Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2024-25

Class:	**SE**	**Semester:**	**IV**
Course Code:	**CSL404**	**Course Name:**	**Microprocessor Lab**

Name of Student:	**Shravani Sandeep Raut**
Roll No. :	**48**
Experiment No.:	**3**
Title of the Experiment:	**Program for drawing square using assembly language**
Date of Performance:	**30/01/2025**
Date of Submission:	**08/02/2025**

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Performance	5	
Understanding	5	
Journal work and timely submission	10	
Total	20	

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Performance	4-5	2-3	1
Understanding	4-5	2-3	1
Journal work and timely submission	8-10	5-8	1-4

Checked by

Name of Faculty : Ms. Sweety Patil

Signature :

Date:

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 colour
CX = column
DX = row

Algorithm:

1. Start
2. Initialize ax to 0013h for graphics mode.
3. Set the Counter bx to 60 h.
4. Initialize the co-ordinates cx and dx to 60h.
5. Set the Color.
6. Set Display Mode function by making ah = 0ch.
7. Increment cx and Decrement bx.
8. Repeat step 7 until bx = 0.
9. Initialize the counter by making bx = 60h.
10. Set the color.
11. Set Display Mode function by making ah = 0ch.
12. Increment dx & Decrement bx.
13. Repeat step 12 until bx = 0.
14. Initialize the counter by making bx = 60h.
15. Set the Color.
16. Set Display Mode function by making ah = 0ch.
17. Decrement cx and Decrement bx.

18. Repeat step 17 until bx = 0.
19. Initialize the counter by making bx = 60h.
20. Set the color.
21. Set Display Mede function by making ah = 0ch.
22. Decrement dx & Decrement bx.
23. Repeat step 22 until bx = 0.
24. To end the program use DOS interrupt:
    1) Load ah = 4ch.
    2) Call int 21h.
25. Stop.

Code:

```
mov ax, 0013h ;screen resolution
int 10h     ;graphics mode enable
mov bx, 50h ;counter
mov cx, 60h ;x coordinate
mov dx, 60h ;y coordinate
mov al, 22h ;blue colour

L1: mov ah, 0ch  ;printing the pixel
inc cx
dec bx
int 10h
JNZ L1

mov bx, 50h

L2: mov ah, 0ch
inc dx
dec bx
int 10h
JNZ L2
```

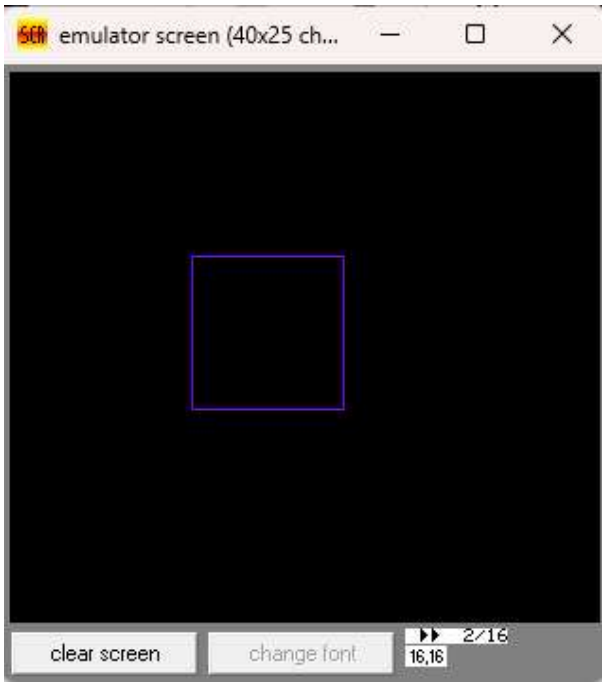
```
mov bx, 50h

L3: mov ah,0ch
dec cx
dec bx
int 10h
JNZ L3

mov bx, 50h

L4: mov ah,0ch
dec dx
dec bx
int 10h
JNZ L4
```

Output:



Conclusion:

In conclusion, drawing a square using assembly language requires understanding low-level graphics programming and interacting with the hardware directly. By switching to graphics mode (such as VGA 13h) and manipulating pixel data, we can draw shapes on the screen. Though more complex than high-level languages, assembly provides precise control over hardware and is a useful skill for learning how computers work at a fundamental level.

1. Explain the use of int 10.

   The int 10h interrupt is used for video services in DOS. It controls the display, including changing video modes, setting cursor positions, and writing characters to the screen. Common functions include setting video modes (e.g., text or graphics) and manipulating the cursor.

2. Explain hardware interrupts.

   Hardware interrupts are signals sent by hardware devices to the CPU to gain its attention. They temporarily halt the CPU's current operations, saving its state, and allow the CPU to handle the interrupting event, such as input from a keyboard, timer, or network device. After processing, the CPU resumes its previous task.