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DEPARTMENT OF COMPUTER SCIENCE



8086 ASSEMBLY LANGUAGE PROGRAMS

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1. Program for 16-bit addition

```
MOV SI, 2000
MOV AX, [SI]
INC SI
INC SI
MOV BX, [SI]
ADD AX, BX
INC SI
INC SI
MOV [SI], AX
HLT
```

2. Program for 16-bit subtraction

```
MOV SI, 2000
MOV AX, [SI]
INC SI
INC SI
MOV BX, [SI]
SUB AX, BX
INC SI
INC SI
MOV [SI], AX
HLT
```

3. Program for multiplication

```
MOV SI, 2000
MOV AX, [SI]
INC SI
INC SI
MOV BX, [SI]
MUL BX
INC SI
INC SI
MOV [SI], AX
INC SI
INC SI
MOV [SI], DX
HLT
```

4. Program for division

```
MOV SI, 2000
MOV AX, [SI]
INC SI
INC SI
MOV BL, [SI]
DIV BL
INC SI
MOV [SI], AX
HLT
```

5. Program for multibyte addition

```
CLC
MOV SI, 2000
MOV DI, 3000
MOV CL, 05
NEXT: MOV AL, [SI]
      ADC [DI], AL
      INC SI
      INC DI
      DEC CL
      JNZ NEXT
      JNC LAST
      MOV [DI], 01
LAST: HLT
```

6. Program for multibyte subtraction

```
CLC
MOV SI, 2000
MOV DI, 3000
MOV CL, 05
NEXT: MOV AL, [SI]
      SBB [DI], AL
      INC SI
      INC DI
      DEC CL
      JNZ NEXT
      HLT
```

7. Program to find 1's complement of a number

```
MOV SI, 2000
MOV AX, [SI]
NOT AX
INC SI
INC SI
MOV [SI], AX
HLT
```

8. Program to find 2's complement of a number

```
MOV SI, 2000
MOV AX, [SI]
NEG AX
INC SI
INC SI
MOV [SI], AX
HLT
```

9. Program to illustrate shifting and masking (Assembly of a number)

```
MOV SI, 2000
MOV BL, [SI]
INC SI
MOV AL, [SI]
MOV CL, 04
RCL AL, CL
ADD AL, BL
INC SI
MOV [SI], AL
HLT
```

10. Program to find the sum of a series of bytes

```
MOV SI, 2000
MOV CL, 05
SUB AL, AL
NEXT: ADD AL, [SI]
INC SI
DEC CL
JNZ NEXT
MOV [SI], AL
HLT
```

11. Program to block data transfer

```
    MOV SI, 2000
    MOV DI, 3000
    MOV CL, 05
NEXT: MOV AL, [SI]
    MOV [DI], AL
    INC SI
    INC DI
    DEC CL
    JNZ NEXT
    HLT
```

12. Program to find the biggest number in a given array

```
    MOV SI, 2000
    MOV CL, 04
    MOV AL, [SI]
GO:   INC SI
    CMP AL, [SI]
    JNC NEXT
    MOV AL, [SI]
NEXT: DEC CL
    JNZ GO
    INC SI
    MOV [SI], AL
    HLT
```

13. Program to find the smallest number in a given array

```
    MOV SI, 2000
    MOV CL, 04
    MOV AL, [SI]
GO:   INC SI
    CMP AL, [SI]
    JC NEXT
    MOV AL, [SI]
NEXT: DEC CL
    JNZ GO
    INC SI
    MOV [SI], AL
    HLT
```

14. Program to sort a given set of bytes in ascending order

```
        MOV DL, 04
AGAIN:   MOV SI, 2000
        MOV CL, 04
GO:     MOV AL, [SI]
        INC SI
        MOV BL, [SI]
        CMP AL, BL
        JC NEXT
        MOV [SI], AL
        DEC SI
        MOV [SI], BL
        INC SI
NEXT:   DEC CL
        JNZ GO
        DEC DL
        JNZ AGAIN
        HLT
```

15. Program to sort a given set of bytes in descending order

```
        MOV DL, 04
AGAIN:   MOV SI, 2000
        MOV CL, 04
GO:     MOV AL, [SI]
        INC SI
        MOV BL, [SI]
        CMP AL, BL
        JNC NEXT
        MOV [SI], AL
        DEC SI
        MOV [SI], BL
        INC SI
NEXT:   DEC CL
        JNZ GO
        DEC DL
        JNZ AGAIN
        HLT
```

16. Program to find the length of a given string of bytes

```
    MOV CL, 00
    MOV SI, 2000
NEXT: LODSB
    CMP AL, '.'
    JZ LAST
    INC CL
    JMP NEXT
    INC SI
    MOV [SI], CL
    HLT
```

17. Program to find the number of occurrences of a character in a given string

```
    MOV SI, 2000
    MOV CL, 0A
    MOV DL, 00
NEXT: LODSB
    CMP AL, 'E'
    JNZ GO
    INC DL
GO:   DEC CL
    JNZ NEXT
    MOV [SI], DL
    HLT
```

18. Program to compare two strings

```
    MOV SI, 2000
    MOV DI, 3000
    MOV CL, 0A
NEXT: CMPSB
    JNZ NE
    DEC CL
    JNZ NEXT
    MOV [200B], 01
    JMP LAST
NE:   MOV [200B], 00
LAST: HLT
```