

15. (a) Elaborate any five peephole optimization techniques with example.

Or

- (b) Elaborate on the storage allocation techniques.

PART C — (1 × 15 = 15 marks)

16. (a) Elaborate on local and loop optimizations. Perform local optimizations for the a sample basic block with atleast ten instructions.

Or

- (b) Construct LR (1) items for the following grammar using LALR parsing and draw the transition diagram representing the transitions among LALR items.

$S \rightarrow E + F \mid F$

$F \rightarrow F * T \mid T$

$T \rightarrow D$

$D \rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7.$

Reg. No. :

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Question Paper Code : 70446

B.E./ B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Sixth Semester

Computer Science and Engineering

CS 8602 – COMPILER DESIGN

(Common to: Computer Science and Business Systems)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

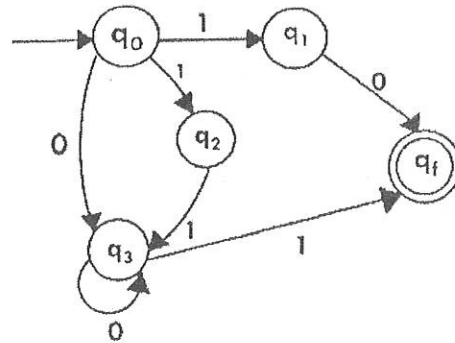
1. Give the significance of symbol table. Draw a sample table.
2. Compare and contrast Compiler and Interpreter.
3. Write down the CFG for the set of odd length strings in $\{a, b\}^*$ such that the it is a palindrome.
4. Write the algorithm to compute FOLLOW of a non-terminal.
5. What is an L-attribute? Give examples.
6. Convert the following statement into three address codes
 $x = a * b + c * e$
Represent the codes using quadraples and indirect triple.
7. When do you call a variable to be syntactically live at a point?
8. What is the use of a Heap memory? When is it created and used?
9. Define peephole.
10. Can DAG be used for optimization? Give example.

11. (a) “Every statement of the software written in any programming language is translated to machine-understandable language before execution.” – Elaborate on the translation process. Explain the process using the statement, “if (a==10) {print(“Welcome”)} else {print(“Exit”)}.”

(Assume the statement is to be written in Python language).

Or

- (b) Convert the following NFA to DFA.



12. (a) Check whether the following grammar can be implemented using SLR parser. Check whether the string “0a*a1” is accepted or not using SLR parsing.

$S \rightarrow 0A1 \mid a$

$A \rightarrow A*S \mid B$

$B \rightarrow a$

Or

- (b) Check whether the following grammar can be implemented using CLR parser. Check whether the string “wxynzs” is accepted or not using CLR parsing.

$A \rightarrow BCD \mid Ab \mid c$

$B \rightarrow w \mid Bx$

$C \rightarrow yCz \mid n$

$D \rightarrow DB \mid s$

13. (a) Generate three address codes for the following piece of code and hence write the syntax directed translation.

```

while (a<b or a>c)
{
    if (a==1)
    {
        c = c+1
        continue
    }
    else
    {
        b = b+1
        break
    }
}
    
```

Or

- (b) Generate three address codes for the following piece of code and hence write the syntax directed translation.

```

while (a<b and c>b)
do
    if c < d
    then
        x := y + z
        break
    else
        x := y - z
    
```

14. (a) Write the code generation algorithm. Explain the process of register allocation and assignment.

Or

- (b) Construct basic blocks and flowgraph for the following piece of code.

```

for i from 1 to m:
    for j from 1 to n:
        a [i, j] = 5.0;
    for k from 1 to m:
        b [i, i] = 1.0;
print (“Done”)
    
```