Total Pages:2

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: CS303

Course Name: SYSTEM SOFTWARE (CS)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1. Explain the instruction format and addressing modes of SIC. (3)
2. Explain program relocation with an example. (3)
3. Write a sequence of instructions for SIC/XE to divide BETA by GAMMA and to store the integer quotient in ALPHA and remainder in DELTA. (3)
4. Describe the data structures used in the two pass SIC assembler algorithm. (3)

PART B

Answer any two full questions, each carries 9 marks.

5. a) What are assembler directives? List any three assembler directives in SIC machine. (4)
   b) Give the algorithm for pass 1 of a two pass SIC assembler. (5)

6. a) Describe the format of object program generated by the two-pass SIC assembler algorithm. (4)
   b) Let NUMBERS be an array of 100 words. Write a sequence of instructions for SIC to set all 100 elements of the array to 1. (5)
7. a) Write notes on the architecture of SIC/XE (4)
   b) Explain with suitable examples, how the different instruction formats and addressing modes of SIC/XE are handled during assembling. (5)

PART C

Answer all questions, each carries 3 marks.

8. Give the algorithm for an absolute loader. (3)
9. Explain the format and purpose of Define and Refer records in the object program. (3)
10. Differentiate between linking loaders and linkage editors. (3)
11. Write short notes on MASM assembler. (3)

PART D

Answer any two full questions, each carries 9 marks.

12. a) Explain the concept of single pass assembler with a suitable example. (5)
    b) Write notes on machine independent loader features. (4)
13. a) How are control sections different from program blocks? Explain, with proper examples, the purpose of EXTREF and EXTDEF assembler directives. (4)
    b) Describe the data structures used for the linking loader algorithm. Give the algorithm for pass 1 of the linking loader. (5)

14. a) Explain, with examples, the working of a multi pass assembler. (5)
    b) Write notes on the different loader design options. (4)

PART E

Answer any four full questions, each carries 10 marks.

15. a) Explain the concept of macro definition and expansion with the help of examples. (5)
    b) Write notes on the user interface of a text editor. (5)
16. a) Describe the data structures used in a one pass macro processor algorithm. (3)
    b) Give the algorithm for a one pass macro processor. (7)
17. a) Explain conditional macro expansion with an example. (5)
    b) Explain the structure of a text editor with the help of a diagram. (5)
18. a) Write notes on the debugging functions and capabilities of an interactive debugging system. (5)
    b) Differentiate between character and block device drivers. (5)
19. a) Give the general design of a device driver. (5)
    b) Explain recursive macro expansion with example. (5)
20. a) Describe any two commonly used debugging methods. (5)
    b) Write notes on keyword macro parameters, giving suitable examples. (5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: CS303

Course Name: SYSTEM SOFTWARE (CS)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks Marks

1		Write notes on SIC machine architecture.	(3)
2		Explain the syntax of the records in the Object Program File.	(3)
3		What are assembler directives? List out any five assembler directives in SIC.	(3)
4		Explain the different data structures used in the implementation of Assemblers.	(3)

PART B

Answer any two full questions, each carries 9 marks

5	a)	Briefly discuss the architecture of SIC/XE machine.	(5)
	b)	Write a subroutine for SIC/XE that will read a record into a buffer. The record may be any length from 1 to 100 bytes. The end of record is marked with a "null" character (ASCII code 00). The subroutine should place the length of the record read into a variable named LENGTH. Use immediate addressing and register-to-register instructions to make the process as efficient as possible.	(4)
6		Explain the two passes of the assembler algorithm with proper example.	(9)
7	a)	With suitable example, explain the concept of Program Relocation.	(5)
	b)	List out the basic functions of Assemblers with proper examples.	(4)

PART C

Answer all questions, each carries 3 marks

8		What is a Literal? How is a literal handled by an assembler?	(3)
9		Explain the algorithm for an absolute loader.	(3)
10		Write notes on Multi pass assemblers.	(3)
11		What is Automatic Library Search.	(3)

PART D

Answer any two full questions, each carries 9 marks

12	a)	With example, write notes on Program Blocks.	(5)
	b)	What is a forward reference? How are forward references handled by a single pass assembler?	(4)
13		With the data structures used, state and explain two pass algorithm for a linking loader.	(9)
14	a)	Explain how external references are handled by an assembler.	(5)
	b)	What is Dynamic Linking? Explain with example.	(4)

PART E

Answer any four full questions, each carries 10 marks

15		Explain the Macroprocessor algorithm.	(10)
16	a)	What are the different data structures used in the implementation of the Macroprocessor algorithm? Give examples.	(5)
	b)	Write notes on Recursive Macro Expansion.	(5)
17	a)	How are unique labels generated in a Macro Expansion?	(5)
	b)	Explain Conditional Macro Expansion with an example.	(5)
18	a)	Explain the general design of device driver.	(5)
	b)	Differentiate between Character and Block Devices.	(5)
19	a)	Explain the different types of Text Editors and User Interface.	(5)
	b)	Explain Editor structure in detail with neat figures.	(5)
20	a)	What is a Debugger?	(4)
	b)	Explain the different debugging methods in detail.	(6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CS303

Course Name: SYSTEM SOFTWARE

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1		Write a sequence of instructions for SIC to set ALPHA = BETA*9+GAMMA.	(3)
2		List out the various registers used in SIC along with their purpose.	(3)
3		What is meant by forward reference? How it is resolved by two pass assembler?	(3)
4		Write down the format of Modification record. Describe each field with the help of an example.	(3)

PART B

Answer any two full questions, each carries 9 marks.

5		What are the various addressing modes supported by SIC/XE? With the help of an example, explain how to find target address during assembling in each case.	(9)
6	a)	Distinguish between Application software and System Software	(3)
	b)	Let A,B & C are arrays of 10 words each. Write a SIC/XE program to add the corresponding elements of A & B and store the result in C.	(6)
7	a)	What are the functions of Operating System?	(3)
	b)	With the aid of an algorithm explain the Second pass of a Two Pass Assembler.	(6)

PART C

Answer all questions, each carries 3 marks.

8		What are control sections? What is the advantage of using them?	(3)
9		Given an idle computer with no programs in memory, how do we get things started?	(3)
10		What are the uses of assembler directives EXTDEF and EXTREF?	(3)
11		What is the use of bitmask in program relocation?	(3)

PART D

Answer any two full questions, each carries 9 marks.

12	a)	Distinguish between Program Blocks and Control Section	(2)
	b)	How the assembler handles multiple Program blocks?	(7)
13	a)	Write short note on Dynamic Linking	(3)

	b)	Explain the algorithm for Pass 1 of Linking Loader.	(6)
14	a)	List and explain the different machine independent features of loaders	(3)
	b)	Explain the working of any one type of One pass Assembler	(6)

PART E

Answer any four full questions, each carries 10 marks.

15	a)	Differentiate between keyword and positional macro parameters.	(3)
	b)	Explain the working of One pass Macro Processor.	(7)
16	a)	Is it possible to include labels in the body of macro definition? Justify your answer.	(6)
	b)	Write short note on concatenation of macro parameters within a character string.	(4)
17		Explain the different types of conditional macro expansion statements and their implementation with examples.	(10)
18	a)	Draw the structure of a typical text editor and describe the functions of each block.	(8)
	b)	List out the main four tasks associated with the Document Editing Process.	(2)
19	a)	Describe the functions and capabilities of an Interactive debugging system.	(6)
	b)	List out the criteria that should be met by the user interface of an efficient debugging system.	(4)
20	a)	What is a Device Driver? What are the major design issues of a Device Driver?	(5)
	b)	Distinguish between Character and Block Device drivers.	(5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: CS303

Course Name: SYSTEM SOFTWARE

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks.

			Marks
1		Explain three functions of Operating System	(3)
2		Write a sequence of instructions for SIC/ XE to find the average of three numbers, BETA, GAMMA and DELTA.	(3)
3		Explain the format of the object program generated by a two-pass SIC Assembler, highlighting the contents of each record type.	(3)
4		Explain the data structures used and their purposes in a two-pass assembler.	(3)

PART B

Answer any two full questions, each carries9 marks.

5		Compare the features of Standard SIC and SIC/XE architecture.	(9)
6	a)	Explain assembler directives. List any four assembler directives in SIC machine.	(5)
	b)	Explain the concept of program relocation with an example.	(4)
7		Write the algorithms for Pass 1 and Pass 2 of a two-pass assembler	(9)

PART C

Answer all questions, each carries3 marks.

8		Differentiate Define record and Refer record.	(3)
9		Explain how forward references are resolved during program assembling in a single pass assembler.	(3)
10		Give the absolute loader algorithm.	(3)
11		Explain the concept of Automatic Library Search.	(3)

PART D

Answer any two full questions, each carries9 marks.

12		Differentiate Program Blocks and Control Sections. Explain how address calculation is performed in the case of Program Blocks.	(9)
13	a)	Explain the working of Multipass Assemblers with an example.	(5)

	b)	Explain Dynamic Linking with an example	(4)
14		Which are the data structures used during the operation of a linking loader? Write the algorithm for Pass 2 of a Linking Loader	(9)

PART E

Answer any four full questions, each carries10 marks.

15	a)	A code segment need to be repeatedly used in various parts of assembly language program and fast execution is also needed. Would you use a macro or a subroutine? Justify your answer with help of examples.	(5)
	b)	List and explain the different design options available for macroprocessors.	(5)
16		Certain macro processor features are independent of the machine architecture. Give the details of such machine independent macro-processor features.	(10)
17		Write the algorithm for one pass macro processor and explain the process, showing when and how the different data structures are used.	(10)
18		Using a neat diagram, explain the structure of a text editor.	(10)
19		A new hardware device is plugged into a system. Which is the appropriate system software needed for the proper working of the new hardware? Give its functionalities and general architecture.	(10)
20		Write down the situations where debugging by induction, deduction and backtracking are used, explaining each process.	(10)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

Course Code: CS303

Course Name: SYSTEM SOFTWARE

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks.

			Marks
1		Distinguish between an assembler and a compiler. Which are the different types of compilers?	(3)
2		Briefly describe the format of object program generated by SIC assembler.	(3)
3		'System Software is machine dependent'. Justify the statement.	(3)
4		What are the uses of OPTAB and SYMTAB during the assembling process? Specify the uses of each during pass 1 and pass2 of a two pass assembler.	(3)

PART B

Answer any two full questions, each carries9 marks.

5	a)	List out the differences between system software and application software.	(4)
	b)	Design an algorithm for performing the pass 1 operations of a two pass assembler.	(5)
6	a)	List and explain the different addressing modes and instruction formats used in SIC/XE architecture.	(5)
	b)	Describe in detail about any 4 system softwares.	(4)
7	a)	What will happen if a SIC program is loaded in a location different from the starting address specified in the program? Will the program work properly? Justify your answer.	(3)
	b)	Explain program relocation with examples. Is there a need to use modification records for the given SIC/XE program segment? Explain your answer. If yes, show the contents of modification record.	(6)

```
0000  COPY      START   0
.....................................................
0006              +JSUB   RDREC
000A              LDA     LENGTH
.....................................................
0033  LENGTH    RESW    1
.....................................................
1036  RDREC     CLEAR   X
```

PART C

Answer all questions, each carries3 marks.

8		Explain the format of Define and Refer Records. What are their uses?	(3)
9		What is a multi pass assembler? Explain with the help of an example, a situation	(3)

where we would need such an assembler.

10 Design an algorithm for an absolute loader. (3)

11 Differentiate between linking loader and linkage editor. (3)

PART D

Answer any two full questions, each carries9 marks.

12 a) Describe the concept of program blocks with a proper example. (4)

b) Explain the working of a single pass assembler with an example. (5)

13 a) Justify the need for having two passes in a linking loader. Illustrate the data structures used for a linking loader, showing how they are used in each pass. (4)

b) Give the algorithm for pass 2 of a linking loader. (5)

14 a) List and explain the different machine independent loader features. (4)

b) What are control sections? Illustrate with an example, how control sections are used and linked in an assembly language program. (5)

PART E

Answer any four full questions, each carries10 marks.

15 a) Differentiate between character and block device drivers. (4)

b) Explain the structure of text editor with the help of a diagram. (6)

16 a) What are the data structures required for a macroprocessor algorithm? Explain the format of each. (4)

b) Design an iterative algorithm for a one pass macroprocessor. (6)

17 a) List and explain the different debugging techniques. (5)

b) Write notes on conditional macro expansion. (5)

18 a) Differentiate between a macro and a subroutine. Illustrate macro definition and expansion using an example. (5)

b) Describe the user interfaces used in a text editor. (5)

19 Explain the general design and anatomy of a device driver with the help of diagrams. (10)

20 a) What do you mean by recursive macro expansion? What are the possible problems associated with it? (5)

b) Is it possible to use labels within the macro body? Explain your answer with the help of examples. Also illustrate a possible solution for the same. (5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth semester B.Tech degree examinations (S) September 2020

Course Code: CS303

Course Name: SYSTEM SOFTWARE

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1 Distinguish between interpreter and compiler. (3)

2 Explain how floating point numbers are represented in SIC/XE. (3)

3 List the basic assembler functions. (3)

4 Consider the statements in SIC program. Consider the program being assembled using a 2 pass assembler. (3)

Line no	Location	Label	Opcode	Operand
10	1000	LENGTH	RESW	4
20	----------	NEW	WORD	3

What will be the address value assigned to the symbol NEW during pass 1?

PART B

Answer any two full questions, each carries 9 marks.

5 a) What is the difference between the instructions LDA #5 and LDA FIVE? Explain how each instruction is executed. (3)

b) Design an algorithm for pass 1 operations of a two pass assembler for SIC architecture. (6)

6 a) Compare the following with reference to SIC and SIC/XE machines: (4)

i. Memory

ii. Instruction format

b) Suppose the address associated with the symbol RETADR is 0030 and the machine equivalent code for STL is 14. Assemble the given SIC/XE instruction, by clearly indicating the instruction format, addressing mode and the setting of different flag bits, given the address value assigned to RETADR is 0030. (5)

Location	Label	Opcode	Operand
0000	FIRST	STL	RETADR

7 a) Suppose RECORD contains a 100-byte record. Write a subroutine for SIC that will write this record onto device 05. (5)

b) What is a relocatable program? Do all instructions of SIC/XE machine program need modification because of relocation? Justify your answer. (4)

PART C

Answer all questions, each carries 3 marks.

8 Differentiate between control sections and program blocks with the help of an example. (3)

9 What is a load and go assembler? (3)

10 What is the use of bitmask in program relocation? Illustrate with example. (3)

11 Explain any one machine independent loader feature. (3)

PART D

Answer any two full questions, each carries 9 marks.

12 a) Give the algorithm for pass 2 of a linking loader. (5)

b) With a help of neat diagram explain what is a linkage editor? (4)

13 a) Employ multipass assembler to evaluate the following expressions. (6)

Expression No.	Loc	Source Statement		
1		HALFSZ	EQU	MAXLEN/2
2		MAXLEN	EQU	BUFEND-BUFFER
3		PREVBT	EQU	BUFFER-1
4	4034	BUFFER	RESB	4096
5	5034	BUFEND	EQU	*

b) Give the algorithm for an absolute loader. (3)

14 a) Give the format and purpose of the different record types present in an object program that uses multiple control sections. (4)

b) Develop the records (excluding header, text and end records) for the following control section named COPY (5)

Loc	Source Statement		
0000	COPY	START	0
		EXTDEF	BUFFER, BUFFEND, LENGTH
		EXTREF	RDREC,WRREC
0000	FIRST	STL	RETADR
0003	CLOOP	+JSUB	RDREC
0007		LDA	LENGTH

000A		COMP	#0
000D		JEQ	ENDFIL
0010		+JSUB	WRREC
0014		J	CLOOP
0017	ENDFIL	LDA	=C 'EOF'
001A		STA	BUFFER
001D		LDA	#3
0020		STA	LENGTH
0023		+JSUB	WRREC
0027		J	@RETADR
002A	RETADR	RESW	1
002D	LENGTH	RESW	1
		LTORG	
0030	*	=C 'EOF'	
0033	BUFFER	RESB	4096
1033	BUFEND	EQU	*
1000	MAXLEN	EQU	BUFEND-BUFFER

PART E

Answer any four full questions, each carries 10 marks.

15 a) Explain the data structures and algorithm of a one pass macro-processor. (10)

16 a) What is meant by concatenation of macro parameter? (5)

b) What is conditional macro expansion? (5)

17 a) What is meant by line-by-line macro processor? What are its advantages? (5)

b) What are the important factors considered while designing general purpose macro processors? (5)

18 a) What are the functions of device drivers? (4)

b) Distinguish between character and block device drivers. (6)

19 a) Explain the overview of editing process. (5)

b) With a neat diagram show the relationship between viewing and editing buffer. (5)

20 a) Discuss the debugging functions and capabilities. (4)

b) Write down the situations where debugging by induction, deduction and backtracking are used. (6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth Semester B.Tech Degree Regular and Supplementary Examination December 2020

Course Code: CS303

Course Name: SYSTEM SOFTWARE

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks. Marks

1 How is system software different from application software? (3)

2 Why is the displacement field of PC related addressing mode interpreted as 12 bit signed integer? (3)

3 Describe the functions of two passes of a simple two pass assembler. (3)

4 Assemble the following instruction indicating the instruction formats used: (3)

a. RMO S,A

b. +JSUB RDREC

c. LDA #1

Assume that the value of RDREC is 1036.

OPTAB

Opcode	Machine code
RMO	AC
JSUB	48
LDA	00

REGISTER

A	0
S	4

PART B

Answer any two full questions, each carries9 marks.

5 a) Explain the architecture of an SIC machine. (5)

b) Write an SIC/XE program to add the elements of an array ALPHA of 100 words and store the result in GAMMA. (4)

6 a) With the help of an example explain the use of BASE assembler directive. (4)

b) Explain with an example how relocation problem is handled by an assembler? (5)

7 a) Describe the data structures used by a simple two pass assembler. (5)

b) Consider the memory contents shown in the following figure (4)

.	.	(X)	000090
3030	003600	(PC)	003000
.	.	(B)	006000
3600	103000		
.	.		
6390	00C303		
.	.		
C303	003030		

What would be loaded to register A with the following instructions:

i. 03C300
ii. 022030

PART C

Answer all questions, each carries3 marks.

8 Give the purpose of following assembler directives with examples: (3)

1) USE

2) CSECT

9 Give an example of situation where the use of a multipass assembler can be justified? (3)

10 Given an idle computer with no program in memory, how do we get things started? (3)

11 Explain the concept of automatic library search. (3)

PART D

Answer any two full questions, each carries9 marks.

12 a) How are program blocks handled by the assembler? (5)

b) Using the given information, generate the machine instruction for the instruction at location 0006 and 003F. Assume that program blocks are used in the program, the machine code for LDA is 00 and STCH is 54 and the block table is as follows. (4)

Block Name	Block Number	Address	Length
(default)	0	0000	0066
CDATA	1	0066	000B
CBLKS	2	0071	1000

Loc	Block Number	Label	Opcode	Operand
0006	0		LDA	LENGTH
003F	0		STCH	BUFFER,X
0003	1	LENGTH	RESW	1
0000	2	BUFFER	RESB	4096

13 a) What do you mean by forward reference? How is forward reference handled by a One-Pass Assembler that generates object code? (5)

b) Give the pass 1 algorithm of a linking loader. (4)

14 a) What are the basic loader functions? (3)

b) Illustrate the process of dynamic linking. (6)

PART E

Answer any four full questions, each carries10 marks.

15 a) What is the difference between macro invocation and subroutine call? (3)

b) Write the one pass macro processor algorithm. (7)

16 a) Explain macro definition and macro expansion. (4)

b) How does a one pass macroprocessor handle recursive macro expansion? Explain with example (6)

17 Explain the following machine independent macro processor features: (10)

i. Generation of unique labels.

ii. Keyword macro parameters

18 a) Describe the general design of a device driver. (5)

b) Differentiate between character and block device driver. (5)

19 With the help of a diagram describe the structure of a text editor. (10)

20 Explain the following methods of debugging: (10)

i. Induction

ii. Deduction

iii. Backtracking

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