CBCS SCHEME

USN

15CS63

Sixth Semester B.E. Degree Examination, Aug./Sept.2020 System Software and Compiler Design

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain SIC Architecture in detail.

(06 Marks)

b. Explain the data structures and Pass-1 algorithm of SIC/ME assembler.

(06 Marks)

c. List out the differences between system software and application software.

(04 Marks)

OR

- a. List the different addressing modes used in SIC/XE. Give instructions format for each and explain the addressing mode. (08 Marks)
 - b. Generate the machine code for the following:
 - (i) 0000 +JSUB RDREC
 - (ii) 0004 STL RETADR
 - (iii) 0008 LDB #LENGTH
 - (iv) 000A CLEAR X

Assume the opcodes are:

 $JSUB = 48_{H}$, $STL = 14_{H}$, $LDB = 60_{H}$, $CLEAR = B4_{H}$

The LC value for : $RDREC = 1036_{H}$

RETADR = 0030_{H} , LENGTH = 0033_{H}

The mnemonics values for registers are

A = 0, X = 1, L = 2, B = 3, S = 4, T = 5, F = 6, Pc = 8, SW = 9.

(08 Marks)

Module-2

3 a. With an example show how relocation and linking operations are performed.

(08 Marks)

b. With source code, explain the working of boot-strap loader.

(08 Marks)

OR

4 a. Explain machine independent loader features given an example with implementation.

(08 Marks)

 With a neat diagram, explain how object program can be processed using linkage loader and linkage editor. (08 Marks)

Module-3

a. With a neat diagram explain the different phases of the complier.

(10 Marks) (06 Marks)

b. Explain the concept of input buffering with its implementation.

(

a. Describe language processing system with a neat diagram.

(06 Marks)

b. Write the transition diagram for the following:

(06 Marks)

(i) relop (ii) unsigned numbers (iii) ide Differentiate between compiler and interpreter.

(04 Marks)

1 of 2

www.vturesource.com

15CS63

Module-4

7 a. Compute: (i) First() and Follow()

(ii) Predictive parsing table for the given grammar

 $D \rightarrow L; T$

 $L \rightarrow L$; id | id

 $T \rightarrow int | real$

b. Consider the CFG with the production set,

 $E \rightarrow E + T \mid T$

 $T \rightarrow TF \mid F$

 $F \rightarrow F* |a|b$

Compute the following,

(i) FIRST() and FOLLOW()

(ii) Set of LR(0) items

(iii) SLR parsing table.

(10 Marks)

OR

8 a. Compute the following for the given grammar.

 $S \rightarrow AA$

 $A \rightarrow a \mid b$

(i) LR(1) items (ii) Canonical Parsing table (iii) Verify for any valid string. (10 Marks)

b. Write a short note on shift reduce parsing with an example.

(06 Marks)

Module-5

9 a. Write the annotated parse tree and its syntax directed definition to obtain

1 * 2 * 3 * (4 + 5)n for the grammar

 $L \rightarrow En$

 $E \rightarrow E + T \mid T$

 $T \rightarrow T * F \mid F$

 $F \rightarrow (E) \mid digit$

(06 Marks)

b. Translate the arithmetic expression:

a * -(b + c) into

(i) Quadruples (ii) Triples (iii) Indirect triples

(06 Marks)

c. Discuss various issues in the design of code generation.

(04 Marks)

OR

 a. By considering an array type int[3][3], write syntax directed translation with semantic rules and its annotated parse tree. (06 Marks)

b. Obtain the directed acyclic graph for the expression x + x * (y + z) + (y + z) * w, along with the steps

c. Generate assembly level language code (target code) for the following three address sequence assuming that p and q are in memory locations:

y = *q

q = q + 4

*p = y

p = p + 4

(04 Marks)

2 of 2