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Question Paper Code : P 1202

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Seventh Semester

Information Technology

CS 1203 — SYSTEM SOFTWARE

(Common to Third Semester - Computer Science and Engineering and Information Technology)

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Can an assembler have a single pass? What are the advantages and limitations?

2. List any four addressing modes of SIC/XE.

3. What is the need for a modification record? Give its format for SIC/XE.

4. What are the functions of EXTREF and BASE assembler directives?

5. What is a literal?

6. Distinguish between program blocks and control sections.

7. How does the assembler assist in handling relocation?

8. Distinguish between a subprogram and a macro.

9. Can we use labels while defining macros? Justify.

10. List down the main functions accomplished by a typical editor.

PART B — (5 × 16 = 80 marks)

11. (a) Discuss the SIC/XE architecture, explaining in detail the data and instruction formats.

Or

(b) Generate the object code for the following SIC/XE source program

Label	Operation	Operand	Opcode
TOTAL	START	0	
FIRST	LDX	#0	04
	LDS	#3	6C
	LDT	#300	74
	LDA	#0	0[illegible]
	+LDB	#TABLE2	[illegible]8
	BASE	TABLE2	
LOOP	ADD	TABLE, X	18
	ADD	TABLE2, X	18
	ADDR	S, X	90
	COMPR	X, T	A0
	JLT	LOOP	38
	+STA	TOTAL	0C
	RSUB		4C
COUNT	RESW	1	
TABLE	RESW	2000	
TABLE2	RESW	2000	
TOTAL	RESW	1	
	END	FIRST	

12. (a) Discuss the detailed design of pass 1 of a two-pass assembler. Mention clearly the formats of the data structures used. What are the assembler directives that are handled in pass 1?

Or

(b) What is a single pass assembler? Discuss the detailed design of such an assembler.

13. (a) Discuss the detailed design of a linking and relocating loader. Mention clearly the formats of the data structures used. Indicate the inputs taken and the outputs generated.

Or

(b) Consider the following SIC/XE :

```
0000        PROGA START     0
                            EXTDEF DATA_1A, DATA_2A
                            EXTREF DATA_1B, DATA_2B
0050        REF1            LDA    DATA_1A-64
0090        DATA_1A         EQU    *
00C2        DATA_2A         EQU    *
00D0        REF2            WORD DATA_1B + DATA_2B-20
            END             REF1
```

```
0000        PROGB START     0
                            EXTDEF DATA_1B, DATA_2B
                            EXTREF DATA_1A, DATA_2A
0030        REF1            +LDA   DATA_1A-64
0080        DATA_1B         EQU    *
00A5        DATA_2B         EQU    *
00C8        REF2            WORD DATA_1B + DATA_2B-20
            END
```

The opcode for LDA is 00. Show the object programs generated by the assembler for these two programs. Show how these two programs will appear in memory after linking and loading, assuming the program starting address is 5000.

14. (a) Discuss in detail the algorithm for a two-pass macro processor along with the data structures used.

Or

(b) Write notes on the following :

(i) Macro within macro (8)

(ii) MASM Macro Processor. (8)

15. (a) What is a text editor? Discuss clearly the design of the functional components of a text editor.

Or

(b) List down the options provided by any debugger that you have used. Discuss briefly the possible design of this debugger.

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