National University of Computer and Emerging Sciences 0254

Lahore Campus

Computer Org &Assembly Lang. Lab (EL2003)

Final Lab Exam

Date: 27th December,2024

Course Instructor(s)

Total Time (Hrs): 3

Total Marks: 40

Total Questions: 2

Roll No _____ Section _____ Student Signature _____

Do not write below this line

Attempt all the questions.

Instructions:

1. Attempt all questions. Programmable calculators are allowed.
2. This is an Open book Exam. Only Hard form of "*Assembly Language by Belal Hashmi*" book is allowed. No soft form copy.
3. Use of Internet is NOT ALLOWED.
4. Make reasonable assumptions in case of any confusion, questions during Exam are not allowed.

Submission Instructions:

a) Make an unzipped folder and rename it with your Roll-No. Place your .asm files of each Question and also rename them as Roll-No Q# e.g. I21-1234q1.asm. Also, submit one txt file of your code.

b) Submit above folder to XEON/Fall 2024/ Zoha Waheed /BS (your degree program)/ your Section. E.g. for Section A of BSSE its XEON /fall 2024/ Zoha Waheed /BS SE/Section A Submission

Question #1 : Attempt all parts of question. Your Code should properly terminate once 'Esc' is pressed. ***[Marks 20]***

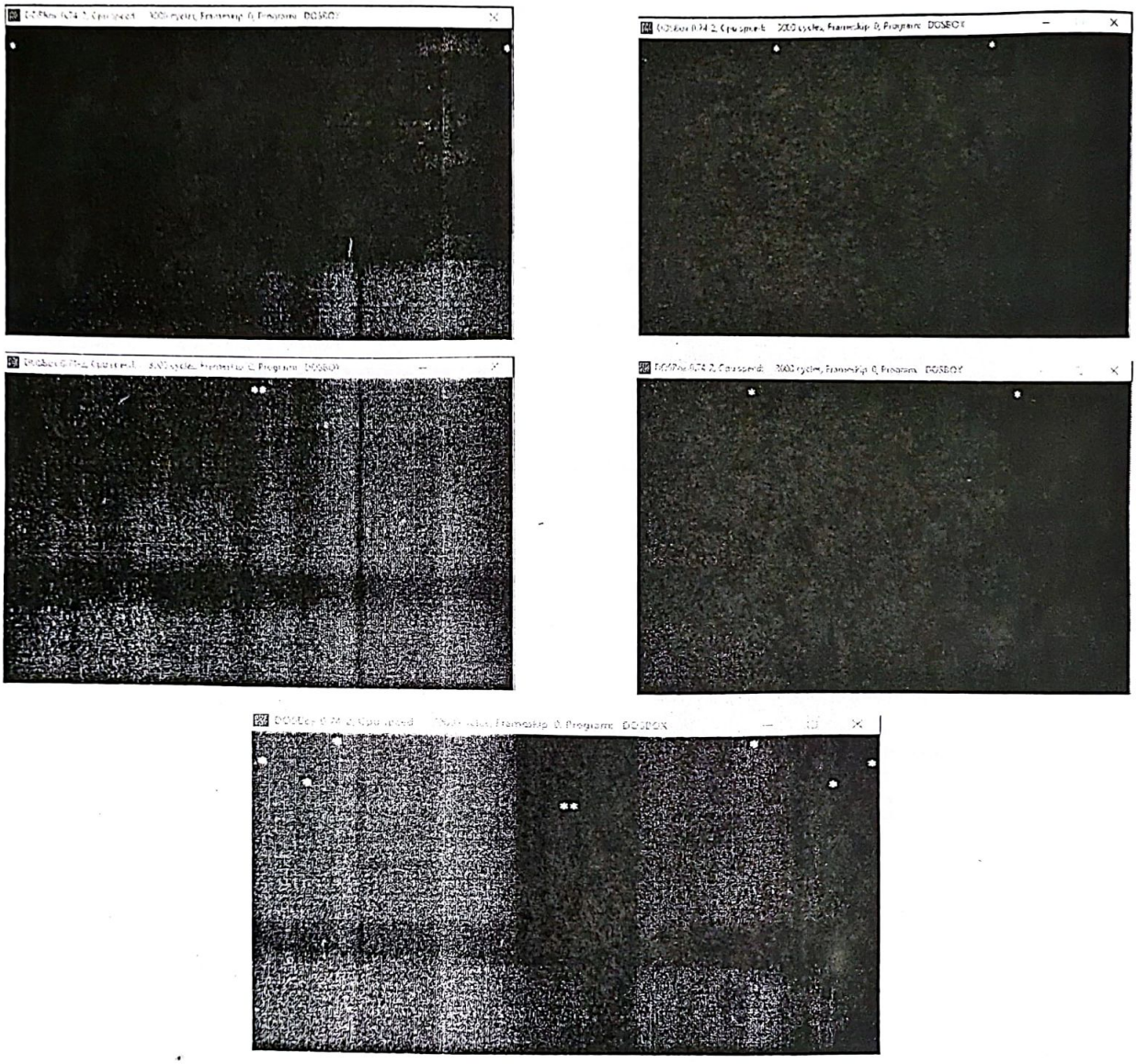
a) Write a subroutine that takes the row number as a parameter. This subroutine should perform the following operations:

- Move two asterisks continuously, starting from the left and right corners of the row, towards the center. [5]
- Once the asterisks collide in the center, they should reverse direction and continue moving towards their respective corners. [5]

b) Implement multitasking to run multiple instances or threads of this subroutine. The behavior should be as follows:

- When any key (other than Esc) is pressed, another pair of asterisks should start moving in a **different row**. [4]

- Limit the number of tasks to **26 tasks** (Task 0 + 25 instances of the subroutine). [2]
- If you run 25 instances of the subroutine, you should be able to see the asterisks moving in **all 25 rows.** [4]



Question #2 : Attempt all parts of question. Your Code should properly terminate once 'Esc' is pressed. ***[Marks 20]***

a) Write an assembly program to implement a **real-time clock (RTC)**. The program should include a timer interrupt that triggers every 1 second. For this part, your program should:

- Update the clock every 1 second by modifying the hours, minutes, and seconds. [5]
- Display the updated time in the format `HH:MM:SS` on the screen. . [5]

b) The user should be able to input the time (hours, minutes, and seconds) for the RTC.RTC initial time starts from 00:00:00. Your program should:

- Take the input and record that time in memory, [5]
- When the clock reaches the input time, it should **stop updating** RTC [5]

Once the clock reaches the specified time, all characters on the screen should start **blinking**.

ASCII and Scan Codes:

For both questions, you may need the following ASCII values and scan codes for handling input/output:

- **Asterisk ('*') ASCII value**: 42
- **Space (' ') ASCII value**: 32
- **Esc Key ASCII value**: 27
- **Enter Key Scan Code**: 0x1C
- **Esc Key Scan Code**: 0x01
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Digit	ASCII Value	Scan Code (Hex)
0	48	0x0B
1	49	0x02
2	50	0x03
3	51	0x04
4	52	0x05
5	53	0x06
6	54	0x07
7	55	0x08
8	56	0x09
9	57	0x0A