实验一　利用 DEBUG 熟悉常用指令的使用

一、实验目的

熟悉 DEBUG 中的常用调试命令 R\D\E\T\A\G\P 等，通过实验加深对各种寻址方式的理解；能熟练使用 DEBUG 中的命令对指令进行反汇编，观察并了解机器代码。

二、实验题

1、 通过 debug 命令对寄存器和存储单元进行设置，使(DS)=2000H,(BX)=0100H,(SI)=0002H,(BP)=0200H,(SS)=2300H,(20100)=12H,(20101)=34H, (20102)=56H, (20103)=78H, (21200)=2AH, (21201)=4CH,(21202)=B7H,(21203)=65H, (23204)=88H, (23205)=99H

2 分别输入下列指令，并单步 T 执行，观察执行结果并截图。并说明各指令执行完后 AX 寄存器的内容。

(1) MOV AX,1200H

源操作数为立即寻址方式(AX)=1200H

```
-t=0

AX=1200  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0003   NV UP EI PL NZ NA PO NC
0770:0003 89D8          MOV     AX,BX
```

(2) MOV AX,BX

源操作数为寄存器寻址方式(BX)=0100H

```
-t

AX=0100  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0005   NV UP EI PL NZ NA PO NC
0770:0005 A10012        MOV     AX,[1200]                       DS:1200=4C2A
```

(3) MOV AX,[1200H]

源操作数为直接寻址方式([1200H])=(21200H)=4C2AH

```
-t

AX=4C2A  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0008   NV UP EI PL NZ NA PO NC
0770:0008 8B07          MOV     AX,[BX]                         DS:0100=3412
```

(4) MOV AX,[BX]

源操作数为寄存器间接寻址方式([BX])=(20100H)=3412H

```
-t

AX=3412  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=000A   NV UP EI PL NZ NA PO NC
0770:000A 8B870011      MOV     AX,[BX+1100]                    DS:1200=4C2A
```

(5) MOV AX,1100[BX]

源操作数为基址寻址方式(1100[BX])=(21200H)=4C2AH

```
-t

AX=4C2A  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=000E   NV UP EI PL NZ NA PO NC
0770:000E 8B00          MOV     AX,[BX+SI]                      DS:0102=7856
```

(6) MOV AX,[BX][SI]

源操作数为变址寻址方式([BX][SI])=(20102H)=7856H

```
AX=7856  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0010   NV UP EI PL NZ NA PO NC
0770:0010 8BB00011      MOV     AX,[BX+SI+1100]                 DS:1202=65B7
```

(7) MOV AX,1100[BX][SI]

源操作数为基址变址加偏移地址寻址方式(1100[BX][SI])=(21202H)=65B7H

```
-t

AX=65B7  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0014   NV UP EI PL NZ NA PO NC
0770:0014 8B4204        MOV     AX,[BP+SI+04]                   SS:0206=0000
```

(8) MOV AX,[BP+SI+04]

源操作数为基址变址加偏移地址寻址方式([BP+SI+04])=(20104H)=0000H

```
-t

AX=0000  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0017   NV UP EI PL NZ NA PO NC
0770:0017 0000          ADD     [BX+SI],AL                      DS:0102=56
```

三、实验报告

总结操作步骤及各种寻址方式，记录调试结果。

任务一运行结果

```
-r
AX=FFFF  BX=0000  CX=0009  DX=0000  SP=0000  BP=0000  SI=0000  DI=0000
DS=0760  ES=0760  SS=076F  CS=0770  IP=0000   NV UP EI PL NZ NA PO NC
0770:0000 B87007        MOV     AX,0770
-r ds
DS 0760
:2000
-r bx
BX 0000
:0100
-r si
SI 0000
:0002
-r bp
BP 0000
:0200
-r ss
SS 076F
:2300
-r
AX=FFFF  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0000   NV UP EI PL NZ NA PO NC
0770:0000 B87007        MOV     AX,0770
- ;_
```

使用 r+寄存器名字给寄存器赋值

```
SI 0000
:0002
-r bp
BP 0000
:0200
-r ss
SS 076F
:2300
-r
AX=FFFF  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0000   NV UP EI PL NZ NA PO NC
0770:0000 B87007        MOV     AX,0770
-f 100 103
           ^ Error
-f 100 103 12 34 56 78
-d100
2000:0100  12 34 56 78 00 00 00 00-00 00 00 00 00 00 00 00   .4Vx............
2000:0110  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0120  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0130  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0140  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0150  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0160  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0170  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
-_;
```

使用 f 命令给 20100 到 20103 赋值

```
2000:0160  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0170  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
-f 200 203
           ^ Error
-f 200 203 2a 4c b7 65
-d200
2000:0200  2A 4C B7 65 00 00 00 00-00 00 00 00 00 00 00 00   *L.e............
2000:0210  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0220  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0230  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0240  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
-f 1200 1203 2a 4c  b7 65
-d1200
2000:1200  2A 4C B7 65 00 00 00 00-00 00 00 00 00 00 00 00   *L.e............
2000:1210  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1220  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1230  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1240  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
-_;
```

使用 f 命令给 21200 到 21203 赋值

```
2000:0250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:0270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
-f 1200 1203 2a 4c  b7 65
-d1200
2000:1200  2A 4C B7 65 00 00 00 00-00 00 00 00 00 00 00 00   *L.e............
2000:1210  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1220  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1230  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1240  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
-f 3204 3205 88 99
-d3204
2000:3200              88 99 00 00-00 00 00 00 00 00 00 00       ............
2000:3210  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3220  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3230  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3240  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3280  00 00 00 00                                       ....
-_;
```

```
2000:1240  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:1270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
-f 3204 3205 88 99
-d3204
2000:3200                88 99 00 00-00 00 00 00 00 00 00 00       ............
2000:3210  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3220  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3230  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3240  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3280  00 00 00 00                                       ....
-d3200
2000:3200  00 00 00 00 88 99 00 00-00 00 00 00 00 00 00 00   ................
2000:3210  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3220  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3230  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3240  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
2000:3270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
- ;
```

使用 f 命令给 23204 到 23205 赋值

任务二

使用 a 命令给代码段添加汇编代码

使用 u 命令反汇编代码查看代码是否正确

```
-a 0
0770:0000 mov ax,1200
0770:0003 mov ax,bx
0770:0005 mov ax,[1200]
0770:0008 mov ax,[bx]
0770:000A mov ax,1100[bx]
0770:000E mov ax,[bx][si]
0770:0010 mov ax,1100[bx][si]
0770:0014 mov ax,[bp+si+04]
0770:0017
-u
0770:0000 B80012        MOV     AX,1200
0770:0003 89D8          MOV     AX,BX
0770:0005 A10012        MOV     AX,[1200]
0770:0008 8B07          MOV     AX,[BX]
0770:000A 8B870011      MOV     AX,[BX+1100]
0770:000E 8B00          MOV     AX,[BX+SI]
0770:0010 8B800011      MOV     AX,[BX+SI+1100]
0770:0014 8B4204        MOV     AX,[BP+SI+04]
0770:0017 0000          ADD     [BX+SI],AL
0770:0019 0000          ADD     [BX+SI],AL
0770:001B 0000          ADD     [BX+SI],AL
0770:001D 0000          ADD     [BX+SI],AL
0770:001F 0000          ADD     [BX+SI],AL
- ;
```

使用 t 命令单步运行命令

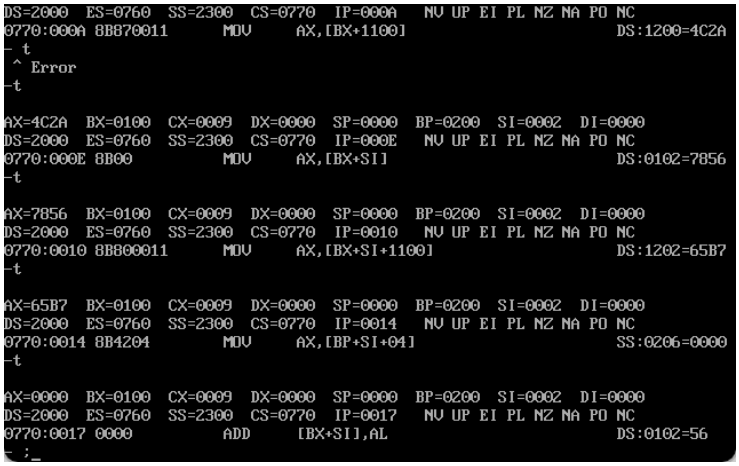
```
-t=0

AX=1200  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0003   NV UP EI PL NZ NA PO NC
0770:0003 89D8          MOV     AX,BX
-t

AX=0100  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0005   NV UP EI PL NZ NA PO NC
0770:0005 A10012        MOV     AX,[1200]                       DS:1200=4C2A
-t

AX=4C2A  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=0008   NV UP EI PL NZ NA PO NC
0770:0008 8B07          MOV     AX,[BX]                         DS:0100=3412
-t

AX=3412  BX=0100  CX=0009  DX=0000  SP=0000  BP=0200  SI=0002  DI=0000
DS=2000  ES=0760  SS=2300  CS=0770  IP=000A   NV UP EI PL NZ NA PO NC
0770:000A 8B870011      MOV     AX,[BX+1100]                    DS:1200=4C2A
- ;
```


DS=2000 ES=0760 SS=2300 CS=0770 IP=000A NV UP EI PL NZ NA PO NC
0770:000A 8B870011 MOV AX,[BX+1100] DS:1200=4C2A
-t
^ Error
-t
AX=4C2A BX=0100 CX=0009 DX=0000 SP=0000 BP=0200 SI=0002 DI=0000
DS=2000 ES=0760 SS=2300 CS=0770 IP=000E NV UP EI PL NZ NA PO NC
0770:000E 8B00 MOV AX,[BX+SI] DS:0102=7856
-t
AX=7856 BX=0100 CX=0009 DX=0000 SP=0000 BP=0200 SI=0002 DI=0000
DS=2000 ES=0760 SS=2300 CS=0770 IP=0010 NV UP EI PL NZ NA PO NC
0770:0010 8B800011 MOV AX,[BX+SI+1100] DS:1202=65B7
-t
AX=65B7 BX=0100 CX=0009 DX=0000 SP=0000 BP=0200 SI=0002 DI=0000
DS=2000 ES=0760 SS=2300 CS=0770 IP=0014 NV UP EI PL NZ NA PO NC
0770:0014 8B4204 MOV AX,[BP+SI+04] SS:0206=0000
-t
AX=0000 BX=0100 CX=0009 DX=0000 SP=0000 BP=0200 SI=0002 DI=0000
DS=2000 ES=0760 SS=2300 CS=0770 IP=0017 NV UP EI PL NZ NA PO NC
0770:0017 0000 ADD [BX+SI],AL DS:0102=56
-