Computer Science & Engineering Department I.I.T Kharagpur

Compilers

3rd year CSE: 5th Semester (Class Test 1)

Time limit: 1 hour (Time: 14.15-15.15)

Date: 1st Sep., 2022

030300

Max Marks: 15

Answer all the questions

1. Implement a DFA (Recognizer) for valid Identifiers and constants (int_const and char_const) as given below:

letter: $A \mid B \mid \dots \mid Z \mid a \mid b \mid \dots \mid z$

digit: 0 | 1 | 2 | ... | 9

nonzero_digit: 1 | 2 | ... | 9

quote: "

Identifiers: letter (letter | digit)*

int const: nonzero_digit (digit)*

char const: quote (letter)+ quote

Note: Only one recognizer is required to be implemented for all three Identifiers and constants (int_const and char_const). Knee closure (*), positive closure (+), and or function (|) is as per their usual meaning.

(5)

2. (a) Consider the grammar G1

G1: <{if, then, a, else, b}, {S, S',E}, {S}, P1>

P1:

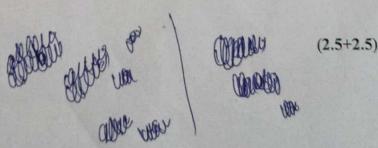
S→ if E then S S' |a

 $S' \rightarrow else S \mid \epsilon$

 $E \rightarrow b$

In the light of the following string, justify if the grammar G is ambiguous or not. if b then if b then a else a

(b) Explain how can you differentiate between an identifier and a keyword, with the help of a single state transition machine?



3. Parse the string b++d by executing the non-deterministic recursive descent parser with the grammar G2 as specified below. Apply the productions strictly following the (increasing) sequence, indicated by the rule#. Clearly show the functions invoked by the parser and all the backtracking steps, if any. Finally, justify, if the parser accepts or rejects this string.

G2: <{+,b,d}, {A,B,C}, {A}, P2> P2:

Rule#	Production
1.	$A \rightarrow B * C$
2.	$A \rightarrow B + C$
3.	$B \rightarrow bbC$
4.	$B \rightarrow b$
5.	$C \rightarrow +dC$
6.	$C \rightarrow +d$

END

AND CONTROL AND CO

(5)