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Question Paper Code: 56201

B.E./B.Tech. DEGREE EXAMINATION, MAY 2018

Sixth Semester

Computer science and Engineering

15UCS601- PRINCIPLES OF COMPILER DESIGN

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (5x 1 = 5 Marks)

1. Name the phase that can detect errors, when the characters remaining in the input do not form any token of the language CO1- R
 - (a) Syntax analysis
 - (b) Semantic analysis
 - (c) lexical analysis
 - (d) Intermediate code generation
2. The right most derivation in reverse is obtained by CO2- R
 - (a) Handle
 - (b) Handle pruning
 - (c) Right most derivation
 - (d) Sentinels
3. Back-Patching is useful for handling CO3- R
 - (a) Conditional jumps
 - (b) Forward references
 - (c) Backward references
 - (d) Unconditional jumps
4. The information needed during an execution of a procedure is kept in a block of storage called an CO4- R
 - (a) Stack
 - (b) File
 - (c) Activation record
 - (d) Register

5. Replacement of runtime computation by compile time computation is CO5- R
- (a) Constant folding (b) Elimination common sub expression
- (c) Local optimization (d) Algorithm optimization

PART – B (5 x 3= 15Marks)

6. A grammer with production $A \rightarrow Ab/c$. Eliminate the left recursion and compute the first and follow. CO1- R
7. Draw the DAG representation of $a := -b*c + d$. CO2- R
8. How three address statements are implemented ? Give any one example. CO3- R
9. What is peephole optimization? Give the characteristics of the same. CO4- R
10. When the array access in a loop is ' affine'? CO5- R

PART – C (5 x 16= 80Marks)

11. (a) Illustrate the possible errors that can be identified in each phase,also relate its functions by considering the following statement $Z = X*Y$ in the compiler. CO1-App (16)

Or

- (b) (i) Explain various compiler construction tools. CO1- U (8)
- (ii) Explain input buffering techniques with suitable code? CO1- U (8)
12. (a) Construct a predictive parser for the following grammar. CO2- App (16)
 $S \rightarrow a^+ / (T)$ $T \rightarrow T, S / S$
 Is the parser LL(1). Show the actions of the parser for the input string (a,a)

Or

- (b) Consider the following grammar CO2- Ana (16)
 $S \rightarrow As/b$ $A \rightarrow SA/a$
 Construct the SLR parser and check the above grammer is SLR(1) or not.
13. (a) Illustrate the ways to generate intermediate code for the flow of control statements? Explain with examples. CO3-Ana (16)

Or

- (b) (i) Generate three address code for the following ' if ' statement if $(X < 100) \parallel (X > 200 \&\& X \neq Y) X = 0;$ CO3- App (8)
- (ii) Explain back-patching with semantic rules. CO3- App (8)
14. (a) (i) Discuss the issues to be considered in code generation. CO4- U (10)
- (ii) Apply structure preserving transformation for the following basic block. CO4- App (6)
- $a = b + c; b = a - d; c = b + c; d = a - d;$

Or

- (b) (i) Explain the code generation algorithm in detail. CO4- U (10)
- (ii) Construct DAG for the following basic block CO4- App (6)
- $a = b + c$
 $b = a - d$
 $c = b + c$
 $d = a - d$
15. (a) Describe the principle sources of optimizations with example. CO5-U (16)

Or

- (b) What is data reuse? Classify the different kinds of reuses. CO5-U (16)

