Code No: 115AP

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, November - 2015

COMPILER DESIGN

(Computer Science and Engineering)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A (25 Marks)

1.a) Define Cross Compiler. [2]

b) Eliminate immediate left recursion for the following grammar: [3]
E->E+T | T
T->T* F | F
F-> (E) | id

c) List the rules for computing FOLLOW SET. [2]

d) Define CLOSURE (I). [3]

e) What is a symbol table? [2]

f) What does a semantic analysis do? [3]

g) Define basic block in a flow graph. [2]

h) What is a DAG? Mention its applications [3]

i) Generate a object code for following statements [2]
a = b + c; d = a+e

j) Mention the properties that a code generator should possess. [3]

PART - B (50 Marks)

2. What are the various phases of the compiler? Explain each phase in detail. [10]

OR

3. Construct the predictive parser for the following grammar: [10]
S->(L)/a
L->L,S/S

4. Find the SLR parsing table for the given grammar:
E->E+E | E*E | (E) | id.
And parse the sentence (a+b)*c. [10]

OR

5. Construct an LALR Parsing table for the following grammar: [10]
E-> E+T |T
T-> T*F|F
F->id

6. Generate intermediate code for the following code segment along with the required syntax directed translation scheme:

```
if(a>b)
x=a+b
else
x=a-b
```

Where a and x are of real and b of int type data. [10]

OR

7. Give syntax directed translation scheme for simple desk circulator. [10]

8. Explain the following with an example:
   a) Redundant sub expression elimination
   b) Frequency reduction
   c) Copy propagation. [3+3+4]

OR

9. Optimize the following code using various optimization techniques: [10]

```
i=1; s=0;
for (i=1; i<=3; i++)
for (j=1;j<=3;j++)
c[i][j]=c[i][j] + a[i][j] + b[i][j]
```

10. Explain in detail about machine dependent code optimization techniques. [10]

OR

11. Give an example to show how DAG is used for register allocation. [10]

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