P2037

[5059]-642

B.E. (Computer Engineering)
PRINCIPLES OF MODERN COMPILER DESIGN
(2012 Pattern) (Semester - I)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:
1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 or Q8.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Assume suitable data if necessary.*

Q1) a) Discuss the action taken by every phase of compiler on following string
A = B*C+D/E   **[6]**

b) For the following grammar :   **[8]**

S - > Aa | bAc |Bc | bBa

A - > d

B - > d

i)   Compute First & Follow set

ii)   Construct LR(1) parsing table

c) Explain following terms with suitable examples (any 2) :   **[6]**

i)   S - Attributed Grammar

ii)   L - Attributed Grammar

iii) Type Expression

OR

Q2) a) Explain following storage allocation schemes with proper examples :**[6]**

i)   Stack Storage Allocation

ii)   Static Storage Allocation

iii) Heap Storage Allocation

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b) Generate SLR parsing table for the given grammar and parse the string id1 + id2 + id3 * id4 **[8]**

$$E \rightarrow E + T / T$$
$$T \rightarrow T * F / F$$
$$F \rightarrow id$$

c) What is mean by 'Syntax Directed Definitions'? Give syntax directed definition for any example arithmetic expression. **[6]**

Q3) a) Explain following optimizations with examples : **[8]**
   i) Common sub expression elimination
   ii) Strength reduction
   iii) Code movement
   iv) Variable propagation

b) Compare Quadruples and Triples. Generate indirect triples for following :**[6]**
   a = b * c – d – e

c) What is Register Allocation and Assignment problem? **[4]**

OR

Q4) a) What is code optimization? Differentiate among local, global and loop optimization. **[6]**

b) What is DAG? Explain its use in code generation. Generate DAG for **[6]**
   T1 = A + B
   T2 = C + D
   T3 = E – T2
   T4 = T1 – T3

c) Explain with example: **[6]**
   i) Basic blocks and flow graph
   ii) Peephole optimization

Q5) a) Write a note on importance of source language data representation. **[6]**

b) Explain the row major and column major representation of arrays. **[6]**

c) Explain type checking with respect to context handling. **[4]**

Q6) a) Explain structure of a functional compiler. Discuss various issues related to compilation of functional languages. **[6]**

b) Write short note on Java CC. **[6]**

c) What is lazy evaluation in functional languages? **[4]**

Q7) a) Write short note on NVidia CUDA compiler. **[6]**

b) What is interpreter? Explain JVM as an example of interpreter. **[4]**

c) How tuple space can be implemented on distributed memory systems. **[6]**

OR

Q8) a) Explain following points for parallel Object Oriented languages : Object location, object migration, object replication **[6]**

b) Write short notes : **[6]**
   i)   Tuple spaces
   ii) XML VM
   iii) JIT

c) Discuss issues related to parallel compiler. Explain with respect to NVCC. **[4]**

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