Bahria University

Lahore Campus

Mid Term Exams (Spring-2024 Semester)

Department of Computer Sciences

Paper Show Date & Time:
Jun 14, 2024, 08:30AM – 11:30AM

Exam Date & Time	**Jun 12, 2024, 08:30AM – 11:30AM**	**Session**	**Regular Lab Slot**
Instructor Name	**Mr. Muhammad Mudassar**	**Program/Semester:**	**BSCS/5A**
Course Title	**Compiler Construction – Lab**	**Course Code:**	**CSC 323**
Time Allowed	**150 mins**	**Max Marks**	**30**

Instructions:

Read out the Instructions carefully.

I. Read the statements carefully and attempt all the questions.

II. Understanding the questions is part of the exam.

III. Copied submission will straight away be awarded with *ZERO.*

IV. Timely submission is required, late submission will not be accepted at all.

V. Submission of the final term is to be done on LMS under Paper Section.

VI. For Output you need to take a full screen *Screenshot* and paste it in the given space.

VII. The submission method is as follows; it should be strictly followed otherwise marks will be deducted.

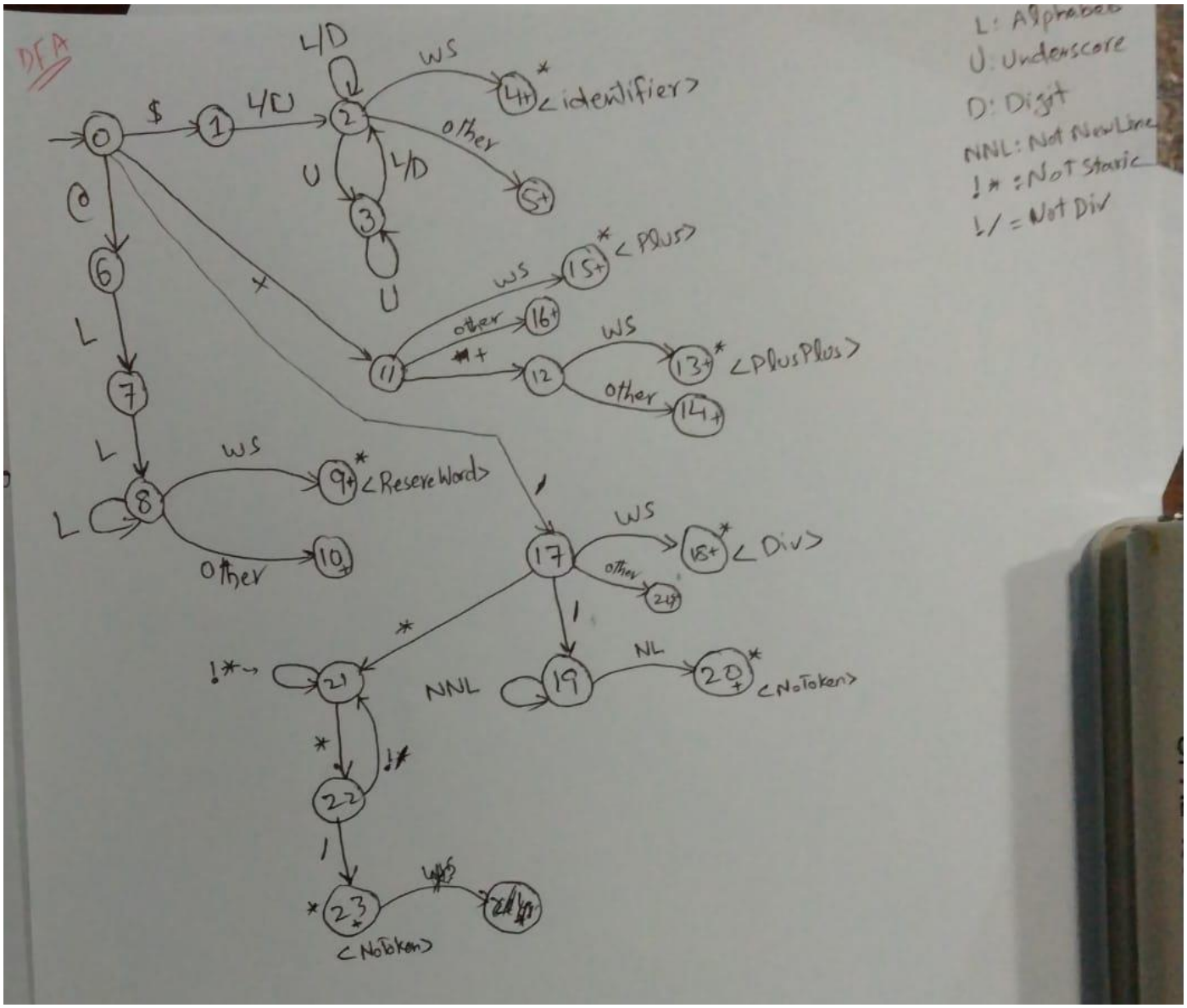
Make a Folder to add this word solution file in the folder naming "*Name_Enroll_Midterm_Section*" along with the .cpp files of each programming question. The .cpp file name should be saved according to the question no. i.e "*Q1.cpp*" (no cpp file required for output question). Make .zip/.rar of the folder and upload it on the given link on LMS.

Student Name …… **Enrollment Number**: ……

Evaluation of CLO	Ques # / Part #	Marks	Obtained Marks
CLO1: Apply various techniques to implement the lexical module, symbol table and syntax analyzer of a compiler.	1	20	
CLO-2: Implement different code generation techniques.	2	10	
	Total Marks	**30**	

Question No 01: **[10 + 5 + 5 = 20 marks]**

a. Consider the Deterministic Finite Automaton (DFA) given below, write a C++ program for the lexical analyzer using soft-coded method with ASCII values. You are supposed to read a text file (of your own choice) which contains some strings and words based on the DFA given below. The program must display the appropriate tokens on the words and no token on the strings. Submit the code and respective transition table both in your solution file.



b. Consider the ENUM and 2-D array given below, understand the language and write a C++ program for lexical analyzer using soft-coded method without ASCII values. You are supposed to read a text file which contains some strings and words based on the DFA given below. The program must display the appropriate tokens on the words and no token on the strings.

```
Enum Col-Name {
L=0, D, U, NLDU, Equal, Plus, NE, NEP, A, R, T };

TT[10][11] = {{1,-1,1,-1,7,3,-1,-1,0,0,0}, {1,1,1,2,-1,-1,-1,-1,0,0,0}, {-1,-1,-1,-1,-1,-1,-1,-1,1,1,identifier}, { -1,-1,-1,-1,4,5,-1,6,0,0,0}, { -1,-1,-1,-1,-1,-1,-1,-1,1,0,operator}, { -1,-1,-1,-1,-1,-1,-1,-1,1,0,operator}, { -1,-1,-1,-1,-1,-1,-1,-1,1,1,operator}, { -1,-1,-1,-1,9,-1,8,-1,0,0,0}, { -1,-1,-1,-1,-1,-1,-1,-1,1,1,operator}, { -1,-1,-1,-1,-1,-1,-1,-1,1,0,operator} };
```

c. Write a C++ program that reads the Context Free Grammar (CFG) from the text file, store it in a 2-D array, and then calculates the first set of all the non-terminals. A sample CFG of the text file can be as follow (single rule in a line):

Context Free Grammar (CFG)
S → sAX
A → aA
X → Dd
D → d

Question No 02: **[10 marks]**

Consider the Context Free Grammar (CFG) given below, write a C++ program for syntax analyzer. The program must be able to read input content from a text file. You are supposed to write a suitable content in the text file based on the given CFG. Non-terminals in the grammar are as "HTML, Tag, Attr, Value, and Content" whereas the terminals are as "<, >, =, ", ', id, text".

Context Free Grammar (CFG)
HTML → Tag | Content
Tag → '<' id Attr '>' Content '</' id '>'
Attr → id '=' Value | ε
Value → "" text "" | '\" text '\"
Content → Tag Content | ε

Do your own work, some One is watching.

Best of Luck 👍