National University of Computer and Emerging Sciences

Laboratory Manual

for

Computer Organization and Assembly Language Programming

(EL 213)

Course Instructor	Ms. Aatira Anum
Lab Instructor(s)	M. Salman Mubarik Rasaal Ahmad
Section	H
Semester	Fall 2023

Department of Computer Science

FAST-NU, Lahore, Pakistan

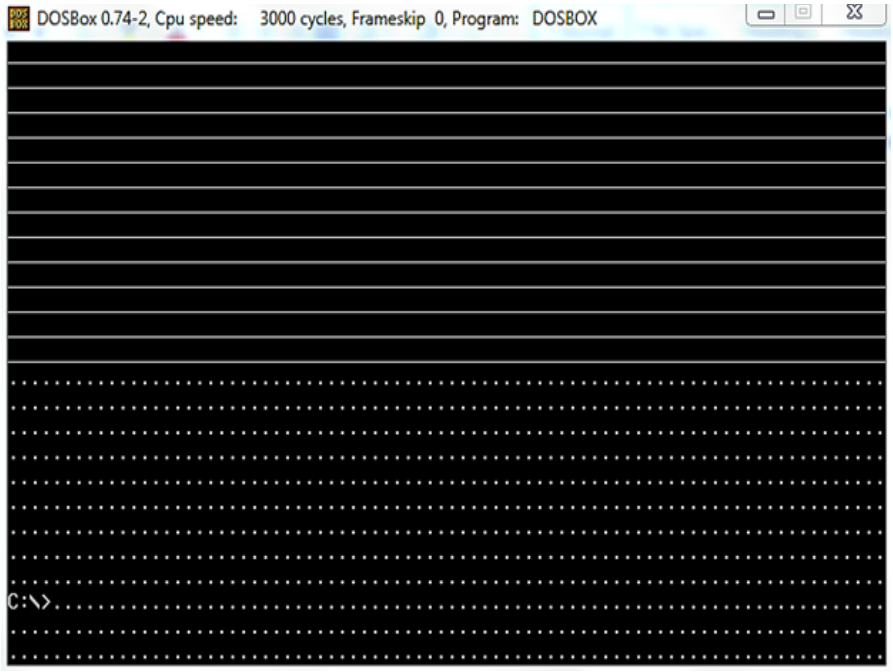
Objectives

After performing this lab, students shall be able to:

- ✓ Subroutines
- ✓ Display Memory
- ✓ String Instructions

Exercise 1: The code to clear the screen is given in example 6.1. Your task is to modify this code and print '_' (underscore) on the first 13 rows of the screen and '.' In the rest of the rows. The required output is given below. Properly calculate the cells required with each character.

Required Output:



Exercise 2: Write a Subroutine 'HollowTriangle', that takes 3 parameters on the stack.

1. The memory address of the character is to be printed to form a triangle.
2. The starting row of the triangle
3. Ending row of the triangle

The subroutine then prints the outline of a triangle, using the character specified in memory. It will start in the middle of the screen from the row mentioned as the starting row and go down to the ending row. The starting row will have only one character in the middle of the screen - Column 40. All the rows between the starting and ending rows will have two characters in them, with a certain number of spaces between the two characters, the number of spaces will depend on the row number. For example, the

second row (of the triangle) will have one space; the third row will have three, and so on. The ending row will be a row of the character.

Example:

Character: db '%'

StartingRow: db 5

EndingRow: db 11

The output will be

Row no	Col …	Col 34	Col 35	Col 36	Col 37	Col 38	Col 39	Col 40	Col 41	Col 42	Col 43	Col 44	Col 45	Col 46	Col …
1															
2															
3															
4															
5								%							
6							%		%						
7						%				%					
8					%						%				
9				%								%			
10			%										%		
11		%	%	%	%	%	%	%	%	%	%	%	%	%	
12															
13															
14															

Exercise 3: Write a function that searches for a substring from a string and highlights the found substring with yellow color. If the string is not found it will not highlight anything.

Sample Run:

String: "I am a student of COAL"
Substring: "student"
Printed String after Search: "I am a student of COAL"

Exercise 4: Write a function that compresses a string by removing consecutive occurrences of the same character.

Sample Run:

String Before Compression:
Str: "ggggddddddddyyyyakxxxuww"
String after Compression:
Str: "gdyakxuw"