CS5T2

Reg. No. | | | | | | | | | | |

Fifth Semester B.E. Degree Examination, January/February 2003

Computer Science and Engineering

System Software

Time: 3 hrs.] [Max.Marks : 100

Note: ***Answer any FIVE full questions.***

1. (a) Bring out the difference between system software and application software. (4 Marks)

   (b) Explain SIC/XE machine instruction formats and all addressing modes, clearly indicating setting of flag bits. (10 Marks)

   (c) With reference to pentium pro architecture explain
   i) Registers
   ii) Memory
   iii) Instruction set

2. (a) What are Assembler Directives? Explain START and LTORG. (6 Marks)

   (b) Briefly explain data structures required for a simple Assembler. (4 Marks)

   (c) Generate object code for the below SIC/XE assembly language program. Also show the contents of symbol table at the end of Assembly process. (6 Marks)

```
SUM     START   4000
        LDX     # 0
        LDA     # 0
        BASE    COUNT
        ADD     TABLE, X
        TIX     COUNT
        JLT     LOOP
+       STA     TOTAL
        RSUB
TOTAL   RESW    1
TABLE   RESW    4000
COUNT   RESW    1
        END
```

Assume below OP codes (all in hexadecimal)

LDX - 04	JLT - 38
LDA - 00	STA - 0C
ADD - 18	RSUB - 4C
TIX - 2C	

3. (a) Explain different methods for specifying relocation as a part of object program. (10 Marks)

   (b) Explain Dynamic linking. (6 Marks)

   (c) Write the algorithm for 2 - pass linking loader. (4 Marks)

4. (a) Write the algorithm for 1 - pass macro processor. (10 Marks)

   (b) Using the following macro definition, expand the 2 macro calls, which are called in a sequence. (10 Marks)

Contd.... 2

```
i)              RDBUFF   F1, BUFFER, LENGTH, 00, 1024
ii)  LOOP       RDBUFF   F2, BUFFER, LTH
RDBUFF          MACRO & INDEV, & BUFADR, & RECLTH,
                & EOR, & MAXLTH
                IF (& FOR NE")
&EORCK          SET   1
                ENDIF
                CLEAR   X
                CLEAR   A
                IF   ( & EORCK  = EQ  1)
                LDCH    = X'& FOR'
                RMO   A,S
                ENDIFF
                IF (& MAXLTH  EQ ")
           +    LDT    # 4096
                ELSE
           +    LDT    # MAXLTH
                ENDIF
$ LOOP          TD     = X'& INDEV'
                JEQ    $ LOOP
                RD     = X '& INDEV'
                IF    (& EORCK  EQ  1)
                COMPR    A, S
                JEQ    $ EXIT
                ENDIF
                STCH    & BUFADR, X
                TIXR    T
                JLT    $ LOOP
$ EXIT          STX    & RECLTH
                MEND
```

(10 Marks)

5. (a) Explain lexical phase of a compiler. (6 Marks)

(b) Explain operator precedence parser. (6 Marks)

(c) Write Recursive Descent Parser Procedure for write statement, whose grammar is

$$< write > \quad ::= WRITE(< id - list >)$$
$$< id - list > \quad ::= id\{, id\}$$

(8 Marks)

6. (a) Explain different machine-dependent code optimization techniques. (10 Marks)

(b) How does a compiler deal with Block structured languages. (10 Marks)

7. (a) With a neat diagram, explain the structure of a text editor. (10 Marks)

(b) Explain lex and yace tools. Write a lex program to count the number of signed integers and fractions. (10 Marks)

8. Write short notes on:

(a) One-pass Assembler

(b) Linkage Editor

(c) Debugging facilities in text editor

(d) P-code compiler.

(5×4=20 Marks)

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CS5T2

USN | | | | | | | | | | |

Fifth Semester B.E. Degree Examination, July/August 2003

Computer Science and Engineering

System Software

Time: 3 hrs.] [Max.Marks : 100

Note: ***Answer any FIVE full questions.***

1. (a) Differentiate between CISC and RISC machine architecture. (4 Marks)

   (b) Explain the register organization, data formats, instruction formats and addressing modes of SIC/XC machine architecture (8 Marks)

   (c) Explain the memory, addressing modes, instruction set and data formats of cray T3E architecture. (8 Marks)

2. (a) What are the assembler directives? (3 Marks)

   (b) Write on algorithm for pass 1 of two pass assembler. (10 Marks)

   (c) Explain the program relocation with an example. (7 Marks)

3. (a) Explain a simple bootstrap loader. (10 Marks)

   (b) Write an algorithm for pass 2 of linking loader. (10 Marks)

4. (a) Explain the concept of dynamic linking. (10 Marks)

   (b) Explain the term linkage editors with example. (10 Marks)

5. (a) Explain any two machine independent macro processor features. (10 Marks)

   (b) Explain the general purpose macro processors. (10 Marks)

6. (a) Explain the lexical analysis phase of compiler with suitable example. (10 Marks)

   (b) Explain the operator - procedence parsing with an example. (10 Marks)

7. (a) Explain the concept of storage allocation. (10 Marks)

   (b) Explain the block-structured languages. (10 Marks)

8. (a) Explain the general format of lex source with example. (8 Marks)

   (b) Write a lex program that histograms the lengths of words, where a word is defined as a string of letters. (6 Marks)

   (c) Write a short note on "Yacc" (6 Marks)

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CS5T2

USN | | | | | | | | | | |

Fifth Semester B.E. Degree Examination, July/August 2004

Computer Science and Engineering

System Software

Time: 3 hrs.] [Max.Marks : 100

Note: *Answer any FIVE full questions.*

1. (a) Briefly explain the instruction formats and addressing nodes of SIC/XE computing system. (8 Marks)

   (b) Develop an assembly level program for SIC/XE machine to sort the array elements in the descending order. Assume the array of 100 words. (7 Marks)

   (c) Enlist and discuss the features of power PC architecture. (5 Marks)

2. (a) Discuss the program or the algorithm of a bootstrap loader. (10 Marks)

   (b) Describe how relocation is accomplished using the following:
   i) Modification records ii) Bit masks. (10 Marks)

3. (a) Discuss the need for a two pass assembler and explain the functions performed. (8 Marks)

   (b) Write an explanatory note on 'SUN OS LINKER'. (6 Marks)

   (c) Explain in brief, the capabilities of inter active system and explain debugging. (6 Marks)

4. (a) Describe the important features of the Microsoft MS-DOS linker for pentium and X86 systems. (10 Marks)

   (b) List four significant tasks to be performed by a text editor for an interactive user computer dialogue and explain. (6 Marks)

   (c) Briefly explain the aspect of user interface criteria in a text editor. (4 Marks)

5. (a) Describe any two machine independent macro processor features. (10 Marks)

   (b) Explain the general purpose macro processors. (10 Marks)

6. (a) Briefly discuss the different machine dependent code optimization techniques. (10 Marks)

   (b) Describe how a compiler deals with block structured languages. (10 Marks)

Contd.... 2

7. (a) Discuss about the structure of lex and yacc programs. (6 Marks)

(b) Develop a lex program to validate an indentifier for any programming language that you are familiar with. (7 Marks)

(c) Write a yacc program to evaluate the arithmetic expressions. Consider all possible cases. (7 Marks)

8. Write short notes on the following : (5×4=20 Marks)

i) ALX assembler

ii) Debugging facilities in text editor

iii) ELENA macro processor

iv) P-Code compiler

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NEW SCHEME

CS51

USN

Fifth Semester B.E. Degree Examination, July/August 2005

Computer Science / Information Science and Engineering

System Software

Time: 3 hrs.] [Max.Marks : 100

Note: ***Answer any FIVE full questions.***

1. (a) Explain data format, instruction format and addressing modes of SIC/XE machine architecture. (10 Marks)

   (b) What are the fundamental functions that any assembler must perform? With suitable example explain any six assembler directives. (10 Marks)

2. (a) Explain the two major internal data structures used in simple assemblers. Give reason for using that data structures. (10 Marks)

   (b) With required data structures & processing logic, explain the implementation of litarals within an assembler. (10 Marks)

3. (a) Explain the structure and design of one pass assemblers. (10 Marks)

   (b) Explain the two methods for specifying relocation as a part of object program. (10 Marks)

4. (a) What do you mean by dynamic linking? Explain the process of loading and calling of subroutine using dynamic linking. (10 Marks)

   (b) What is an interactive editor? Explain the structure of a typical editor. (10 Marks)

5. (a) Explain the different debugging functions and debugging capabilities. (10 Marks)

   (b) What is the work of microprocessors? Explain the basic concept of macro processing. (10 Marks)

6. (a) Explain the basic functions of a simple one-pass compiler in brief. (10 Marks)

   (b) What is compiler - compilers? Explain the process of using typical compiler-compiler. Mention advantages & disadvantages. (10 Marks)

Contd.... 2

7. (a) What is a regular expression? Briefly explain all the characters that form regular expression. **(14 Marks)**

   (b) Explain the three basic sections of lex program. **(6 Marks)**

8. Write a short note on the following :

   a) RISC V/s CISC

   b) SPARC assembler

   c) Bootstrap loaders

   d) Block structured languages **(4×5=20 Marks)**

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CS5T2

USN | | | | | | | | | | |

Fifth Semester B.E. Degree Examination, July/August 2005

Computer Science and Engineering

(Old Scheme)

System Software

Time: 3 hrs.] [Max.Marks : 100

Note: ***Answer any FIVE full questions.***

1. (a) Compare systems software and application software. Give couple of examples. (5 Marks)

   (b) Briefly discuss the various registers available in SIC/XE machine architecture. (5 Marks)

   (c) List different addressing modes used in SIC/XE. Give instructions for each and explain the addressing mode. (10 Marks)

2. (a) Compare CISC of RISC system ? Give examples for each type. (6 Marks)

   (b) Explain the following with respect to SPARC machine. i) overlap windows ii) data format iii) Addressing modes. (10 Marks)

   (c) List the register set of pentium Pro architecture. (4 Marks)

3. (a) What are the data structures used in Pass - 1 of a two pass assembler ? List the permanent and temporary databases. (10 Marks)

   (b) What is the displacement possible in case of base relative and PC relative addressing mode ? Why is this restriction ? (6 Marks)

   (c) What are the differences between literal and immediate operand ? How assembler does handle literal operand ? (4 Marks)

4. (a) Write two pass assemble algorithm. Mention some of the factors that are not considered in your algorithm. (10 Marks)

   (b) What is relocatable program ? Are all programs relocatable ? Give example and explain the way in which relocation operation takes place. (10 Marks)

5. (a) Write the difference between a linkage editors and a linkage loader. (5 Marks)

   (b) Write a Bootstrap loader program for SIC/XE system. Write comments to explain the program. (10 Marks)

   (c) Explain how relocation is indicated by mask bit. (5 Marks)

6. (a) Write a macro program to save the contents of all the registers. Write the main program to call the above macro. Show also the macro expansion. (10 Marks)

   (b) Write an algorithm for recursive descent parse of a Pascal READ statement. (10 Marks)

Contd.... 2

7. (a) Suppose the rules of the grammar for $< exp >$ *and* $< term >$ is as follows :

$$< exp > \quad ::= < term > | \quad < exp > * < term > | < exp > \quad Div < term >$$
$$< term > \quad ::= < factor > | \quad < term > + < factor > | < term > \quad - < factor >$$

Draw the parse trees for the following :

i) $A1 + B1$ ii) $A1 - B1{*}G1$ iii) $A1 + DIV(B1 + G1) - D1$ **(10 Marks)**

(b) What is the advantage of P-Code Compilers ? **(5 Marks)**

(c) What are the differences between interpreters and compilers ? **(5 Marks)**

8. (a) Give the general format of LEX program and expalin. **(5 Marks)**

(b) Write a LEX source program that finds the length of words, where word is defined as a string of letters. **(5 Marks)**

(c) List the Debuggers Use - Interface criteria. **(5 Marks)**

(d) Write short notes on Text command oriented method. **(5 Marks)**

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CS51

NEW SCHEME

Reg. No. | | | | | | | | | | |

Fifth Semester B.E. Degree Examination, January/February 2006

Computer Science/Information Science and Engineering

Systems Software

Time: 3 hrs.) (Max.Marks : 100

Note: ***Answer any FIVE full questions.***

1. **(a)** With reference to SIC/XC machine architecture explain
   i) Instruction formats ii) addressing modes
   iii) Data formats ii) Register organisation **(10 Marks)**

   (b) Differentiate between CISC and RISC machine architecture. **(4 Marks)**

   (c) Suppose that ALPHA is an array of 100 words. Write a sequence of instruction for SIC/XC to set all 100 elements of the array to 0. Use immediate addressing and register to register instructions to make process as efficient as possible. **(6 Marks)**

2. **(a)** What are assembler directives? Give examples. **(2 Marks)**

   (b) Explain the algorithm for one pass of two pass assembler. **(10 Marks)**

   (c) What is the need for relocation of the program? With an example explain how relocation can be done. **(8 Marks)**

3. **(a)** Briefly explain a simple boot-strap loader with an algorithm. **(8 Marks)**

   (b) Explain with example the data structures used for a linking loader. **(6 Marks)**

   (c) With sketch explain how object program can be processed using linkage editor. **(6 Marks)**

4. **(a)** List the different tables used for a macro processor. Explain their functions. **(6 Marks)**

   (b) With an example explain conditional macro expansion. **(6 Marks)**

   (c) Write a note on processing macro within language translators. **(8 Marks)**

5. **(a)** With suitable example explain lexical analysis phase of a compiler. **(10 Marks)**

   (b) Describe the code generation for a read statement. **(10 Marks)**

6. **(a)** Explain the structure of lex program with example. **(6 Marks)**

   (b) Write a YACC program to recognize the grammar $a^n b^n / n > 0$. **(8 Marks)**

   (c) Explain with an example reduce-reduce conflicts and shift reduce conflicts. **(6 Marks)**

Contd.... 2

7. (a) Write a note on P-code complier. **(6 Marks)**

(b) List the important tasks to be accomplished by a text editor for an interactive user - computer dialogue. **(4 Marks)**

(c) With figure explain the structure of an editor. **(10 Marks)**

8. Write short notes on :

(a) SPARC assembler

(b) Program blocks

(c) MASM macro processor

(d) Dynamic linking. **(5×4=20 Marks)**

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