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Total number of printed pages – 3

B. Tech
PCCS 4305

Sixth Semester Regular Examination – 2015

COMPILER DESIGN

BRANCH : IT

QUESTION CODE : J 442

Full Marks – 70

Time : 3 Hours



Answer Question No. 1 which is compulsory and any five from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10
- (a) What is the difference between compiler and interpreter ? Give at least four differences.
 - (b) What is a rational preprocessor ? Explain its functionality with an example.
 - (c) Given expression Value = $x + y * 10$, what will be the output of the lexical analysis phase ?
 - (d) What are the drawbacks of SR parser ?
 - (e) What is type checking ? Give an example of type checking in SDD.
 - (f) What is the difference between s-attributed definition and l-attributed definition ?
$$A := - B * (C * D)$$
 - (g) How syntax directed translation is different from SDD ? Explain.
 - (h) What is the difference between register-descriptor and address-descriptor ? Explain.
 - (i) What is activation ? Explain with an example.
 - (j) What is dead code elimination ? Explain.
2. Write down the algorithm for conversion of a regular expression into ϵ -NFA and subsequently NFA to DFA. Use the algorithms to convert the regular expression RE = $(a|b)^*abb$ into ϵ -NFA and then to DFA. 10

P.T.O.

3. (a) What is predictive parsing approach ? Draw the predictive parsing table for the following grammar. 5

$E \rightarrow E+T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

- (b) What is shift reduce conflict ? Draw the SLR parsing table for the following grammar and show whether any conflict is present or not. 5

$S \rightarrow L=R \mid R$

$L \rightarrow *R \mid id$

$R \rightarrow L$

4. What is LALR ? Why it is used ? Write the algorithm to construct LALR parsing table. Draw a LALR parsing table using an example. 10

5. (a) What is SDD ? Why it is required ? Write down the SDD for the following set of production rules : 4

$S \rightarrow E\$$

$E \rightarrow E_1 + E_2$

$E \rightarrow E_1 * E_2$

$E \rightarrow (E_1)$

$E \rightarrow I$

$I \rightarrow I \text{ 1 digit}$

$I \rightarrow \text{digit}$

- (b) What is three address code ? What are the different forms of three address code ? Explain quadruple, triple, indirect triple representation of three address code 6

$(a + b) * c / d.$

6. (a) What is symbol table ? Describe the various approaches of symbol table organization. 5

- (b) How to handle activation records for calling sequences ? Explain. 5

7. (a) How do you define basic blocks ? Find out the basic blocks for a source code as given below : 5

```
w=0;
x=x+y;
y=0;
if (x>z)
  { y=x;
    x++;
  }
else
  { y=z;
    z++;
  }
w=x+z
```

Also draw the flow graph for it.

- (b) Write down the algorithm to construct a DAG. Construct the DAG for the following basic block : 5

```
a := b+c
b := a-d
c := b+c
d := a-d
```

8. Write short notes on any **two** : 5×2
- (a) Error reporting and recovery
 - (b) Handle punning
 - (c) Dependency graph
 - (d) Peephole optimization.