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:	**Bhagyashri Kaleni Sutar**
Roll No. :	**75**
Experiment No.:	**3**
Title of the Experiment:	**Program for drawing square using assembly language**
Date of Performance:	**27/01/2025**
Date of Submission:	**03/01/2024**

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:

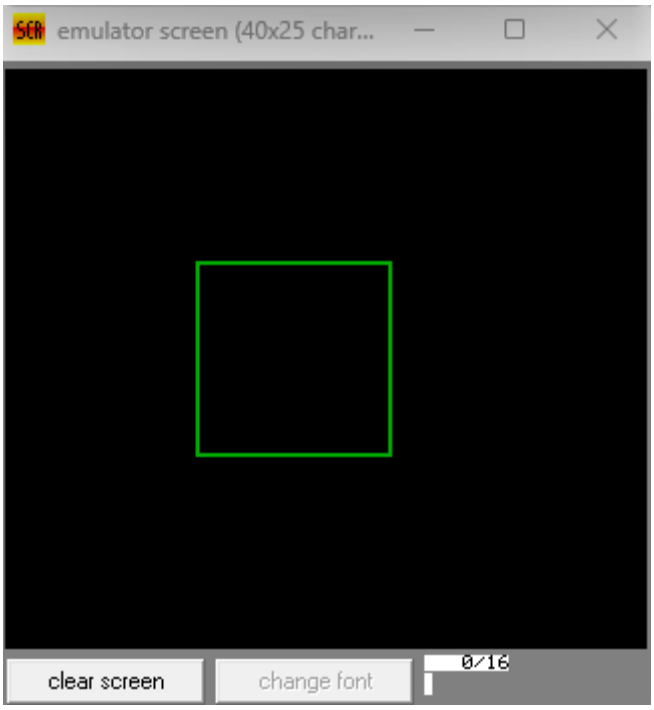
1. Start
2. Initialize ax to 0013h for graphics mode.
3. Set the Counter bx to 60 h.
4. Initialize the co-ordinates cx and dx to 60h.
5. Set the Color.
6. Set Display Mode function by making ah = 0ch.
7. Increment cx and Decrement bx.
8. Repeat step 7 until bx = 0.
9. Initialize the counter by making 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
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
mov al,02h
L2: mov ah, 0ch
inc dx
dec bx
int 10h
jnz L2


mov bx,60h
mov al,02h
L3: mov ah,0ch
dec cx
dec bx
int 10h
jnz L3

mov bx,60h
mov al,02h
L4: mov ah,0ch
dec dx
dec bx
int 10h
jnz L4


```

Output:



Conclusion:

1. Explain the use of int 10.

Ans:- The INT 10h (Interrupt 10h) is a BIOS (Basic Input/Output System) interrupt used in x86-based computers to interact with video hardware. It is primarily used for controlling the display output, including tasks like setting the video mode, changing text or graphics modes, and handling screen output. In assembly language programming, interrupt INT 10h is called to communicate directly with the video hardware.

Here are some common uses of INT 10h:

1. Set Video Mode

- This function sets the display mode of the screen, such as text or graphics mode.
- The video mode is set by passing a mode number in the AH register. For example, AH = 00h and AL contains the mode number (e.g., 03h for 80x25 color text mode).
- Example: mov ah, 00h; mov al, 03h; int 10h sets the screen to 80x25 text mode.

2. Cursor Control

- INT 10h allows manipulation of the cursor, such as moving it to a specific position, hiding it, or changing its shape.
- Example: To move the cursor to the row and column specified by DH and DL, respectively:

. Text and Graphics Mode Functions

- Displaying characters on the screen, changing the attribute (color) of text, and other related functions.
- For example, displaying a character at the current cursor position can be done using AH =

0Eh (Teletype output).

4. Screen Clearing

- Clears the screen (in text mode) by filling the screen with spaces or another specified character and resetting the cursor to the top-left corner.

5. Palette Management (Graphics Mode)

- When in graphics mode, INT 10h can be used to change the colors of pixels or to modify the color palette.

2. Explain hardware interrupts.

Ans:=-**Hardware interrupts** are signals sent by hardware devices to the CPU (Central Processing Unit) to grab its attention and request immediate processing. These interrupts enable hardware devices to inform the CPU about events or conditions that require its attention. Instead of continuously checking the status of each device (which would be inefficient), hardware interrupts allow the CPU to perform other tasks and respond to an interrupt when needed.

Example of Hardware Interrupts:

- **Keyboard Interrupt:** When a key is pressed on the keyboard, a hardware interrupt is generated (IRQ 1), and the CPU processes the input.
- **Timer Interrupt:** The system timer generates interrupts (IRQ 0) periodically, allowing the operating system to keep track of time, manage tasks, and handle multitasking.
- **Disk I/O Interrupt:** When a hard drive finishes reading or writing data, it sends an interrupt to notify the CPU that it can proceed with further processing.