Function

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```
.model small
.code
xyz proc
  Mov DL,0
L2:
  Cmp BL,CL
  JG   L1
  Add  DL,BL
  Add  BL,1
  JMP  L2
L1: RET
xyz endp
main proc
  Mov BH,d₁
  Mov CH,d₂
  Mov DH,d₃
  Mov BL,BH
  Mov CL,CH
  CALL  xyz
  Mov AL,DL
  Mov BL,CH
  Mov CL,DH
  CALL  xyz
  Sub  DL,AL
  Mov AH,2
  Int    33
  Mov AH,76
  Int    33
main endp
end    main
```

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Function xyz computes $DL=\sum_{i=BL}^{i=CL} i$ Main program finds $\sum_{i=d2}^{i=d3} i - \sum_{i=d1}^{i=d2} i$

Input 5,7,13 output4 CALL L1   means   JMP L1 However the address of the location from where the call is performed is saved. So that it can be used by RET. RET means jump to the location from where call was made.

1. Define a function CL=BL*BH. Using it write program, which reads 4 digits and prints the letter of $d_1+3d_2+5d_3+4d_4$. 8357→F.
2. Read two digits. Output the letter whose ascii code is that. 72→ H. Hint 10x+y. Use above function for multiplication.
3. Read 3 digits and output their product. 853→x. No loop in main.
4. Read 4 digits. Find $d_1*d_2+d_3*d_4$. 5479→S. No loop in main.
5. Read 5 digits. $d_1*1+d_2*2+d_3*3+d_4*4+d_5*5$. Input 62547 output L (6*1+2*2+5*3+4*4+5*7=76). Loop in main
6. Define a function to find CL=AL div AH and CH=AL mod AH. Using it write program, which reads a character and prints its ascii code. Input Y output 089 x→120. No loop in main.
7. Give the shape of a function to the above program. Using it write program which reads 5 letters and prints the ascii codes of biggest, smallest, second biggest and second smallest letters. CATPK→084 065 080 067. No loop.
8. Using the function mod (defined in one of the above questions) define a function CL= smallest factor of CH. Write program that reads a letter and outputs smallest factor of its ascii. i→3 H2 y;
9. Using it write program which reads 9 letter and prints how many of these are prime.

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```
main proc
  Mov AL,x
  CALL  f
  Output DL
  Stop
main endp
f proc
  Cmp AL,3
  JG   L1
  Mov DL,1
  RET
L1:Push AX
  Sub AL,1
  CALL f
  Pop AX
  Mov BL,DL
  Push AX
  Push BX
  Sub  AL,2
  Call  f
  Pop  BX
  Pop  AX
  Add  BL,DL
  Sub  AL,3
  Push BX
  Call  f
  Pop  BX
  Add  DL,BL
  RET
f endp
end  main
```

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10. Read 7 digits and print them in reverse order. Use only AL,AH,BL,BH,DL,DH.
11. Read a letter. Output all factors of ascii. H→02, 03, 04, 06, 08, 09, 12, 18, 24, 36, 72.
12. Define a function xyz (using Int 33 not more than six times) so that following main program outputs the given picture. ADBEJ,EHFIN,BECFK,

| Mov CL,65 | Call xyz | Mov CL,69 | call xyz | Mov CL,66 | call xyz |

The recursive function DL=f(AL).
Al=10 outputs i(105)
$f(x) = 1$ if $x \le 3$
$f(x) = f(x-1)+f(x-2)+f(x-3)$ otherwise

1. Define a recursive function f(BL,BH). It prints all characters whose ASCII codes are between BL and BH. e.g. f(67,72) will print CDEFGH. Use following logic:
   $f(x,y)=print(x);f(x+1,y)$ if $x \leq y$
2. Define a recursive function CL= AL div AH by using following logic $200,3 \rightarrow B$
   $CL = 0$ if $AL < AH$ $CL = [(AL-AH)div AH]+1$ otherwise
3. CL= AL*AH.   CL=0 if AH=0 $CL=[(AL*(AH-1)]+AL$ otherwise $8,9 \rightarrow H$
4. CL=gcd(BL,BH). CL=BL(if BH=0) CL=gcd(BH,(BL mod BH)) otherwise $54,42 \rightarrow 6$
5. Define a recursive function CH=AL mod AH. CL=AL div AH.
6. Define a recursive function to find sum of digits (in base 3) of contents of AL e.g. AL=103 output 5. Since $103=(10211)_3$. Hint use mod and div.
7. ^nC_r: $^nC_r=1$ if n=r or r=0 $^nC_r=^{n-1}C_{r-1} + {}^{n-1}C_r$ otherwise $^9C_6 \rightarrow T(84)$ $^8C_4 \rightarrow F$
8. Mov Ax,23145   call f   printDL outputs first digit. (A) Program for sum of digits.
9. Recursive function (no backward jump) to print ABC....(BH letters).
10. Using it write program to print ABCDEABCDABCABA.