

School Of Mathematics & Computer Applications

End Semester Exam(07/12/2006)

CA-020( System Programming)

Time : 3 Hrs

Marks 36

Note: Attempt only five questions. Q No 1 is compulsory. Attempt all parts of a question in a sequence.

Q1 a. Which steps of compiler uses the knowledge of machine architecture? 3  
What are the important issues relating to that step?

b. Compare and contrast the efficiency of the execution of the following code(on the speed ,memory and correctness) 2

(i) Binary bit stream

(ii) Assembly program

c. What is an ambiguous grammar? How the ambiguity is determined? 2  
Explain by using an example

d. On what type of operations, strength reduction optimization can not be performed and why? 1

Q2 a. What is operator precedence? How the precedence is determined from the given set of rules? 3

b. An if statement may be written with or without an else part. Given the following operator grammar for if 4

$\langle \text{if\_stmt} \rangle \rightarrow \text{if } \langle \text{exp} \rangle \text{ then } \langle \text{stmt} \rangle \text{ else } \langle \text{stmt} \rangle \mid \text{if } \langle \text{exp} \rangle \text{ then } \langle \text{stmt} \rangle$

$\langle \text{assignment} \rangle \rightarrow \langle \text{var} \rangle = \langle \text{exp} \rangle$

$\langle \text{stmt} \rangle \rightarrow \langle \text{assignment} \rangle \mid \langle \text{if\_stmt} \rangle$

where if, then and else are operators, find the operator precedence matrix.

Q3 a. Write down the second pass algorithm for the 2 pass assembler. 4

b. An assembly program contains the statement 3

A EQU B+10

Indicate how the EQU statement can be processed if

(i) B is a back reference.

(ii) B is a forward reference.

- Q4 a. Explain the algorithm of Marco expansion? 4
- b. What is data type? For what purpose the semantic of a data type is used? 2
- c. What is value numbers? Why these are used? 1
- Q5 a. Write down the algorithm for the evaluation order for operators? 3
- b. Explain the formats of the following object records 4
- (i) EXTDEF
  - (ii) SEGDEF
  - (iii) LEDATA
  - (iv) PUBDEF
- Q6 a. Write a program to generate code from a table of quadruples.(only the pseudo code) 3
- b. What types of features are used by compiler to implement function calls? 2
- c. Which data structures are used in the second pass of the linker? Explain each of the data structure. 2
- Q7 a. Write down the algorithm for the first pass of the linker. 3
- b. Define token and lexemes through an example. 2
- c. What is the efficient way to access non local variables in block structured languages? Support your answer. 2