Hour-min:       SHLD  5001H
                XRA   A
sec-min-hour:   STA   5000H
                call  sec delay
                LDA   5000H
                ADI   01H
                DAA
                MOV   E,A
                CPI   60
                JNZ   sec-min-hour
                XRA   A
                STA   5000H
                MOV   E,A
                LHLD  5001H
                MOV   A,L
                ADI   01H
                DAA
```

```
            MOV   L,A
            CPI   60
            JNZ   Hour-min
            XRA   A
            STA   5001H
            MOV   L,A
            MOV   A,H
            ADI   01H
            DAA
            MOV   H,A
            CPI   12
            JNZ   Hour-min
            JMP   START

            MVI   D,02H
sec_delay:
outer_loop: LXI   B,FFFFH
Inner_loop: DCX   B
            MOV   A,B
            ORA   C
            JNZ   inner_loop
            DCR   D
            JNZ   outer_loop
            RET.
```

MOV A,B

RAR

RLC

RRC