Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

IT3CO24 Compiler Design

Programme: B.Tech. Branch/Specialization: IT

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. The total number of states required to design minimum DFA of the given regular expression (ab + ba + aa + bb): **1**

(a) 3 (b) 4 (c) 2 (d) 6

ii. Number of final state require to accept zero length string i.e. ε in minimal finite automata. **1**

(a) 1 (b) 2 (c) 3 (d) None of these

iii. Which of the following is used as compiler constructor tool for implementing various phases of compiler? **1**

(a) LEX

(b) YACC

(c) Syntax directed translation

(d) All of these

iv. scanf("a = %d, &a = %x", a, &a); how many token are there in given c statement: **1**

(a) 9 (b) 5 (c) 10 (d) 6

v. Which of the following is not top down parsing technique? **1**

(a) LL(1) parsing (b) Predictive parsing

(c) LR(0) parsing (d) Recursive Descent Parser

vi. Which of the following is correct in terms of their number of states? **1**

(a) CLR(1)>=LR(0) (b) LR(0)=SLR(1)

(c) SLR(1)=LALR(1) (d) All of these

vii. For the following SDT X->YZ { Y.att= X.att} the Y is: **1**

(a) Synthesized attribute (b) Inherited attribute

(c) S-attribute (d) Both (a) and (c)

P.T.O.

viii. If a attribute A is L-attribute then, which of the following is true: **1**
(a) A is Synthesized attribute
(b) A is Inherited attribute
(c) A is synthesize and inherited only when it inherits only from its parents and left siblings
(d) A is synthesize and inherited only when it inherits only from its parent

ix. The loop optimization method, loop jamming is also known as: **1**
(a) Loop fusion (b) Loop rolling
(c) Constant folding (d) Both (a) and (b)

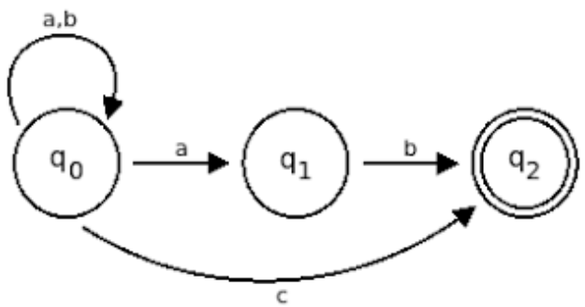
x. Code optimization helps to: **1**
(a) Improve the efficiency of code
(b) Improve execution time
(c) Reduce the size of the code
(d) All of these

Q.2 i. Convert the following regular expression to DFA- (0+1)*0(0+1)*. **2**

ii. What is Leftmost and Rightmost derivation? Explain with example. **3**

iii. Design Finite automata over the alphabets (0,1) which accept – **5**
(a) Odd number of 1's and any number of 0's
(b) Number of 0's mod 3=2 and number of 1's mod 4=3

OR iv. What is Difference between NFA and DFA with respect to transition function? Convert the following NFA to DFA- **5**



Q.3 i. What is role of lexical Analyser? **2**

ii. (a) Explain the concept of pass. **8**
(b) What do you mean specification of tokens?
(c) Explain concept of One buffer and two buffer schemes.

OR iii. Difference between compiler and interpreter. Also explain different phases of Compiler with example. **8**

Q.4 i. What do you mean by Left Recursion? Explain with example. **2**

ii. What are the different types of parsing technique? **3**

iii. Show that following grammar is LL(1): **5**
S->AaAb
S-> BbBa
A-> ε
B-> ε

OR iv. Check whether the grammar is SLR(1) or not: **5**
S->(L)/a
L->L,S | S

Q.5 i. Explain Syntax directed translation? **4**

ii. Draw syntax tree and DAG for the expression: **6**
(a*b)+(c-d)*(a*b)+b.

OR iii. Explain implementation of three address code for the expression: **6**
a+b*c/e^f+b*a

Q.6 Attempt any two:

i. Explain concept of symbol table. **5**

ii. What are various loop optimization method? **5**

iii. Explain parameter passing technique with example of any two. **5**

******

Marking Scheme
IT3CO24 Compiler Design

Q.1	i.	The total number of states required to design minimum DFA of the given regular expression (ab + ba + aa + bb): (a) 3		**1**
	ii.	Number of final state require to accept zero length string i.e. ε in minimal finite automata. (a) 1		**1**
	iii.	Which of the following is used as compiler constructor tool for implementing various phases of compiler? (d) All of these		**1**
	iv.	scanf("a = %d, &a = %x", a, &a); how many token are there in given c statement: (c) 10		**1**
	v.	Which of the following is not top down parsing technique? (c) LR(0) parsing		**1**
	vi.	Which of the following is correct in terms of their number of states? (d) All of these		**1**
	vii.	For the following SDT X->YZ { Y.att= X.att} the Y is: (b) Inherited attribute		**1**
	viii.	If a attribute A is L-attribute then, which of the following is true: (d) A is synthesize and inherited only when it inherits only from its parent		**1**
	ix.	The loop optimization method, loop jamming is also known as: (a) Loop fusion		**1**
	x.	Code optimization helps to: (d) All of these		**1**
Q.2	i.	Regular expression to DFA- (0+1)*0(0+1)*.		**2**
	ii.	Definition Leftmost and Rightmost derivation Example	2 marks 1 marks	**3**
	iii.	(a) Odd number of 1's and any number of 0's (b) Number of 0's mod 3=2 and number of 1's mod 4=3	2.5 marks 2.5 marks	**5**
OR	iv.	Difference between NFA and DFA Convert the following NFA to DFA	2 marks 3 marks	**5**
Q.3	i.	Any two role of lexical Analyser 1 mark for each	 (1 mark * 2)	**2**
	ii.	(a) Concept of pass (b) Specification of tokens (c) Concept of One buffer and two buffer schemes	2 marks 2 marks 4 marks	**8**
OR	iii.	Difference between compiler and interpreter Phases of Compiler Example	1 mark 4 marks 3 marks	**8**
Q.4	i.	Definition of Left Recursion Example	1 mark 1 mark	**2**
	ii.	Types of parsing technique		**3**
	iii.	Show that following grammar is LL(1): For First and follow Parsing Table	 2 marks 3 marks	**5**
OR	iv.	Check whether the grammar is SLR(1) or not: For Canonical collection For Table	 2.5 marks 2.5 marks	**5**
Q.5	i.	Syntax directed translation		**4**
	ii.	Draw syntax tree and DAG for the expression: Syntax Tree DAG	 3 marks 3 marks	**6**
OR	iii.	Explain implementation of three address code for the expression 2 marks for each implementation for three address code	 (2 marks *3)	**6**
Q.6		Attempt any two:		
	i.	Concept of symbol table.		**5**
	ii.	Loop optimization method At least 5 methods 1 mark for each	 (1 mark * 5)	**5**
	iii.	Parameter passing technique Example of any two	3 marks 2 marks	**5**

******