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INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B TECH V SEMESTER CIE – I EXAMINATIONS, OCTOBER – 2022

Regulation: UG20

COMPILER DESIGN

Time: 2 Hours

(Common to CSE | CSE(AI&ML) | CSIT | IT)

Max Marks: 20

Answer any FOUR questions

All parts of the question must be answered in one place only

1. (a) Describe in detail about bootstrapping concept. List the properties of strings and languages.
[BL: Understand| CO: 1|Marks: 2]
- (b) Explain how LEX program perform lexical analysis to identify identifiers, comments, numerical constants, keywords, arithmetic operators?
[BL: Understand| CO: 1|Marks: 3]
2. (a) Summarize various phases of a compiler in detail. Differentiate frontend and backend of a compiler.
[BL: Understand| CO: 1|Marks: 2]
- (b) Outline the DFA that will accept those words from $\Sigma^* = \{a, b\}$ where the number of a s is divisible by two and the number of b s is divisible by three. Sketch the transition table of the finite automata
[BL: Apply| CO: 1|Marks: 3]
3. (a) Outline the CLR parsing model and write the CLR parsing algorithm for constructing the parsing table.
[BL: Understand| CO: 2|Marks: 2]
- (b) Consider the grammar given below.
 $E \rightarrow E+T \mid T$,
 $T \rightarrow T^*F \mid F$, $F \rightarrow (E) \mid id$.
 Construct LR parsing table for the above grammar .Give the moves of LR parser on $id * id + id$
 [BL: Understand| CO: 2|Marks: 3]
4. (a) Summarize handle pruning in detail with example. Discuss the role of stack in shift reduce parsing method.
[BL: Understand| CO: 2|Marks: 2]
- (b) Construct SLR parsing table for the below grammar
 $E \rightarrow E+T \mid T$, $T \rightarrow T^*F \mid F$, $F \rightarrow (E) \mid id$.
 [BL: Apply| CO: 2|Marks: 3]
5. (a) Describe briefly about synthesized and inherited attribute in detail.
[BL: Understand| CO: 3|Marks: 2]
- (b) Construct production rules and semantic actions for S-attributed grammar for the following grammar along with syntax tree and annotated parse tree for the given string $a*b-c/d+e$?
 $L \rightarrow E$
 $E \rightarrow E+T \mid E-T \mid T$
 $T \rightarrow T^*F \mid T/F \mid F$
 $F \rightarrow P-F \mid P$
 $P \rightarrow (E)$
 $P \rightarrow ID$
 [BL: Apply| CO: 3|Marks: 3]