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Title:	Program for drawing square using Assembly Language.
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Marks:	
Sign of Faculty:	

Aim: Program for drawing square using Assembly Language.

Theory: INT 10h is a video service bios interrupt. It includes services like setting the video mode, character and string output and reading and writing pixels in graphics mode. To use the BIOS interrupt load ah with the desired sub-function. Load other required parameters in other registers and make a call to INT 10h.

INT 10h/AH = 0ch -Write graphics pixel.

Input:
AL = pixel
colourCX =
column
DX = row

Algorithm:

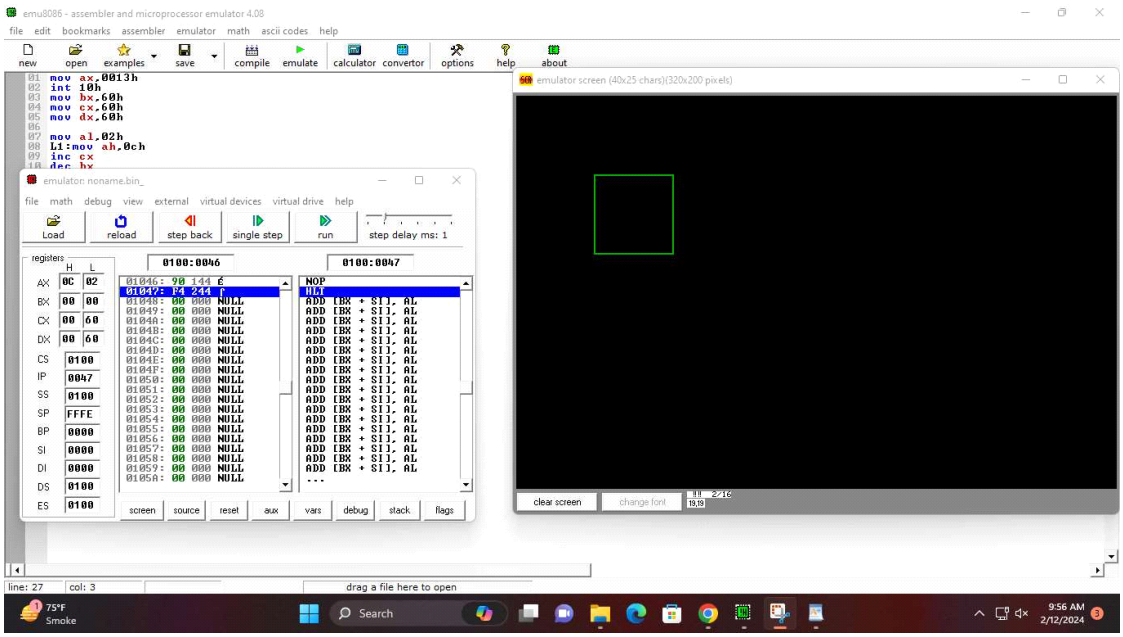
- Start
- Initialize ax to 0013h for graphics mode.
- Set the Counter bx to 60 h.
- Initialize the co-ordinates cx and dx to 60h.

- Set the Color.
- Set Display Mode function by making ah = 0ch.
- Increment cx and Decrement bx.
- Repeat step 7 until bx = 0.
- Initialize the counter by making bx = 60h.
- Set the color.
- Set Display Mode function by making ah = 0ch.
- Increment dx & Decrement bx.
- Repeat step 12 until bx = 0.
- Initialize the counter by making bx = 60h.
- Set the Color.
- Set Display Mode function by making ah = 0ch.
- Decrement cx and Decrement bx.
- Repeat step 17 until bx = 0.
- Initialize the counter by making bx = 60h.
- Set the color.
- Set Display Mede function by making ah = 0ch.
- Decrement dx & Decrement bx.
- Repeat step 22 until bx = 0.
- To end the program use DOS interrupt:
- Load ah = 4ch.
- Call int 21h.
- Stop.

Program Code:

```
mov ax, 0013h
int 10h
mov bx,60h
 mov cx,60h
 mov dx,60h
 mov al, 02h

 L1:mov ah, 0ch
 inc cx
 dec bx
 int 10h
 JNZ L1
 mov bx,60h

 L2: inc dx
 dec bx
 int 10h

 JNZ L2
 mov bx,60h

 L3: dec cx
 dec bx
 int 10h
 JNZ L3
 mov bx,60h

 L4:dec dx
 dec bx
 int 10h
 JNZ L4
```

Output -



Conclusion:

The program showcasing the drawing of a square using Assembly Language succinctly highlights the direct control over hardware and graphics manipulation. It demonstrates fundamental principles of low-level programming while efficiently generating a square shape on the screen. This exercise offers valuable insights into computer graphics programming at its most basic level.

- Explain the use of int 10.

Ans. The "int 10" instruction is a software interrupt used in x86 assembly language to call BIOS video services. It allows programs to interact with the display hardware, enabling tasks such as setting video modes, manipulating the cursor position, and drawing characters or pixels on the screen. Essentially, "int 10" provides a standardized interface for accessing basic video functions, making it crucial for text and graphical output in DOS-based systems and early versions of Windows.

- Explain hardware interrupts.

Ans. Hardware interrupts are signals sent by external devices to the CPU to request its attention. They prompt the CPU to temporarily suspend its current task and handle the incoming request. These interrupts can originate from various hardware components such as input/output devices, timers, or errors detected by hardware.

Upon receiving a hardware interrupt, the CPU stops its current operation, saves its state, and jumps to a predefined location in memory known as an interrupt vector table. This table contains addresses pointing to specific interrupt service routines (ISRs) responsible for handling each type of interrupt.

Once the ISR completes its task, the CPU resumes its previous operation. Hardware interrupts are crucial for enabling multitasking, efficient use of system resources, and real-time responsiveness in computer systems.