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Fifth Semester B.E. Degree Examination, Dec.2013/Jan.2014
System Software

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART - A

- 1 a. Bring out the differences between application software and system software. (04 Marks)
 b. Write programs in both SIC and SIC/XE to copy a character string 'System Software' to another string. (06 Marks)
 c. Explain the following with reference to SIC / XE machine architecture:
 i) Instruction formats.
 ii) Addressing mode.
 iii) Data formats.
 iv) Register organization. (10 Marks)

- 2 a. Explain the different data structures used in two pass assembler. Mention clearly their functions in Pass 1 and Pass 2. (06 Marks)
 b. What is the need of pass 2 assembler? Reason out with a simple example. (04 Marks)
 c. Generate the object code and complete object program for the following SIC/XE program. (10 Marks)

SUM	START	0	OPCODES
FIRST	LDX	#0	LDX -04
	LDA	#0	LDA -00
	+LDB	#TABLE2	LDB -68
	BASE	TABLE2	ADD -18
LOOP	ADD	TABLE, X	TIX -2C
	ADD	TABLE2, X	JLT -38
	TIX	COUNT	STA -0C
	JLT	LOOP	RSUB -4C
	+STA	TOTAL	
	RSUB		
COUNT	RESW	1	
TABLE	RESW	2000	
TABLE	RESW	2000	
TOTAL	RESW	1	
	END	FIRST	

- 3 a. With suitable example, explain the use of LTORG assembler directive. (04 Marks)
 b. Differentiate between program blocks and control sections. Explain how control sections are processed. (08 Marks)
 c. Discuss how forward references are handled by multi-pass assembler. Show step by step procedure to evaluate the following statements. Show the symbol table after each scan.
 1. NUMB EQU MAXLEN/2
 2. MAXLEN EQU BEND-BUF
 3. PREVB EQU BUF-1
 4. BUF RESB 4096
 5. BEND EQU *

Assume the value for location counter as 1034 (H) at line number 4.

(08 Marks)

- 4 a. Explain with an algorithm the working of an absolute loader. (06 Marks)
 b. Distinguish between linking loader and linkage editor. (04 Marks)
 c. What are the major data structures required for linkage loader? Write and explain the algorithm for pass 1 of linking loader. (10 Marks)

PART – B

- 5 a. What is an interactive editor? List the four tasks performed by document linking process in an interactive system. (04 Marks)
 b. Explain briefly structure of a typical editor with the help of a block diagram. (10 Marks)
 c. Discuss briefly the following debugging functions:
 i) Break points.
 ii) Tracing.
 iii) Trace back. (06 Marks)

- 6 a. Explain with an example the various data structures required for the design of a macro processor. (08 Marks)
 b.

```
SUM MACRO &ID
    LDA    X&ID→1
    ADD    X&ID→2
    STA    X&ID→5
MEND
```

Expand the following macro invocation statement using the above given macro:

- i) SUM BEETA ii) SUM A (04 Marks)
 c. Explain the advantages and disadvantages of general purpose macro processors. (08 Marks)
- 7 a. Explain with an example the structure of lex program. (08 Marks)
 b. Define regular expression. Give regular expression for the following:
 i) • ii) * iii) ^ iv) \$ v) { } vi) ? (04 Marks)
 c. Write a lex program to count the vowels and consonants in a given string. (08 Marks)

- 8 a. What is shift/reduce parsing? Explain the parsing for the string "fred = 12 + 13" using the following grammar.
 Statement → NAME = expression
 Expression → NUMBER + NUMBER / NUMBER - NUMBER (10 Marks)
 b. Write a Yacc program to recognize the validity of an arithmetic expression that uses +, -, * and /. (10 Marks)
