

## MUL-DIV

Program A	Program B	Program C	Program D	Program E		
Mov BL,250	Mov AX,5497	Mov AX,2000	Mov DX,40	Mov AH,1		
Mov AL,244	Mov BL,100	Mov BX,150	Mov AX,4000	Int 21h		
Imul BL	Div BL	Mul BX	Mov BX,10000	Mov BL,2		
Mov DH,AH	Mov DL,AL	Mov CX,AX	Div BX	Mul BL		
Mov AH,2	Mov DH,AH	Mov AH,2	Mov CX,AX	Mov DL,AL		
Mov DL,AL	Mov AH,2	Int 21h	XCHG DH,DL	Mov AH,2		
Int 21h	Int 21h	Mov DL,CH	Mov AH,2	Int 21h		
Mov DL,DH	Mov DL,DH	Int 21h	Int 21h	Mov AH,76		
Int 21h	Int 21h	Mov DL,CL	Print DH,CH,CL	Int 21h		
Mov AH,76	Stop	Int 21h		End		
Int 21h		Stop				

Program A: BL=6 AL=12 BL\*AL AX=6\*12=72(H)

BL=250=-6 AL=244=-12 IMUL BL does AX=AL\*BL=(-6)(-12)=72=0\*256+72 AH=0 AL=72.

Replace IMUL by MUL AX=250\*244=61000 AH=238 AL=72 206\*6=1236=4,212 or -300=254,212

Program B: Div BL performs AL=AX div BL=54 AH=AX mod BL=97 Hence output is 6a.

BL: 156 o/p 35,37(#%) 5497 div 156=35 5497 mod 156=37

Idiv BL: BL=156=-100 5497=(-54)\*(-100)+97. Output 202,97 Since -54=202

AX=60139=-5397 BL:100 -5397=(-53)\*100-97 o/p 203,159 BL:156 -5397=(53)\*(-100)-97 o/p 53,159

Program C: Mul BX is AX\*BX stored in DX:AX 2000\*150=3,00,000

DX=3,00,000 div 65536=4 AX=mod=37856 AH=147 AL=224

Program D: Div BX is AX=DX:AX div BX DX=mod DX=40 AX=4000 DX:AX=65536\*40+4000  
= 2625440 div-mod10000 AX=262 DX=5440 AH=1 AL=6 DH=21 DL=64

Program E: Read a letter output a letter with double ascii code. 2 → d # → F

AL	BL	Mul BL (Unsigned)	IMul BL Signed multiplication
156	200	AX=31200	AX=5600 because 156 is -100. 200 is -56. (-100)(-56)=+5600
156	100	AX=15600	AX=55536 because 156 is -100. 100 is +100. (-100)(+100)=-10000 it is (-10000+65536=55536)
AX	BL	Div BL (Unsigned)	IDiv BL Signed division
12035	100	AL=120 AH=35	AL=120 AH=35 because 12035=(+100)(+120)+35
12035	156	AL=77 AH=23 12035=77*156+23	AL=136 AH=35 because 12035=(-100)(-120)+35 0..32765 are positive and 32768..65535 are negative.
53501	100	divide overflow 535 unrepresentable	AL=136 AH=221 because -12035=(+100)(-120)-35 -120 is 256-120=136 -35 is 256-35=221
53501	156	divide overflow	AL=120 AH=221 because -12035=(-100)(+120)-35

1. Read two digits. Find product. Input 98 output H. Input 76 output \* Input 99 output Q
2. Read two letters. Find (product of ascii) divmod 100. Input FQ output 8F  $70*81=5670$  EG  $\rightarrow 0c$
3. Read a letter. Print last digit of ascii code. H  $\rightarrow 2$  b  $\rightarrow 8$ . Second last digit. G  $\rightarrow 7$  g  $\rightarrow 0$  z  $\rightarrow 2$
4. Read a letter Find  $(7*\text{ascii}) \text{ div } 5$ . 2  $\rightarrow$  F  $(50*7=350)$  G  $\rightarrow$  c
5.  $(\text{ascii}-80)*13+75$  S  $\rightarrow$  r N  $\rightarrow$  l  $(\text{ascii}-80)*(-13)+75$  S  $\rightarrow$  \$ N  $\rightarrow$  e
6.  $[1000 \text{ divmod } (\text{ascii}-80)]+75$  7  $\rightarrow$  #K p  $\rightarrow$  jS 2  $\rightarrow$  \*U  $(-1000 \text{ divmod..})$  7  $\rightarrow$  sK n  $\rightarrow$  \*A
7.  $[\{122*(\text{ascii}-80)\} \text{ div } 500]+75$  (byte mul) i  $\rightarrow$  Q 7  $\rightarrow$  E (Hard)
8.  $[\{162*(\text{ascii}-80)\} \text{ div } 500]+75$  i  $\rightarrow$  S 7  $\rightarrow$  C
9.  $[\{1000 \text{ div } (\text{ascii}-80)\} \text{ mod } 50]+75$  Y  $\rightarrow$  V G  $\rightarrow$  @ (unsign AX=AL is AH=0 sign AX=AL is CBW)
10.  $[(\text{ascii}-80) \text{ divmod } 6]+75$  (CBW:AX=AL) d  $\rightarrow$  NM 3  $\rightarrow$  GF  $[(\text{ascii}-80) \text{ divmod } -6]+75$  d  $\rightarrow$  HM 3  $\rightarrow$  OF
11.  $[100000 \text{ mod } (x-80)]+75$  n  $\rightarrow$  U 2  $\rightarrow$  U B  $\rightarrow$  W (use CBW)  $[-100000\dots]$  n  $\rightarrow$  A d  $\rightarrow$  K B  $\rightarrow$  ?
12.  $[100000 \text{ div } \{100*(x-80)\}]+75$  2  $\rightarrow$  \* x  $\rightarrow$  d  $[-100000 \text{ div..}]$  n  $\rightarrow$  \* x  $\rightarrow$  2
13.  $[\{(\text{ascii}-80)*256\} \text{ divmod } 100]+75$  L  $\rightarrow$  A3 E  $\rightarrow$  /; T  $\rightarrow$  Uc (no mul) divmod -100 L  $\rightarrow$  U3 E  $\rightarrow$  g; T  $\rightarrow$  Ac
14.  $[\{100*(\text{ascii}-80)\} \text{ divmod } 256]+75$  (no div) Z  $\rightarrow$  N3 F  $\rightarrow$  Gc(not H) (using div) Z  $\rightarrow$  N3 F  $\rightarrow$  Hc
15.  $[100000 \text{ div } \{256*(\text{ascii}-80)\}]+75$  (no mul) d  $\rightarrow$  ^ 7  $\rightarrow$  < s  $\rightarrow$  V A  $\rightarrow$  l(49) -100000 d  $\rightarrow$  8 7  $\rightarrow$  Z s  $\rightarrow$  @ A  $\rightarrow$  e
16.  $[\{65536*(\text{ascii}-80)\} \text{ div } 10000]+75$  (no mul) L  $\rightarrow$  l(49) T  $\rightarrow$  e

65 B  
 DX: AX  
 16  
 A  
 D  
 A