

CS2304-SYSTEM SOFTWARE

2 MARK QUESTION & ANSWERS.

UNIT – I INTRODUCTION

1. Define System Software.

System software consists of a variety of programs that supports the operations of a computer. Eg. Compiler, Assembler, Editor

2. What are the types of software?

1. System software
2. Application software.

3. Illustrate how input and output operations are performed in SIC. (or) Write I/O instructions used in SIC?

In SIC IO operations are performed using I/O instruction like

TD – Test Device

RD – Read Data

WD – Write Data

4. How the target address will be calculated in Relative addressing modes

The Relative addressing modes are,

1. Base relative addressing mode
2. PC relative addressing mode

In Base relative addressing mode, the target address will be calculated, adding displacement value with Base register

$$\text{TA} = (\text{B}) + \text{disp}$$

In Program Counter Relative addressing the displacement value will be added with program counter value

$$\text{TA} = \text{PC} + \text{disp}$$

5. Write about Direct and Indirect addressing modes.

Direct Addressing Mode:

In this address mode the operand value is present in the target address.

In Direct Address:

The address mode in which the operands address is present in the target address.

6. Compare RISC and CISC machines.

	RISC	CISC
1.	It contains less No. of instructions	It contains more Bo. of Instructions.
2.	It has more registers.	It has less registers.
3.	Reduced Instruction set Computer	Complex Instruction set computer
4.	Eg .VAX ,Pentium Pro	Eg. Ultra SPARC, Power PC

7. Explain the term Virtual address space (virtual memory)

The virtual memory allows programs to operate as though they had access to an extremely large memory, regardless of the amount of memory actually present on the system. For Eg. VAX architecture supports virtual address space.

8. What is Process Status Long Word (PSL)

PSL contains state variable and flags associated with a process. The PSL also includes a condition code and a flag that specifies whether compatibility mode is being used or not.

9. Explain about trailing and leading numeric?

Trailing Numeric:

Numeric format is used to represent numeric values with one digit per byte. In this format if sign appears in the last byte then it is called Trailing numeric.

Leading Numeric:

If sign appears as a separate byte preceding the first digit called leading separate numeric.

10. What is little Endian Byte ordering?

The least significant part of a numeric value is stored at the lower numbered address. This is called little endian byte ordering because the “little end” of the value comes first in memory.

11. What is Big endian Byte Ordering?

The least significant part of the numeric value is stored at the lowest numbered address is called Big Endian Byte Ordering.

12. Write about Immediate addressing mode?

The value of the operand is specified as part of the instruction itself is called immediate addressing.

Eg. LDX #100

13. Define Data Format.

Each Architecture is having its own format for defining a data. It is called Data format .For example in SIC integers are stored as 24 bit binary number.

14. What is Instruction Set?

Each Architecture provides set of Instruction for performing some task. For example in SIC arithmetic instructions like LDA,LDX.

15. Define Program counter.

Program Counter is a register which is used to store the address of the next instruction to be fetched for execution.

16. Describe the use of the registers A, X, L, PC, SW.

Register	Purpose
A	Accumulator –used for Arithmetic operations
X	Index Register-used for addressing.

L	Linkage register
PC	Program Counter- Contains the address of the next instruction to be fetched for execution.
SW	Status Word

17. Explain the use of the registers B,S,T,F.

Register	Purpose
B	Base Register –Used for Addressing
S	General working register
T	General Working register
F	Floating Point Accumulator.

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UNIT II-ASSEMBLER

1. Define Assembler.

An assembler is a set of programs, which is used to translate the assembly language into machine language, and also gives the necessary information to the loader.

2. Write the uses of assembler Directives and give an Example.

The Assembler Directives are used to give necessary information to the Assembler. The Assembler Directives

are,

START: Specifies name and starting address of the program.

RESW: Reserves word

RESB: Reserves byte

END : Indicates the end of the source program

3. What is Forward Reference?

Forward Reference means, the symbols in the program may be referred before that is defined. For eg.

```
        LDA    B
        B     BYTE 10
```

Here B value is referred before it is defined.

4. Write the Data Structure used in Assembler.

The Data structures used in Assembler are,

- SYMTAB – is used to store values assigned to labels.
- OPCODE TAB – is used to look up mnemonic operation codes and translate them to their machine language equivalents.

5. How the Assembler gives Program Relocation Information to the Loader? (Relocatable pgm)

The Assembler does not know the actual location where the program will be loaded. It cannot make the necessary changes in the addresses used by the Program at load time. However the assembler can identify the object program that needs modification. An object program that contains the information necessary to perform this kind of modification is called Relocatable Program. Thus the information would be given to the loader.

6. Write the various records used in Object Program?

- Head Record
- Text Record
- End Record
- Modification Record
- Refer Record
- Define Record

7. Write about Define Record and Refer Record.

Define Record:

A Define Record gives information about external symbols that are defined in the same control section. (These symbols can be used by other sections)

Refer Record:

A Refer Record gives information about external reference i.e. That symbols are defined in another sections.

8. Define Literals?

In Literals, the value of constants operand as a part of the instructions, itself. This avoids having to define the constant elsewhere in the program.

The Literals are identified with prefix '='. Which is followed by the specification of the Literal value.

For eg,

LDA = C 'EOF'

9. Write about Expressions?

There are 2 types of expressions.

- Absolute Expressions
- Relative Expressions

An Expression that contains only absolute terms (independent of program location) is called Absolute Expressions.

In Relative Expressions, the Operand values are Relative to the Starting of the Program Location.

10. Define Program Block

Program Block refer to segment of code are handled by the assembler as one entity resulting in a single block of object code. In this object code the generated machine instructions and data appeared in the same order as they are written in the source program.

11. Define Control Sections?

Control Sections refer to segments that are translated into independent object program units. Different control sections are used for subroutine or other logical subdivisions of a program. Symbols defined in one control section, but that symbol must be declared as an external symbol.

12. What is Load and Go Assembler?

The Load and Go Assembler is a one-pass assembler that generates the object code in memory for immediate execution. No object program is written out and no loader is needed. This is used in a system that oriented toward program development and testing.

13. Write the uses of Multi pass Assembler?

A symbol defined in assembler needs more passes to resolve or process the definition of symbols.

14. What is LTORG?

LTORG is a constant operand that is written as part of the instruction that uses it (ie) the value is stated “literally” in the instruction.

15. What is Near Jump?

In a Neat jump the Target is in the same code segment. A near jump is assembled using the current code segment registers. The assembled machine instruction for a near jump occupies 2 or 3 bytes.

Eg. JMP Target

16. What is Far jump?

A far jump is a Jump to a target in a different code segment. A Far Jump is assembled using a different segment register, which is specified in an instruction prefix. The assembled instruction for a Far Jump requires 5 bytes.

Eg. `JMP FARPTR TARGET`

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PART B QUESTIONS

UNIT I-INTRODUCTION

16 marks

1. Explain about SIC Architecture.
2. Explain about SIC/XE Architecture.
3. Explain the various instruction formats provide and give 3 examples for each
4. Explain addressing modes in detail
5. Explain the various instruction Sets.

UNIT II -ASSEMBLER

8 marks:

1. Write an algorithm for **Pass1 of Assembler** and Explain
2. Write an algorithm for **and pass2 of Assembler** and Explain.
3. Explain about the Following
 - 1.Literals
 - 2.Symbol defining Statements
 - 3.Expressions
4. Explain about **Program relocation** in detail
5. Discuss in detail in One pass assembler with example
6. Explain about the **Multi Pass assembler** with Example

16 marks

1. Explain about **Basic Functions** of Assembler.
2. Explain **machine dependent assembler** features.
3. Explain **machine Independent assembler** features.
4. Explain **Assembler design options** in detail.
5. Explain about **MASM** assembler in Detail.

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