Facultatea de Automatica si Calculatoare, Bucuresti
Anul al III-lea de studii
An universitar 2015-2016

Materie: Sisteme cu Microprocesoare
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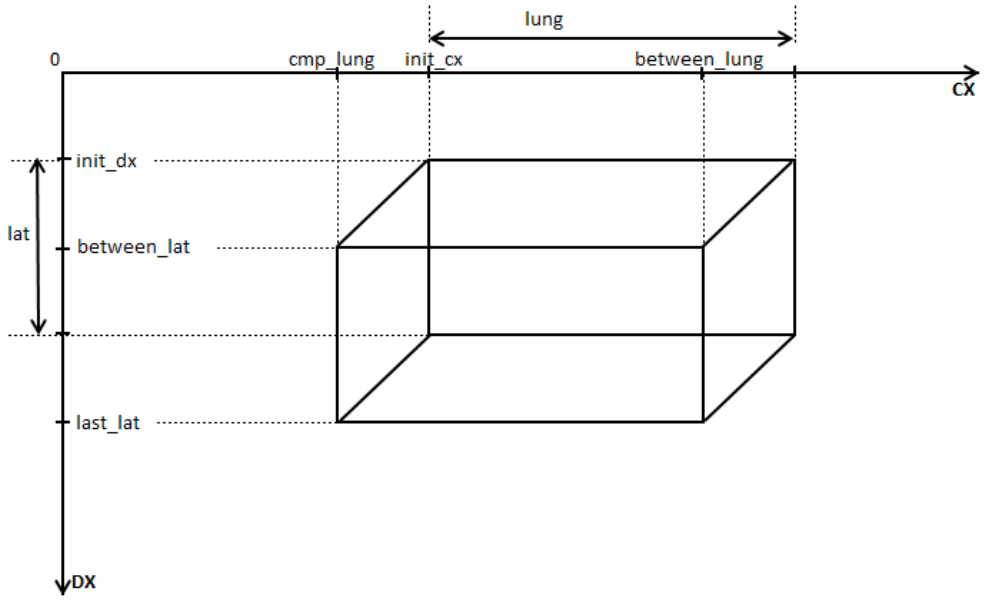
Proiect laborator

Acest proiect presupune luarea unor date de la tastatura (lungimea si latimea unui dreptunghi), calcularea ariei dreptunghiului si desenarea unui paralelipiped utilizand datele acestea.

Pentru o mai buna intelegere a programului, se poate urmari urmatorul desen:

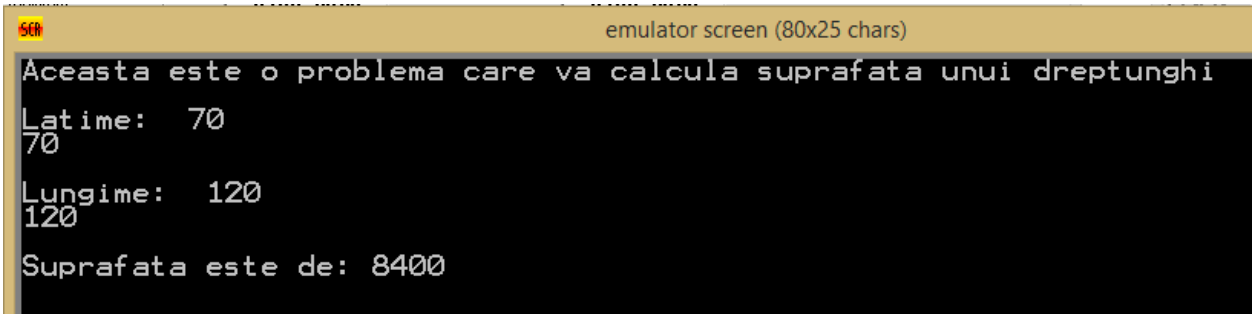


- **init_cx** si **init_dx** se seteaza in interiorul programului. Implicit, init_cx=100, iar init_dx=30
- **lat** si **lung** se introduc de la tastatura

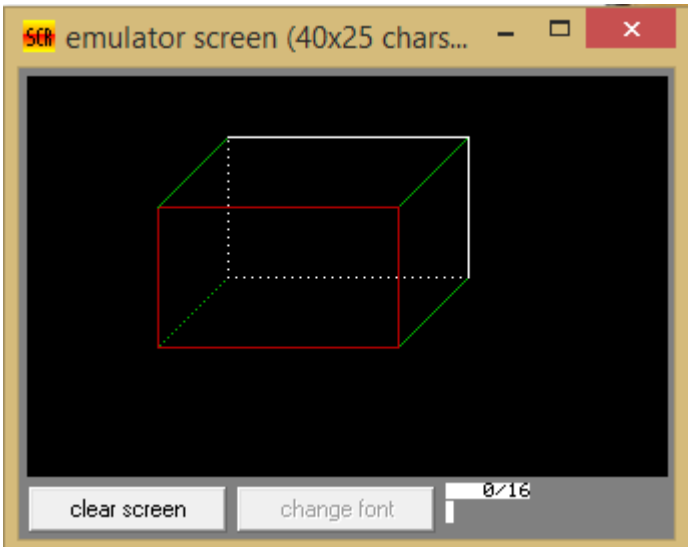
In functie de cele patru variabile, se calculeaza urmatoarele:

- **between_lat** = init_dx + lat/2
- **last_lat** = between_lat + lat
- **cmp_lung** = init_cx – lat
- **between_lung** = init_cx + between_lung – lat/2

Un output al programului putem urmari mai jos:



dupa care se trece in mod grafic:



Cod sursa:

```
name "progr_SMP"
INCLUDE 'emu8086.inc'
org 100h

lat dw ?
lung dw ?
between_lung dw ?
between_lat dw ?
cmp_lung dw ?
last_lat dw ?


jmp start
```

```
intro db "Aceasta este o problema care va calcula suprafata unui dreptunghi", 0Dh, 0Ah, '$'
msg_latime db 0Dh, 0Ah, 'Latime :  $'
msg_lungime db 0Dh, 0Ah, 'Lungime:  $'
rezultat db 0Dh, 0Ah, 'Suprafata este de: $'

start:
;enuntul problemei
mov dx, offset intro
mov ah, 9
int 21h

;latime
lea dx, msg_latime
mov ah, 09h    ; output string at ds:dx
int 21h


call scan_num
mov lat, cx


putc 0Dh  ;linie noua
putc 0Ah

mov ax, lat
call print_num  ; printare latime

putc 0Dh  ;linie noua
putc 0Ah

;lungime
lea dx, msg_lungime
mov ah, 09h    ; output string at ds:dx
int 21h

call scan_num
mov lung, cx

putc 0Dh  ;linie noua
putc 0Ah

mov ax, lung
call print_num

putc 0Dh   ;linie noua
```

```
putc 0Ah

;rezultat
lea dx, rezultat
mov ah, 09h    ; output string at ds:dx
int 21h

mov ax, lat
mov bx, lung
mul bx        ;ax=ax*bx
call print_num


putc 0Dh  ;linie noua
putc 0Ah

;=========================================
;----------grafica 3D----------------

jmp code

code: mov ah, 0
   mov al, 13h ; trecere in mod grafic 320x200
   int 10h

; afisare lungura superioara
mov cx, 100
add cx, lung ; coloana
mov dx, 20 ; rand
mov al, 15 ; alb
u1: mov ah, 0ch ; afisare pixel
   int 10h
   dec cx
   cmp cx, 100
   jae u1

; afisare lungura inferioare
mov cx, 100
add cx, lung
mov dx, 20
add dx, lat
mov al, 15
u2: mov ah, 0ch
   int 10h
   dec cx
```

```
   cmp cx, 100
   ja u2

; lungura din stanga
mov cx, 100
mov dx, 20
add dx, lat
mov al, 15
u3: mov ah, 0ch
   int 10h
   dec dx
   cmp dx, 20
   ja u3

; lungura din dreapta
mov cx, 100
add cx, lung
mov dx, 20
add dx, lat
mov al, 15
u4: mov ah, 0ch
   int 10h
   dec dx
   cmp dx, 20
   ja u4

;==================================
;pregatire desenare dreptunghi #2

   mov dx, lat
   sar dx, 1
   add dx, 20
   mov between_lat, dx

   mov dx, between_lat
   add dx, lat
   mov last_lat, dx

   mov dx, between_lat

   mov cx, lat
   sar cx, 1
   mov bx, 100
   sub bx, cx
   mov cmp_lung, bx
```

```
    mov bx, lat
    sar bx, 1
    mov cx, 100
    add cx, lung
    sub cx, bx
    mov between_lung, cx

    mov al, 4

u12:mov ah, 0ch ; afisare pixel
    int 10h
    dec cx
    cmp cx, cmp_lung
    jae u12

; afisare lungura inferioare
mov cx, between_lung
mov dx, last_lat
mov al, 4

u22:mov ah, 0ch
    int 10h
    dec cx
    cmp cx, cmp_lung
    ja u22

; lungura din stanga
mov cx, cmp_lung
mov dx, last_lat
mov al, 4           ;culoare Red

u32: mov ah, 0ch
    int 10h
    dec dx
    cmp dx, between_lat
    ja u32

; lungura din dreapta
mov cx, between_lung
mov dx, last_lat
mov al, 4

u42: mov ah, 0ch
    int 10h
```

```
   dec dx
   cmp dx, between_lat
   ja u42
; asteptare apasare tasta
mov ah,00
int 16h

;=======================================
;---------adancime-desenare----------

;afisare oblica stanga sus
mov cx, 100
mov dx, 20
mov al, 2          ;culoare Green

u13:mov ah, 0ch ; afisare pixel
   int 10h
   dec cx
   add dx, 1
   cmp cx, cmp_lung
   jae u13

; afisare oblica dreapta sus
mov cx, between_lung
mov dx, 20
mov al, 2
  ;calculare punct extrem
   mov bx, lung
   add bx, 100
   mov cx, bx

u23:mov ah, 0ch
   int 10h
   dec cx
   add dx, 1
   cmp cx, between_lung
   ja u23

; afisare oblica stanga jos
mov cx, 100
mov dx, 20
add dx, lat
mov al, 2          ;culoare Red

u33: mov ah, 0ch
```

```
   int 10h
   dec cx
   add dx, 1
   cmp cx, cmp_lung
   ja u33

; lungura din dreapta
mov cx, 100
add cx, lung
mov dx, 20
add dx, lat
mov al, 2

u43: mov ah, 0ch
   int 10h
   dec cx
   add dx, 1
   cmp cx, between_lung
   ja u43
; asteptare apasare tasta
mov ah,00
int 16h


DEFINE_SCAN_NUM
DEFINE_PRINT_STRING
DEFINE_PRINT_NUM
DEFINE_PRINT_NUM_UNS
```