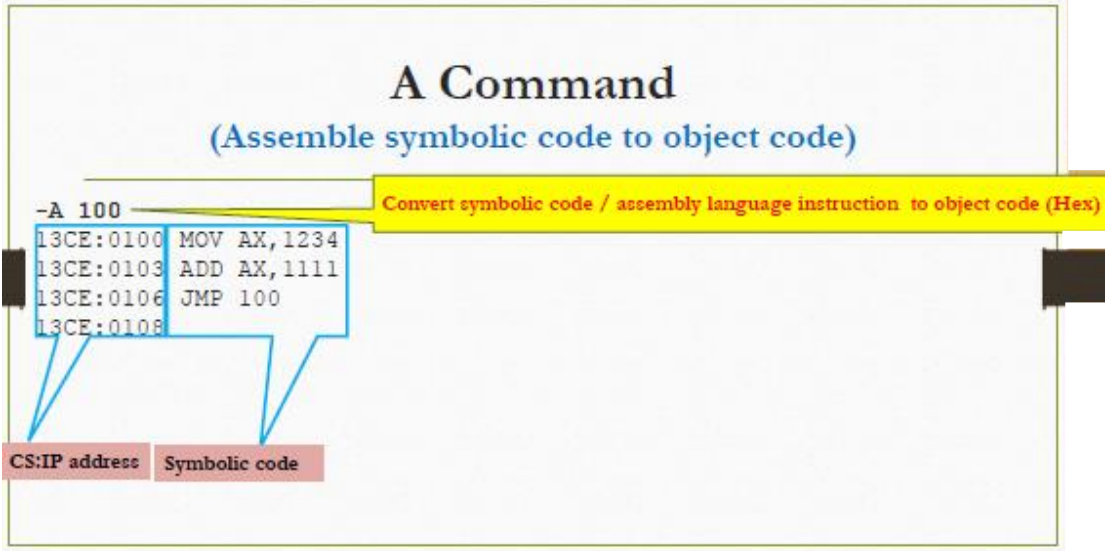


1. Using Debug Commands

1.1 Rules & Commands

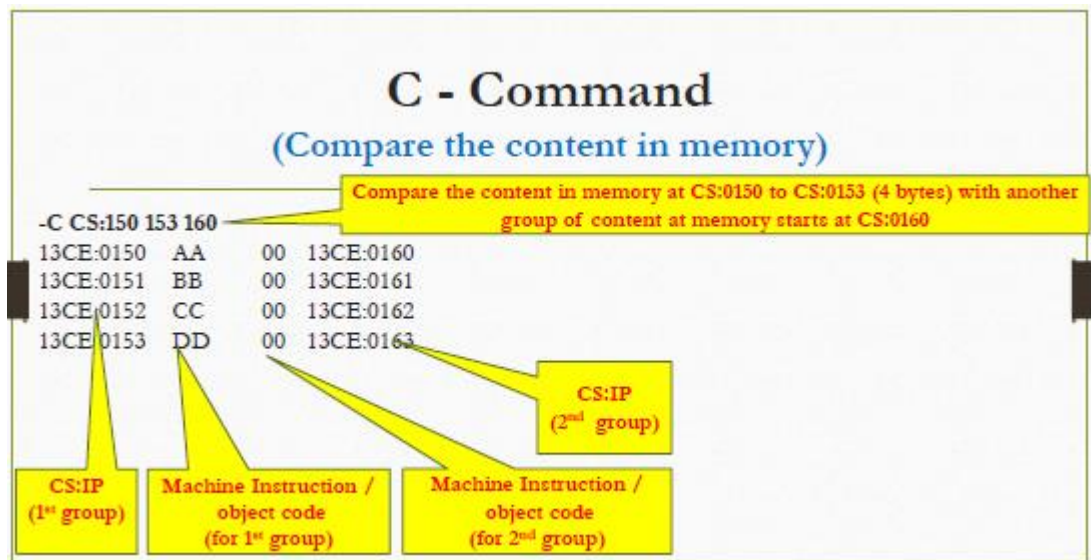
| | | |
|----------------|---|--|
| Rules | <ul style="list-style-type: none"> No case sensitive All number as Hex Space as separator Segment & offset address are separated by colon | |
| Debug commands | Command | Description |
| | A | Assemble (symbolic code → object code) |
| | C | Compare memory content |
| | D | Display memory content |
| | E | Enter content to memory |
| | F | Fill in memory content repeatedly & continuously |
| | H | Hex computation |
| | P | Proceed to execute a group of instruction |
| | Q | Quit |
| | R | Retrieve the content of register |
| | T | Trace the instruction execution 1 by 1 |
| | U | Un-assemble (object code → symbolic code) |

3.2 Sample Outputs

| Command | Description |
|----------|--|
| A | <p>Assemble (symbolic code → object code)</p>  |

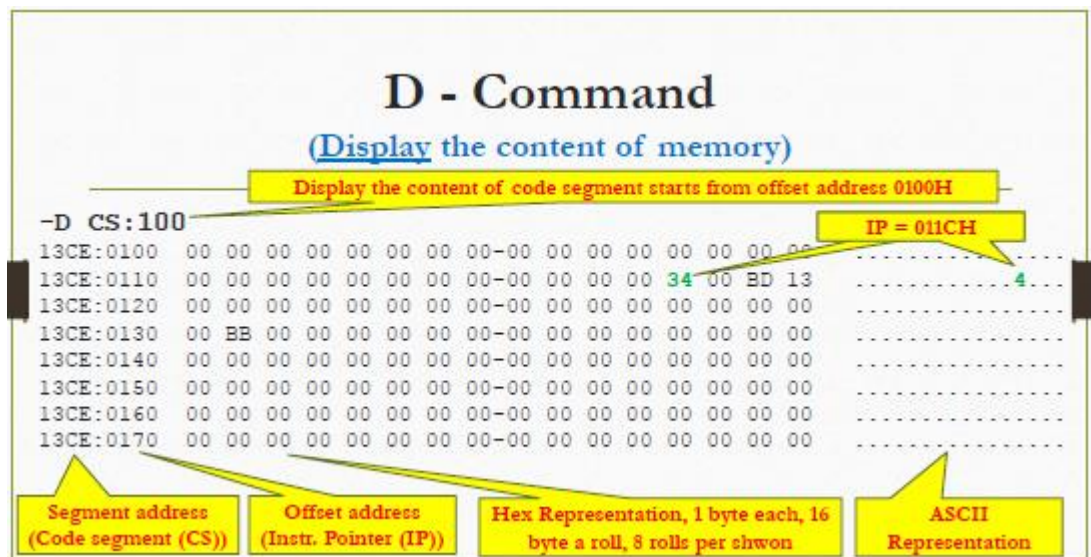
C

Compare memory content



D

Display memory content



E**Enter content to memory**

E - Command
(Enter data/ instruction to memory)

Enter the machine instruction (AAH, BBH, CCH & DDH) to memory at CS:0100

-E CS:150 AA BB CC DD

-D CS:150

Display the content of code segment starts from offset address 0100H

| | | |
|-----------|--|-------|
| 13CE:0150 | AA BB CC DD 00 00 00 00-00 00 00 00 00 00 00 | |
| 13CE:0160 | 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 | |
| 13CE:0170 | 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 | |
| 13CE:0180 | 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 | |
| 13CE:0190 | 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 | |
| 13CE:01A0 | 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 | |
| 13CE:01B0 | 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 | |
| 13CE:01C0 | 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 | |

Segment address (Code segment (CS)) Offset address (Instr. Pointer (IP)) Hex Representation, 1 byte each, 16 byte a roll, 8 rolls per shown ASCII Representation

F**Fill in memory content repeatedly & continuously**

F - Command
(Fill in the content to memory repeatedly)

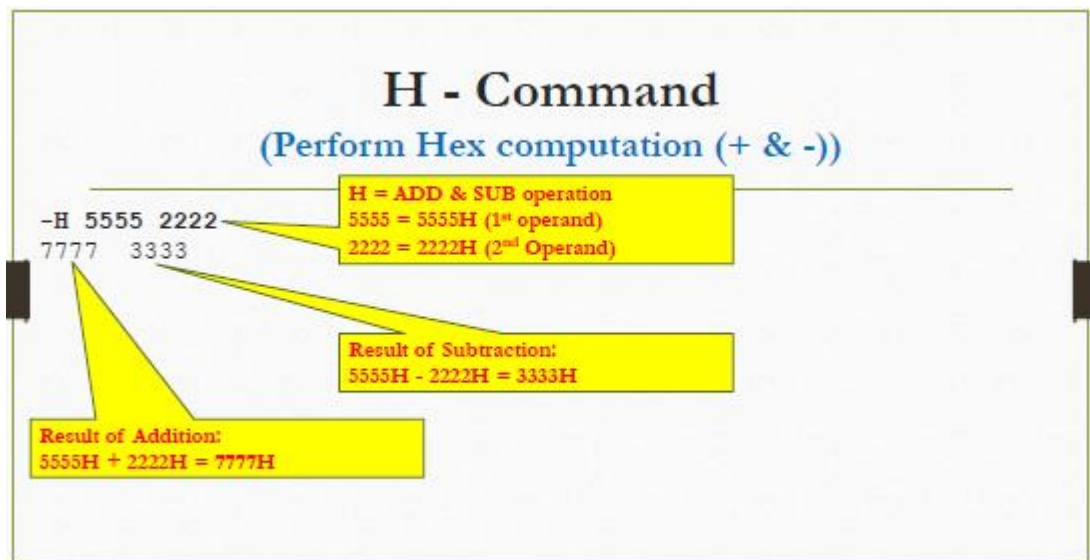
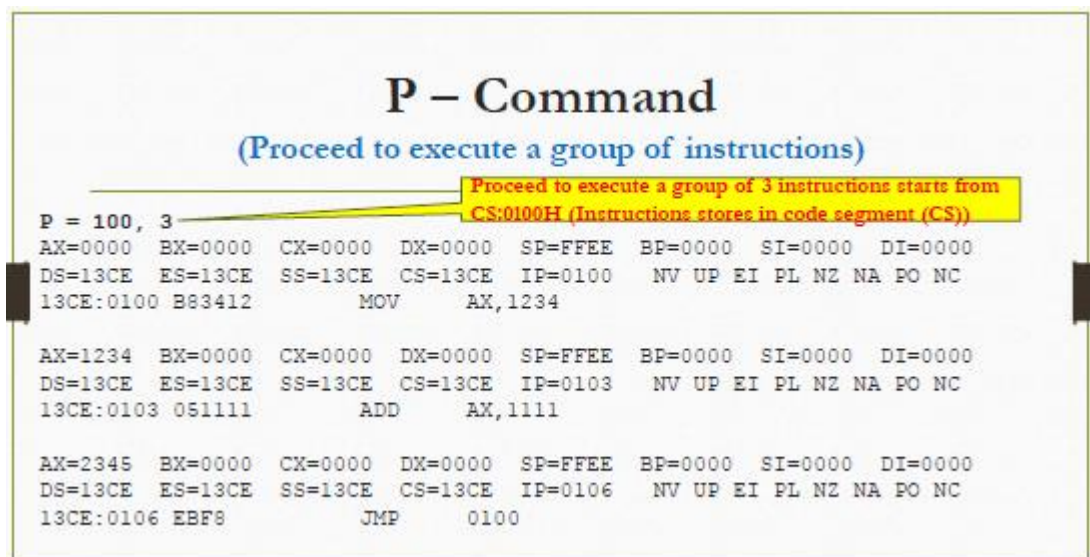
Fill in the memory content with the ASCII code "I LOVE ICS" start from CS:0180 to CS:01AE.

-F CS:180 1AF "I LOVE ICS"

-D CS:180

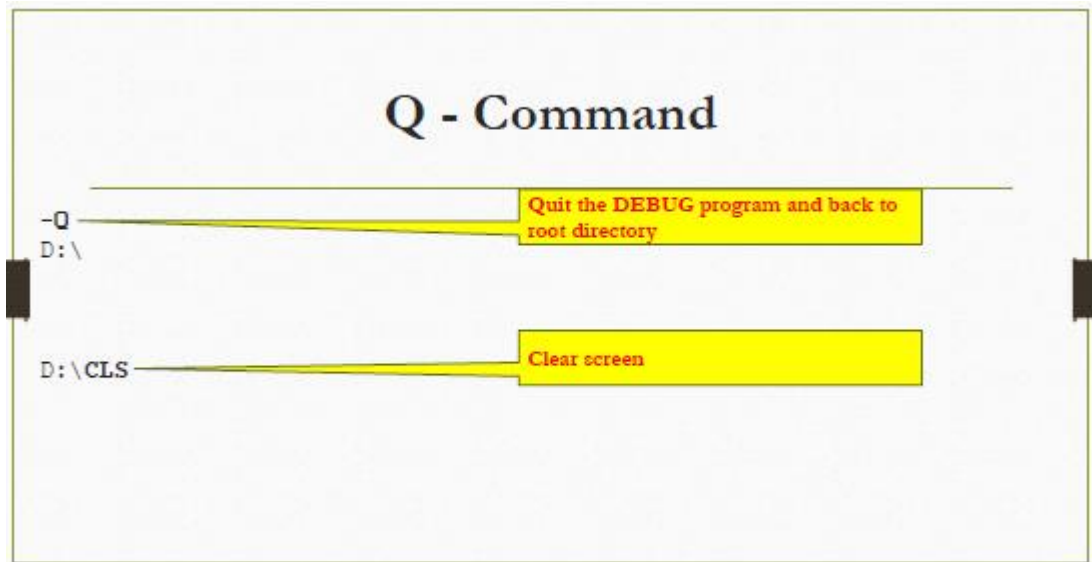
| | | |
|-----------|---|--------------------|
| 13CE:0180 | 69 20 6C 6F 76 65 20 63-73 61 69 20 6C 6F 76 65 | I LOVE ICSI LOVE |
| 13CE:0190 | 20 63 73 61 69 20 6C 6F-76 65 20 63 73 61 69 20 | ICSI LOVE ICSI |
| 13CE:01A0 | 6C 6F 76 65 20 63 73 61-69 20 6C 6F 76 65 20 63 | LOVE ICSI LOVE C |
| 13CE:01B0 | 49 4A 41 42 43 44 45 46-47 48 49 4A 41 42 43 44 | IJKLMNOPQRSTUVWXYZ |
| 13CE:01C0 | 45 46 47 48 49 4A 41 42-43 44 45 46 47 48 49 4A | ABCDEFGHIJKLMN |
| 13CE:01D0 | 41 42 43 44 45 46 47 48-49 4A 41 42 43 44 45 46 | ABCDEFGHIJKLMN |
| 13CE:01E0 | 47 48 49 4A 41 42 43 44-45 46 47 48 49 4A 41 42 | HIJKLMNOPQRSTU |

ASCII Representation

H**Hex computation****P****Proceed to execute a group of instruction**

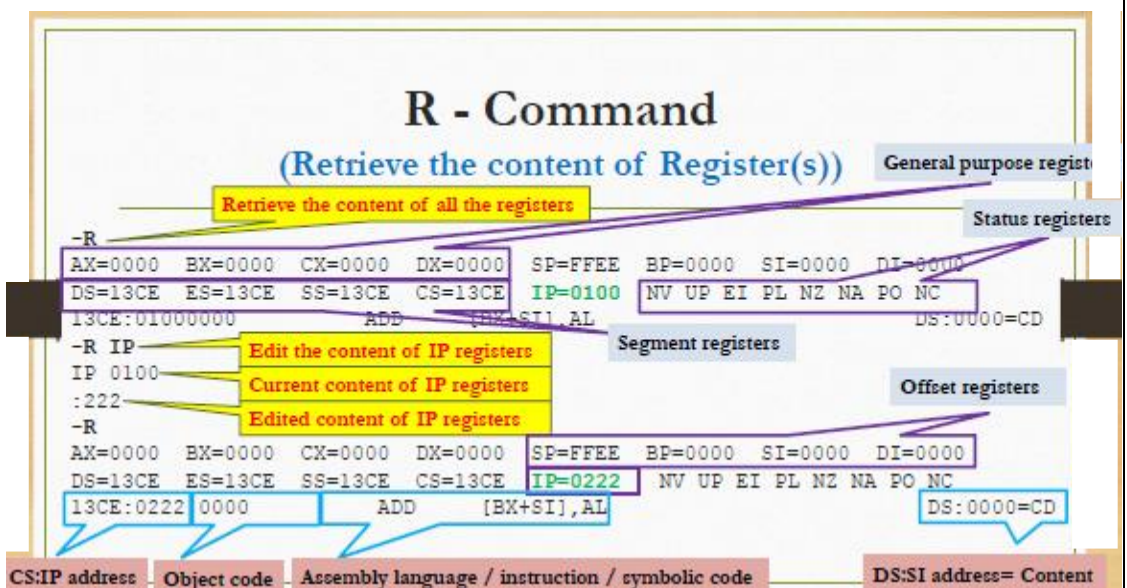
Q

Quit



R

Retrieve the content of register



T**Trace the instruction execution 1 by 1**

T - Command
(Trace to execute instruction 1 by 1)

Initial AX

Length of instruction / object code = 3 bytes

```

-R
AX=0000 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=13CE ES=13CE SS=13CE CS=13CE IP=0100 NV UP EI PL NZ NA PO NC
13CE:0100 B83412 MOV AX,1234
-T
Trace instruction execution. MOV AX,1234 will be executed
AX=1234 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=13CE ES=13CE SS=13CE CS=13CE IP=0103 NV UP EI PL NZ NA PO NC
13CE:0103 051111 ADD AX,1111
IP is updated based on the length of instruction
0100H + 3 bytes = 0103H
-T
AX=2345 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=13CE ES=13CE SS=13CE CS=13CE IP=0106 NV UP EI PL NZ NA PO NC
13CE:0106 78 JMP 0100
AX After 1st execution

```

U**Un-assemble (object code → symbolic code)**

U - Command
(Un-assemble: Convert object code to symbolic code)

Un-assemble from CS:0100 till CS:0107

```

U 100, 107
13CE:0100 B83412 MOV AX,1234
13CE:0103 051111 ADD AX,1111
13CE:0106 EBF8 JMP 0100

```

2 bytes

| CS:IP address | Object code (Hex) | Symbolic code |
|---------------|-------------------|---------------|
| 13CE:0100 | B83412 | MOV AX,1234 |
| : | : | : |
| : | : | : |