C: > masm > ASM ex11.asm

```
TITLE PRG10: Debug program for arithmetic operation
 2
        .MODEL SMALL
                                     DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
                                                                                                                        \times
 3
        .STACK 100H
                                    Microsoft (R) Segmented Executable Linker Version 5.31.009 Jul 13 1992
Copyright (C) Microsoft Corp 1984–1992. All rights reserved.
 4
        .DATA
        .CODE
 5
                                    Run File [ex11.exe]:
List File [nul.map]:
 6
        MAIN PROC
                                     Libraries [.lib]:
 7
              MOV AX,4000H
                                    Definitions File [nul.def]:
                                     C:\>debug ex11.exe
 8
              ADD AX, AX
                                    -u
076A:0000 B80040
 9
              SUB AX,0001H
                                                               MOV
                                                                        AX,4000
                                     076A:0003 03C0
                                                               ADD
                                                                        AX,AX
10
               NEG AX
                                     076A:0005 83E801
                                                               SUB
                                                                        AX,+01
                                                                        AX
AX
                                     076A:0008 F7D8
                                                               NEG
               INC AX
11
                                     076A:000A 40
                                                               INC
                                     076A:000B B44C
                                                               MOV
                                                                        AH,4C
12
                                     076A:000D CD21
                                                               INT
13
               EXIT:
                                     076A:000F 3F
                                                               AAS
                                    076A:0010 00E8
076A:0012 3C00
                                                               ADD
                                                                        AL,CH
14
              MOV AH, 4CH
                                                               CMP
                                                                        AL,00
                                    076A:0014 E83900
076A:0017 E83600
                                                               CALL
                                                                        0050
15
               INT 21H
                                                                        0050
                                                               CALL
                                    076A:001A E83300
076A:001D E83000
                                                               CALL
                                                                        0050
              MAIN ENDP
16
                                                                        0050
                                                               CALL
17
        END MAIN
```

Figure 11: Output of Experiment 11

```
C: > masm > ASM ex12.asm
         TITLE prg12 : Debugging Logical operation
         .MODEL SMALL
                                  DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
   2
                                                                                                                     \times
   3
         .STACK 100H
                                  Microsoft (R) Segmented Executable Linker Version 5.31.009 Jul 13 1992
Copyright (C) Microsoft Corp 1984–1992. All rights reserved.
   4
         .DATA
   5
         .CODE
                                  Run File [ex12.exe]:
   6
        MAIN PROC
                                  List File [nul.map]:
   7
              MOV AX, 6A78H
                                  Libraries [.lib]:
                                  Definitions File [nul.def]:
   8
              MOV BX, 5B28H
   9
              MOV CX, 290AH
                                  C:\>debug ex12.exe
  10
                                  076A:0000 B8786A
                                                            MOV
                                                                     AX,6A78
              AND AX, BX
 11
                                  076A:0003 BB285B
                                                            MOV
                                                                     BX,5B28
                                  076A:0006 B90A29
                                                            MOV
                                                                     CX,290A
              OR CX,AX
 12
                                  076A:0009 Z3C3
                                                                     AX,BX
                                                            AND
              NEG AX
                                                                     CX,AX
AX
 13
                                  076A:000B 0BC8
                                                            OR
                                  076A:000D F7D8
                                                            NEG
 14
                                                                     AH,4C
                                  076A:000F B44C
                                                            MOV
 15
              EXIT:
                                  076A:0011 CD21
                                                            INT
                                                                     21
                                  076A:0013 00E8
                                                            ADD
                                                                     AL,CH
              MOV AH,4CH
 16
                                  076A:0015 3900
                                                            CMP
                                                                     [BX+SI],AX
 17
              INT 21H
                                  076A:0017 E83600
                                                            CALL
                                                                     0050
                                  076A:001A E83300
076A:001D E83000
                                                            CALL
                                                                     0050
              MAIN ENDP
 18
                                                            CALL
                                                                     0050
 19
        END MAIN
```

Figure 12: Output of Experiment 12

C: > masm > ASM ex9.asm

```
title prg9: Displaying the characters untill the SPACE KEY is pressed
 2
        .model medium
                                             DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra... —
                                                                                                                                \times
 3
        .stack 100h
                                             C:\>masm ex9.asm
                                            Microsoft (R) MASM Compatibility Driver
Copyright (C) Microsoft Corp 1993. All rights reserved.
 4
         .data
 5
         .code
                                              Invoking: ML.EXE /I. /Zm /c /Ta ex9.asm
 6
        main proc
                                            Microsoft (R) Macro Assembler Version 6.11
Copyright (C) Microsoft Corp 1981–1993. All rights reserved.
 7
               mov ah,1
 8
               again:
                                             Assembling: ex9.asm
 9
                     int 21h
                                             ::>link ex9.obj
10
                     cmp al, ''
                                            Microsoft (R) Segmented Executable Linker Version 5.31.009 Jul 13 1992
Copyright (C) Microsoft Corp 1984–1992. All rights reserved.
                     je exit
11
12
               loop again
                                            Run File [ex9.exe]:
                                            List File [nul.map]:
Libraries [.lib]:
13
               exit:
14
                     mov ah,4ch
                                            Definitions File [nul.def]:
15
                     int 21h
                                             Pya(/::
                                             cste16thbatch
16
                     main endp
        end main
17
```

Figure 09: Output of Experiment 09

```
C: > masm > ASM ex10.asm
         title prg10: Displaying IBM 256 characters
   1
   2
         .model small
                                       DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
                                                                                                                               \times
         .stack 100h
   3
   4
         .data
                                        Invoking: ML.EXE /I. /Zm /c /Ta ex10.asm
   5
         .code
                                       Microsoft (R) Macro Assembler Version 6.11
   6
         main proc
                                       Copyright (C) Microsoft Corp 1981-1993. All rights reserved.
   7
              mov ah, 2h
                                        Assembling: ex10.asm
   8
              mov cx, 256
   9
              mov dl,0
                                       C:N>link ex10.obj
 10
               again:
                                       Microsoft (R) Segmented Executable Linker Version 5.31.009 Jul 13 1992
                                       Copyright (C) Microsoft Corp 1984–1992. All rights reserved.
 11
                    int 21H
 12
                     inc dl
                                       Run File [ex10.exe]:
  13
                     dec cx
                                       List File [nul.map]:
                                       Libraries [.lib]:
 14
                     jnz again
                                       Definitions File [nul.def]:
 15
                     jcxz exit
                                       C:\>ex10
               exit:
  16
                                       ワ϶┷┥⁴¥ŸŖ$_±↑↓→∙▲▼ !"#$∞&'()*+,−./0123456789:;<=>?@ABCDEFGHIJKLMYOPQRSTUVWXYZ[\]^
`abcdefghijklmnopqrstuvwxyz{\}~^⊆üéâäàågêëèïîìññĚæfööòûùÿÖÜÇĹ¥ŘfáíóúñѺºċr¬½₄ἰ«
▓▓||┤╣╖┑╣║╗╙┸┐└┴┬├─┼|╟╚╬╦╠┼┼╢┰╖╙┖╒╓╫┼┘┌┸┛╴┍╙ßՐπΣσγτᾶΘℛδο∞€∩≘±≥≤∫Ĵ÷≈°·√<sup>™</sup>²■
 17
                     mov ah,4ch
  18
                     int 21h
 19
                    main endp
  20
         end main
```

Figure 10: Output of Experiment 10

```
C: > masm > 🛰 exp7.asm
  1 title prg7 : Displaying 25 starts in one column
  2
      .model small
                                  DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
      .stack 100h
  4
      .data
      msg db 0dh, 0ah, '* $'
  5
  6
       .code
  7
      main proc
  8
          mov ax,@data
  9
           mov ds,ax
 10
           mov cx, 25
 11
           lea dx,msg
 12
           mov ah,9h
 13
 14
           again:
           int 21h
 15
           loop again
 16
 17
 18
           exit:
 19
           mov ah,4ch
           int 21h
 20
 21
           main endp
 22
       end main
 23
```

Figure 07: Output of Experiment 07

```
C: > masm > ASM ex8.asm
         title prg8: Displaying the characters untill the ENTER KEY is pressed
   1
   2
          .model medium
                                        DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
   3
          .stack 100h
                                        Microsoft (R) MASM Compatibility Driver
Copyright (C) Microsoft Corp 1993. All rights reserved.
   4
         .data
   5
         .code
                                         Invoking: ML.EXE /I. /Zm /c /Ta ex8.asm
   6
         main proc
   7
               mov ah,1
                                       Microsoft (R) Macro Assembler Version 6.11
Copyright (C) Microsoft Corp 1981–1993.  All rights reserved.
   8
               again:
   9
                     cmp al, 0dh
                                        Assembling: ex8.asm
  10
                     je exit
                                        C:∖>link ex8.obj
                     int 21h
  11
                                        Microsoft (R) Segmented Executable Linker Version 5.31.009 Jul 13 1992
Copyright (C) Microsoft Corp 1984–1992. All rights reserved.
  12
               loop again
 13
                                        Run File [ex8.exe]:
  14
               exit:
                                        List File [nul.map]:
Libraries [.lib]:
 15
               mov ah,4ch
                                        Definitions File [nul.def]:
 16
               int 21h
               main endp
  17
                                        ::\>ex8
                                        STE 16th Batch!
  18
         end main
  19
```

Figure 08: Output of Experiment 08

```
C: > masm > № ex5.asm
  1 title prg5 : Displaying CSTE Departments for 20 times
  2
       .model small
                                        DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra... —
                                                                                                                   \times
       .stack 100H
                                       Definitions File [nul.def]:
  4
       .data
  5
       msg db 0dh, 0ah, 'CSTE DepartmeC:\>ex5
       .code
                                       CSTE Department
       main proc
                                        CSTE Department
  8
           mov ax,@data
                                        STE Department
  9
           mov ds,ax
                                        STE Department
                                        STE Department
 10
                                        STE Department
 11
           mov cx, 20
                                        STE Department
 12
           lea dx,msg
                                        STE Department
           mov ah,9
                                        STE Department
STE Department
 13
 14
                                        CSTE Department
 15
           level1:
                                        STE Department
 16
           int 21h
                                        CSTE Department
 17
           loop level1
                                        STE
                                            Department
 18
                                        CSTE Department
                                        STE
                                            Department
 19
           exit:
                                        CSTE Department
 20
           mov ah,4ch
                                        CSTE
                                            Department
 21
           int 21h
                                        CSTE Department
 22
           main endp
                                        CSTE Department
 23
       end main
```

Figure 05: Output of Experiment 05

```
C: > masm > ASM ex6.asm
        title prg6: Displaying 80 starts
   1
   2
         .model small
                                   DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
   3
         .stack 100h
                                     √>masm ex6.asm
                                   Microsoft (R) MASM Compatibility Driver
Copyright (C) Microsoft Corp 1993. All rights reserved.
   4
         .data
   5
         .code
                                    Invoking: ML.EXE /I. /Zm /c /Ta ex6.asm
   6
        main proc
   7
             mov cx,80
                                   Microsoft (R) Macro Assembler Version 6.11
Copyright (C) Microsoft Corp 1981–1993.  All rights reserved.
   8
              mov ah,2
             mov dl,'*'
  9
                                    Assembling: ex6.asm
 10
                                    :\>link ex6.obj
 11
             top:
                                   Microsoft (R) Segmented Executable Linker Version 5.31.009 Jul 13 1992
Copyright (C) Microsoft Corp 1984–1992. All rights reser∨ed.
 12
              int 21h
              loop top
 13
 14
                                   Run File [ex6.exe]:
                                   List File [nul.map]:
Libraries [.lib]:
 15
              exit:
 16
              mov ah,4ch
                                   Definitions File [nul.def]:
 17
              int 21h
                                    ::\>ex6
 18
             main endp
```

Figure 06: Output of Experiment 06

```
C: > masm > ASM ex3.asm
           title prg3: Displaying an one line messsage
           .model small
                                                            BOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra... —
           .stack 100h
    4
           .data
                                                             :\>masm ex3.asm
dicrosoft (R) MASM Compatibility Driver
Copyright (C) Microsoft Corp 1993. All rights reserved.
           msg db 'CSTE 16th Batch!$'
    5
    6
           .code
                                                              In∨oking: ML.EXE /I. /Zm /c /Ta ex3.asm
    7
           main proc
                                                            Microsoft (R) Macro Assembler Version 6.11
Copyright (C) Microsoft Corp 1981−1993.  All rights reser∨ed.
    8
                  mov ax,@data
    9
                  mov ds, ax
                                                             Assembling: ex3.asm
  10
                                                            C:∖>link ex3.obj
  11
                  mov ah,2
                                                            Microsoft (R) Segmented Executable Linker Version 5.31.009 Jul 13 1992
Copyright (C) Microsoft Corp 1984–1992. All rights reserved.
  12
                  lea dx,msg
  13
                  mov ah,9h
                                                            Run File [ex3.exe]:
List File [nul.map]:
Libraries [.lib]:
Definitions File [nul.def]:
                  int 21h
  14
  15
  16
                  exit:
                                                             STE 16th Batch!
  17
                  mov ah,4ch
  18
                  int 21h
  19
                  main endp
  20
           end main
```

Figure 03: Output of Experiment 03

```
C: > masm > ASM ex4.asm
   1
          TITLE PRG4: DISPLAY TWO LINE MESSAGE
   2
           .MODEL SMALL
   3
           .STACK 100H
   4
           .DATA
   5
          MSG1 DB 'Welcome to NSTU$'
   6
          MSG2 DB 0DH, 0AH, 'from CSTE 16th Batch$'
                                           DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
           .CODE
                                                                                                                              X
   7
   8
                 MAIN PROC
                                          Microsoft (R) MASM Compatibility Driver
Copyright (C) Microsoft Corp 1993. All rights reserved.
   9
                 MOV AX,@DATA
                                            Invoking: ML.EXE /I. /Zm /c /Ta ex4.asm
  10
                 MOV DS, AX
  11
                 LEA DX, MSG1
                                          Microsoft (R) Macro Assembler Version 6.11
Copyright (C) Microsoft Corp 1981–1993.  All rights reserved.
  12
                 MOV AH.9
                                            Assembling: ex4.asm
                 INT 21H
  13
  14
                 LEA DX, MSG2
                                          Microsoft (R) Segmented Executable Linker Version 5.31.009 Jul 13 1992
Copyright (C) Microsoft Corp 1984–1992. All rights reserved.
  15
                 MOV AH.9
  16
                 INT 21H
                                            un File [ex4.exe]:
  17
                 exit:
                                          List File [nul.map]:
Libraries [.lib]:
Definitions File [nul.def]:
  18
                 MOV AH, 4CH
  19
                 INT 21H
                                           C:\>ex4
Welcome to NSTU
from CSTE 16th Batch
  20
                 MAIN ENDP
  21
           END MAIN
```

Figure 04: Output of Experiment 04

```
C: > masm > ASM ex1.asm
                                                                DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra... —
                                                                                                                                                             X
    1
           title prg1: Taking Input
                                                                C:\>masm ex1.asm
Microsoft (R) MASM Compatibility Driver
Copyright (C) Microsoft Corp 1993. All rights reserved.
    2
            .model small
    3
            .stack 100h
                                                                 Invoking: ML.EXE /I. /Zm /c /Ta ex1.asm
    4
            .data
                                                                Microsoft (R) Macro Assembler Version 6.11
Copyright (C) Microsoft Corp 1981–1993.  All rights reserved.
    5
            .code
    6
           main proc
                                                                 Assembling: ex1.asm
    7
                   mov ah,1
                                                                  :\>link ex1.obj
                   int 21h
    8
                                                                 dicrosoft (R) Segmented Executable Linker Version 5.31.009 Jul 13 1992
Copyright (C) Microsoft Corp 1984–1992. All rights reserved.
    9
                   mov bl,al
  10
                                                                Run File [ex1.exe]:
List File [nul.map]:
Libraries [.lib]:
Definitions File [nul.def]:
  11
                   exit:
  12
                          mov ah,4ch
  13
                          int 21h
                                                                  \>ex1
  14
                          main endp
  15
            end main
  16
```

Figure 1: Output of Experiment 01

```
C: > masm > ASM ex2.asm
           title prg2: Showing a character in output
    1
                                                                        DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
    2
            .model small
            .stack 100h
    3
                                                                       C:\>masm ex2.asm
Microsoft (R) MASM Compatibility Driver
Copyright (C) Microsoft Corp 1993. All rights reserved.
    4
            .data
    5
            .code
                                                                         Invoking: ML.EXE /I. /Zm /c /Ta ex2.asm
    6
            main proc
                                                                       Microsoft (R) Macro Assembler Version 6.11
Copyright (C) Microsoft Corp 1981–1993.  All rights reserved.
    7
                          mov ah,2
    8
                          mov dl, 'B'
                                                                        Assembling: ex2.asm
    9
                          int 21h
                                                                        :\>link ex2.obj
  10
                                                                       Microsoft (R) Segmented Executable Linker Version 5.31.009 Jul 13 1992
Copyright (C) Microsoft Corp 1984–1992. All rights reserved.
                          exit:
  11
  12
                          mov ah,4ch
                                                                       Run File [ex2.exe]:
List File [nul.map]:
Libraries [.lib]:
Definitions File [nul.def]:
  13
                          int 21h
  14
                          main endp
  15
            end main
                                                                        0:\>ex2
  16
```

Figure 2: Output of Experiment 02