Total No. of Questions : 10]

SEAT No. :

P2327

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[5254]-662

B.E. (Computer Engineering)

PRINCIPLES OF MODERN COMPILER DESIGN

(2012 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Questions. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6, Q. 7 or Q. 8 Q. 9 or Q. 10***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Assume suitable data, if necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Why compilation phases are divided into front-end and back-end? What are the advantages? **[4]**

b) Give syntax directed definition for any example arithmetic expression. **[6]**

OR

Q2) a) What is YACC? Give format of Yacc specification file. **[4]**

b) Write the syntax directed translation scheme for generating Intermediate code for array assignment statement. **[6]**

Q3) a) Explain the terms phase and pass related to compiler. **[2]**

b) Construct LL (1) parsing table for the following grammar. **[8]**

Terminals = {id, num, while, print, >, {,}, ; (,)}

Nonterminal = {S,E,B,L}

Rule =
- i) $S \rightarrow$ print (E)
- ii) $S \rightarrow$ while (B)S
- iii) $S \rightarrow \{L\}$
- iv) $E \rightarrow$ id
- v) $E \rightarrow$ num
- vi) $B \rightarrow E > E$
- vii) $L \rightarrow SL$
- viii) $L \rightarrow \varepsilon$

Start Symbol = S

P.T.O.

OR

Q4) a) Enlist the operations performed on symbol table. **[2]**

b) Construct SLR (1) parsing table for the following grammar. **[8]**

$S \rightarrow aAb|bB$

$A \rightarrow Aa|\ \varepsilon$

$B \rightarrow Bb|\ \varepsilon$

Q5) a) What do you mean by common sub-expression? Discuss the algorithm for elimination of common sub-expression. **[6]**

b) Discuss peephole optimization techniques. **[6]**

c) What is DAG? with suitable illustrations explain the role of DAG in code generation phase. **[6]**

OR

Q6) a) Discuss following optimizations with example. **[6]**

i) Strength reduction

ii) Dead code elimination.

b) What do you meant by 'Next Use' information? How it is computed? **[6]**

c) Explain the algorithm for generating code from labeled tree. **[6]**

Q7) a) Explain the different translation schemes to remove syntactic sugar from Haskell program. **[6]**

b) Explain following features of object oriented languages related to compiler design. **[6]**

i) Overloading

ii) Inheritance.

c) Discuss features of Java CC compiler. **[4]**

OR

Q8) a) Discuss following with respect to object oriented languages. **[6]**

i) Type checking.

ii) Type coercion.

b) Explain following with respect to functional languages. **[6]**

i) Referential transparency.

ii) Lazy evaluation.

c) What is activation record? Explain possible structure of an activation record? **[4]**

Q9) a) Discuss parallel programming models. **[6]**

b) Write short notes: **[6]**

i) g++

ii) NVCC

iii) LLVM

c) Compare processes and threads. **[4]**

OR

Q10)a) Discuss issues in message passing techniques. **[6]**

b) Explain following concepts related to automatic parallelization. **[6]**

i) Data dependencies.

ii) Loop transformations.

c) What is Interpreter? Explain Dalvik. **[4]**