

Code No: 07A60502

R07**Set No. 2**

III B.Tech II Semester Examinations, December 2010

COMPILER DESIGN

Computer Science And Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Explain how storage allocation is done for arrays, strings and records? [16]
2. (a) Write about the issues in the design of code generator.
(b) Write about target code forms. Explain how the instruction forms effect the computation time. [8+8]
3. Define the following terms.
 - (a) Reaching definition.
 - (b) Live variables.
 - (c) Flow graphs.
 - (d) Global optimization. [16]
4. (a) Construct operator precedence parse table for the below grammar.
 $S \rightarrow iEtS|iEtSeS|a$
 $E \rightarrow b|c|d$.
 (b) Eliminate Ambiguity for above grammar. [10+6]
5. (a) Translate the following code segment into Quadruples.
 While $A < C$ and $B < D$
 if $A=1$ then $C:= C+1$
 else while $A \leq D$ do $A:= A+2$
 (b) Explain the different statements allowed in TAC with examples. [8+8]
6. (a) Write the procedure for constructing the DAG.
 (b) For the following basic block construct DAG.
 $d = b * c;$
 $e = a * b;$
 $b = b + c;$
 $c = b * c;$ [8+8]
7. (a) Construct an NFA for regular expression $R = (aa/b)^*ab$ convert it into an equivalent DFA
 (b) Write a LEX program for identifying the keywords and identifiers from the file? [8+8]
8. Give the algorithm to generate the canonical collection of LR(0) items. [16]

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R07**Set No. 4**

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Computer Science And Engineering

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Answer any FIVE Questions
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1. (a) What is the use of Symbol table in compilation process? List out various attributes stored in the symbol table.
(b) Explain different schemes of storing name attribute in symbol table. [8+8]
2. (a) Write the procedure to detect induction variable with example.
(b) With example explain dead code elimination. [8+8]
3. (a) What is next use information explain in detail.
(b) Write about target code forms. Explain how the target code can be generated from the given three address code. [8+8]
4. (a) What is meant by a parser generator? Illustrate with examples using YACC
(b) Mention the error recovery strategies of parser. [14+2]
5. (a) Write a short notes on token specification.
(b) Draw a NFA for a^*/b^* .
(c) Convert the above (b) to DFA. [6+4+6]
6. (a) Consider the following grammar.

$$S \rightarrow 0A|1B|0|1$$

$$A \rightarrow 0S|1B|1$$

$$B \rightarrow 0A|1S$$

Construct leftmost derivations and parse trees for the following sentences

i. 0101

ii. 1100101

- (b) Consider the following grammar

 $E \rightarrow T + E | T$ $T \rightarrow V - T | V$ $V \rightarrow id$

Write down the procedures for the non-terminals of the grammar to make a recursive descent parser. [8+8]

7. (a) Explain DAG and its use.

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(b) For the following statements draw the DAG.

$$t_8 = d + e$$

$$t_6 = a + b$$

$$t_5 = t_6 - c$$

$$t_4 = t_5 * t_8$$

$$t_3 = t_4 - e$$

$$t_2 = t_6 + t_4$$

$$t_1 = t_2 * t_3$$

[8+8]

8. (a) How will you generate the intermediate code for the flow of control statements? Explain with examples.

(b) Translate the following assignment into intermediate code

$$A[I,J] := B[I,J] + C[A[K,L]] + D[I+J]$$

[8+8]

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R07**Set No. 1**

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1. Consider the Grammar

 $S \rightarrow (L)a$ $L \rightarrow L, S | S$

Find the parser trees for the following sentences.

(a) $(a(a, a))$ (b) $(a((a, a)), (a, a))$.

[16]

2. (a) Explain peephole optimization with example.

(b) Explain the procedure for constructing DAG with example. Write the applications of DAG. [8+8]

3. Describe various phases of a compiler? Differentiate a phase and pass? Compare multipass and singlepass compiler? [16]

4. Explain symbol table organization using hash tables? With an example show the symbol table organization for block structured language. [16]

5. Explain shift-reduce parsing. Illustrate with examples.

[16]

6. Explain DAG and its use. Write the procedure to construct the DAG for a statement. [16]

7. Explain data flow analysis. Compute in and out for the following figure 1. [16]

8. (a) Write the quadruples, triples and indirect triples for the expression

i. $(a + b) * (c + d) (a + b + c)$ ii. $a * (b + c)$

- (b) Write a top-down translation scheme to produce quadruples for Boolean Expression. [8+8]

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Set No. 1

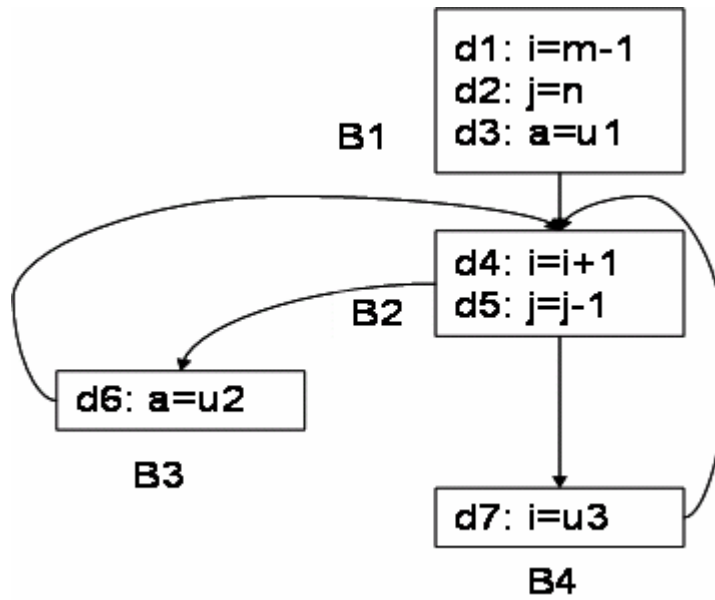


Figure 1

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R07**Set No. 3****III B.Tech II Semester Examinations, December 2010****COMPILER DESIGN****Computer Science And Engineering****Time: 3 hours****Max Marks: 80**

Answer any FIVE Questions
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1. (a) Explain LALR parsing, justify how it is efficient over SLR parsing
(b) Find the moves made by the LR(1) parser on the input string: aabb. [10+6]
2. Explain with example the various techniques in loop optimization. [16]
3. (a) Explain live variable analysis with example.
(b) Explain redundant sub expression elimination with example. [8+8]
4. Generate the code for the following C statements using its equivalent three address code.
(a) $a = b + 1$
(b) $x = y + 3$
(c) $y = a/b$
(d) $a = b + c$. [16]
5. (a) Explain the following top-down parsing methods with Example?
(b) Recursive - Decent parsing

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(c) Predictive Parser.

[16]

6. Explain symbol table organization using hash tables? Construct hash based structure for symbol table for the variable in the following program. int main()

```
{  
int a1, a2, c1, c2;  
char b1;  
float d1, d2;  
—  
—  
}
```

[16]

7. (a) Draw the syntax tree for the following expression $a := b * -c + b * -c$

(b) Write the postfix notation and three address code for the following expression

i. $(-(a + b) * (c + d) + (a + b + c))$ [6+10]

8. Explain with one example how LEX program perform lexical analysis for the following patterns in 'C': identifier, comments, numerical constants, arithmetic operators.

[16]
