c. Write short notes on any four of the following :-

i. Directed acyclic graph(DAG)

ii. Syntax tree

iii. Triple

iv. Quadruple

v. Indirect triple.

4. Attempt any two of the following: (10×2=20)

a. Describe symbol table and its entries. Also discuss various data structure used for symbol table.

b. What is activation record? Explain its organization. Also discuss various storage allocation strategies.

c. Discuss how access links and displays are used to access non local names.

5. Attempt any two of the following: (10×2=20)

a. Explain following code improving transformations with examples

i. Local and global elimination of common sub-expressions.

ii. Copy propagation and dead code elimination.

b. What is basic block .write the algorithm for the construction of basic block? Find the basic block from the following code and also draw the CFG.

Printed Pages :5

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417

NMCA-011

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 214429

Roll No.

SPL. THEORY EXAMINATION, 2014-15

COMPILER DESIGN

Time : 3 Hours] *[Total Marks : 100*

1. Attempt any four of the following: (5×4=20)

a. Explain the compilation with suitable block diagram. Also discuss the role of various phases of compiler.

b. Discuss the bootstrapping of a cross compiler.

c. Describe the task performed by following programs:

i. Pre-processor

ii. Assemblers

iii. Loaders and link-editors.

d. Discuss the algorithms for subset construction and computation of ∈-Closure.

e. Show the construction of NFA for following regular expression

i. (a|b) * a (a|b) (a|b).

ii. (a|b)*abb(a|b)*

f. i. What do you mean by ambiguous grammar? Show that the following grammar is ambiguous.

$S \rightarrow aSBS \mid bSaB \mid \in$

ii. What language is generated by following grammar? In each case justify your answer:

1) $s \rightarrow 0s1 \mid 01$

2) $s \rightarrow +ss \mid -ss \mid a$

3) $s \rightarrow s(s)s \mid \in$

2. Attempt any two of the following: (10×2=20)

a. What do you mean by left factoring & left recursion? Eliminate left recursion from the following grammar:

$E \rightarrow E+T|T$

$T \rightarrow T*F|F$

$F \rightarrow (E)|id$

b. Consider the following grammar:

$S' \rightarrow S\#$

$S \rightarrow ABC$

$A \rightarrow a \mid bbD$

$B \rightarrow a \mid \in$

$C \rightarrow b \mid \in$

$D \rightarrow c \mid \in$

Construct the first and follow sets for the grammar, also design a LL(1) parsing table for the grammar.

c. Give the algorithm to construct LALR parsing table. Construct the LALR parsing table for following grammar:

$S \rightarrow AA$

$A \rightarrow aA|b$

3. Attempt any two of the following: (10x2=20)

a. Consider the following grammar and give the syntax directed definitions to construct parse tree. For the input expression 4*7+1*2 construct an annotated parse tree according to your syntax directed definition:

$E \rightarrow E+T \mid T$

$T \rightarrow T*F \mid F$

$F \rightarrow digit$

b. Translate the following segment into three code:-

i.
```
While(a>b)
    If(c>d)
        c=c-d*e
    else
        c=c+d*e
```

ii.
```
inti,
i=1
while a<10 do
    if x>y then
        a=x+y
    else
        a=x-y
```

PROD:=0

I:=1

T_1:=4*I

T_2:=addr(A)-4

T_3:=T_2[T_1]

T_4:=addr(B)-4

T_5:=T_4[T_1]

T_6:=T_3*T_5

PROD:=PROD+T_6

I:=I+1

if I<=20 goto (3)

c. Write short notes on any three of the following:-

i. Error and its recovery

ii. Local and loop optimization

iii. Loop unrolling, Loop jamming & code motion.

iv. DAG representation of Basic block.

—×—