Faculty of Engineering
Alexandria University
Electronics and Communication
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Microprocessor

Project#4

Pascal Triangle

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NO : 54

Sec : 3

Pascal Triangle

$$
\begin{array}{ccccccc}
 & & & 1 & & & \\
 & & 1 & & 1 & & \\
 & 1 & & 2 & & 1 & \\
1 & & 3 & & 3 & & 1 \\
1 & 4 & & 6 & & 4 & 1 \\
1 & 5 & 10 & & 10 & 5 & 1
\end{array}
$$

$(x+y)^0 = 1$ — 0th row

$(x+y)^1 = 1x + 1y$ — 1st row

$(x+y)^2 = 1x^2 + 2xy + 1y^2$ — 2nd row

$(x+y)^3 = 1x^3 + 3x^2y + 3xy^2 + 1y^2$ — 3rd row

$(x+y)^4 = 1x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + 1y^4$ — 4th row

$(x+y)^5 = 1x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + 1y^5$ — 5th row

$$\binom{n}{k} = \frac{n!}{(n-k)!k!}$$

```
include emu8086.inc

     MOV BX,0300H     ;0300
     MOV ES,BX                     ;NUMERS WILL STORE AT MEMORY LOGIC ADDRESS 0300:0000
     MOV DI,0         ;0000



 print 'ENTER NUMERS OF ROWS=   '
  CALL     SCAN_NUM
     MOV [1234],CX


   MOV BH,0FFH       ;N
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
L1:


print ' '

call print_nl
INC BH

    MOV BL,BH        ;K
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
L2:



  MOV AL,BH
  CALL factorial

  MOV DH,AL  ;N!

  MOV AL,BL
  CALL factorial

  MOV DL,AL  ;K!

  MOV AL,BH
  SUB AL,BL
  CALL factorial



  MUL DL ; K! N-K!
       MOV CL,AL
       MOV AL,DH
 DIV CL
  STOSB
          print ' '
      CALL PRINT_NUM

DEC BL
CMP BL,0FFH
JNZ L2
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

CMP BH,[1234]                  ;NO OF LINES YOU WANT PRINT
JNZ L1
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
HLT


DEFINE_PRINT_NUM
DEFINE_PRINT_NUM_UNS
DEFINE_SCAN_NUM
                             ;FUNCTION TO CALCULATE FACTORIAL

factorial proc NEAR
MOV CL,AL
MOV AX,1
CMP CL,0
JE NOP
AGN:
MUL CL
CMP CL,01
LOOPNE AGN
NOP:
RET
factorial ENDP

              ;FUNCTION TO PRINT NEW LINE

print_nl proc
    push ax
    push dx
    mov ah, 2
    mov dl, 0Dh
    int 21h
    mov dl, 0Ah
    int 21h
    pop dx
    pop ax
    ret
endp
```