

BSC 5th Sem Dec-2014

Subject –System Software

Q.1) Select appropriate answer for objective questions, and write single or double line answer for short notes:

(1) Total memory in SIC machine is

- (1) 2^{15} bytes (2) 2^{32} bytes (3) 2^{14} bytes (4) 2^{20} bytes

Answer: (a)

(2) In SIC machine ----- bytes or ----- bits form a word?

- (1) 3,24 (2) 2,16 (3) 4,24 (4) 3,32

Answer: (a)

(3) Write just meaning of BYTE ?

Answer: A BYTE is a unit of data that is eight binary digit long.

(4) In object program format we use ----- types of records in Assembler ?

- (1) 4 (2) 2 (3) 3 (4) 1

Answer: (3) 3

(5) Which variable is involved to find the length of program in Assembler

- (1) LOC (2) COUNTER (3) INDEX REGISTER (4) LOCCTR

Answer: (4) LOCCTR

(6) Generate three address code for the : $x = a + b * d$

Answer: $t1 = b * d$

$$x = a + t1$$

(7) The directive ----- identifies the beginning of macro definition

- (1) None (2) BGEIN (3) START (4) MACRO

Answer: (4) MACRO

(8) ----- is a process that brings the object program into memory.

- (1) Linker (2) Loader (3) processor (4) Editor

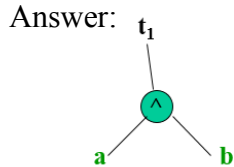
Answer: (2) Loader

(9) ----- is a techniques of merging the bodies of two loop if they have the same number of iterations

- (1) Loop jamming (2) Loop unrolling (3) Loop invariant (4) None

Answer: (1) Loop jamming

(10) Draw DAG for the statement $c = a \wedge b$



Q.2) write a program to load and store a character into two variables for SIC?

Answer:

Line	Source statement			
5	COPY	START	1000	COPY FILE FROM INPUT TO OUTPUT
10	FIRST	STL	RETADR	SAVE RETURN ADDRESS
15	CLOOP	<u>JSUB</u>	RDREC	READ INPUT RECORD
20		LDA	LENGTH	TEST FOR EOF (LENGTH = 0)
25		COMP	ZERO	
30		<u>JEQ</u>	ENDFIL	EXIT IF EOF FOUND
35		<u>JSUB</u>	WRREC	WRITE OUTPUT RECORD
40		<u>J</u>	CLOOP	LOOP
45	ENDFIL	LDA	EOF	INSERT END OF FILE MARKER
50		STA	BUFFER	
55		LDA	THREE	SET LENGTH = 3
60		STA	LENGTH	
65		<u>JSUB</u>	WRREC	WRITE EOF
70		<u>LDL</u>	RETADR	GET RETURN ADDRESS
75		<u>RSUB</u>		RETURN TO CALLER
80	EOF	BYTE	C'EOF'	
85	THREE	WORD	3	
90	ZERO	WORD	0	
95	RETADR	RESW	1	
100	LENGTH	RESW	1	LENGTH OF RECORD
105	BUFFER	RESB	4096	4096-BYTE BUFFER AREA
110	.			
115	.	SUBROUTINE TO READ RECORD INTO BUFFER		
120	.			

125	RDREC	LDX	ZERO	CLEAR LOOP COUNTER
130		LDA	ZERO	CLEAR A TO ZERO
135	RLOOP	TD	INPUT	TEST INPUT DEVICE
140		<u>JEQ</u>	RLOOP	LOOP UNTIL READY
145		<u>RD</u>	INPUT	READ CHARACTER INTO REGISTER A
150		COMP	ZERO	TEST FOR END OF RECORD (X'00')
155		<u>JEQ</u>	EXIT	EXIT LOOP IF EOR
160		<u>STCH</u>	BUFFER, X	STORE CHARACTER IN BUFFER
165		TIX	MAXLEN	LOOP UNLESS MAX LENGTH
170		<u>JLT</u>	RLOOP	HAS BEEN REACHED
175	EXIT	STX	LENGTH	SAVE RECORD LENGTH
180		<u>RSUB</u>		RETURN TO CALLER
185	INPUT	BYTE	X'F1'	CODE FOR INPUT DEVICE
190	MAXLEN	WORD	4096	
195	.			
200	.			SUBROUTINE TO WRITE RECORD FROM BUFFER
205	.			
210	WRREC	LDX	ZERO	CLEAR LOOP COUNTER
215	WLOOP	TD	OUTPUT	TEST OUTPUT DEVICE
220		<u>JEQ</u>	WLOOP	LOOP UNTIL READY
225		<u>LDCH</u>	BUFFER, X	GET CHARACTER FROM BUFFER
230		<u>WD</u>	OUTPUT	WRITE CHARACTER
235		TIX	LENGTH	LOOP UNTIL ALL CHARACTERS
240		<u>JLT</u>	WLOOP	HAVE BEEN WRITTEN
245		<u>RSUB</u>		RETURN TO CALLER
250	OUTPUT	BYTE	X'05'	CODE FOR OUTPUT DEVICE
255		END	FIRST	

Q.3) Explain Data format and Instruction set of VAX architecture for CISC?

Answer: In data format you have to explain:

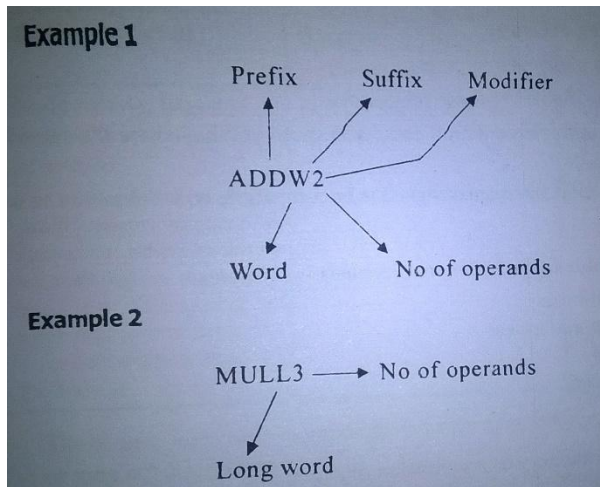
- about bit, byte, word, nibble...etc.
- about ASCII code
- about 1's and 2's complement representation
- about floating point representation.

Instruction set:

You have to explain:

- A prefix that specifies the type of operation.
- A suffix that that specifies the data type of operand
- Modifier, specifies the number of operands.

Ex:



Q.4) Write the differences between M/C dependent and M/C independent assembler features?

Answer: Please refer Chapter 2 of the book “*system_software_an_introduction_to_system_software-Leland_Beck-3rd-edition*”

Q.5) What is User interface and explain its two basic component?

Answer: You have to define User Interface and have to explain the two components:

- (1) Presentation Manager
- (2) Dialog manager

Q.6) Explain the phases of compiler in short?

Answer: Please refer Chapter 1 of the book “*Principles of Compiler Design, by A V Aho, J D Ullman, Pearson Education*”

Q.7) What is the advantages of multipass assembler over single pass assembler?

Answer: Please refer Chapter 2 of the book “*system_software_an_introduction_to_system_software-Leland_Beck-3rd-edition*”

5

Q.8) Explain three code optimization techniques of compiler?

Answer: There are some optimization techniques:

1. Peephole optimization
2. Local optimization
3. Global optimization
4. Loop optimization
5. Loop unrolling
6. Loop jamming.
7. Elimination of local common sub expression.

You should explain any three of the above.