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10CS52

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 system software and application softwares, with examples. **(04 Marks)**

b. Explain the SIC / XE machine architecture in detail. **(12 Marks)**

c. Suppose that RECORD contains a 100 byte record. Write a subroutine for SIC / XE that will write this record onto device F1. Use immediate addressing and register-to-register instructions to make the subroutine as efficient as possible. **(04 Marks)**

2 a. Write and explain the algorithm for a PASS-1 of a two-pass assembler. **(10 Marks)**

b. Generate the complete object program for the source program given below:

```
SUM     START   0
FIRST   LDX     #0
        LDA     #0
        +LDB    #TABLE2
        BASE    TABLE2
LOOP    ADD     TABLE, X
        ADD     TABLE2, X
        TIX     COUNT
        JLT     LOOP
        +STA    TOTAL
        RSUB
COUNT   RESW    1
TABLE   RESW    2000
TABLE2  RESW    2000
TOTAL   RESW    1
        END     FIRST
```

Assume the below opcodes for mnemonics. **(10 Marks)**

Mnemonic	Opcode
ADD	18
JLT	38
LDA	00
LDB	68
LDX	04
RSUB	4C
STA	0C
TIX	2C

3 a. Distinguish between literal and immediate operands. How does the assembler handle the literal operands? **(05 Marks)**

3 b. Assuming the following symbol table definitions:

Symbol	Type
BUFFER	Relative
FIRST	Relative
MAXLEN	Absolute
LENGTH	Relative
BUFEND	Relative

Classify the following into absolute, relative or neither absolute nor relative expressions:

(i) BUFFER – FIRST (ii) BUFFER + 4095
(iii) MAXLEN – 1 (iv) BUFFER + MAXLEN – 1
(v) BUFFER – MAXLEN (vi) 2 * LENGTH
(vii) 2 * MAXLEN – 1 (viii) MAXLEN – BUFFER
(ix) FIRST + BUFFER (x) FIRST – BUFFER + BUFEND **(05 Marks)**

c. Give the formats of the following records:
(i) Define record (ii) Refer record **(04 Marks)**

d. Write the schematic of symbol table entries that shows how multipass assembler handles the following forward references:

```
1  HALFSZ   EQU   MAXLEN / 2
2  MAXLEN   EQU   BUFEND – BUFFER
3  BUFFER   RESB  2048
4  BUFEND   EQU   *
```

Assume that when line 3 is read, the location counter contains the hexadecimal value 750. **(06 Marks)**

4 a. Write the SIC/XE source code for a simple bootstrap loader. **(07 Marks)**
b. Explain dynamic linking with suitable diagrams. **(07 Marks)**
c. Explain the facilities available in MS-DOS linker for program linking. **(06 Marks)**

PART – B

5 a. With a neat diagram, explain the structure of a text editor. **(10 Marks)**
b. Explain the debugging functions and capabilities of an interactive debugging system. **(06 Marks)**
c. Write a note on the concept of user-interface criteria in a text editor. **(04 Marks)**

6 a. Explain the various data structures used in the implementation of a macro processor. **(08 Marks)**
b. Explain the following machine-independent macro processor features with examples:
(i) Concatenation of macro parameters.
(ii) Generation of unique labels.
(iii) Keyword macro parameters. **(12 Marks)**

7 a. Explain the communication between the Parser and Lexer with a neat block diagram. **(05 Marks)**
b. What is a regular expression? Explain the various regular expressions in UNIX with examples for each. **(10 Marks)**
c. Write a LEX program to count the number of vowels and consonants in a given string. **(05 Marks)**

8 a. Explain the structure of a YACC program. **(06 Marks)**
b. Write a YACC program to recognize an arithmetic expression involving operators +, – , * and /. **(08 Marks)**
c. What is shift / reduce parsing? Explain with an example. **(06 Marks)**

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