

2.2 What is the advantage of a relocatable assembler compared to an absolute assembler?

A relocatable assembler allows you to develop application software in modules that are linked together to create the program to go into the ROM.

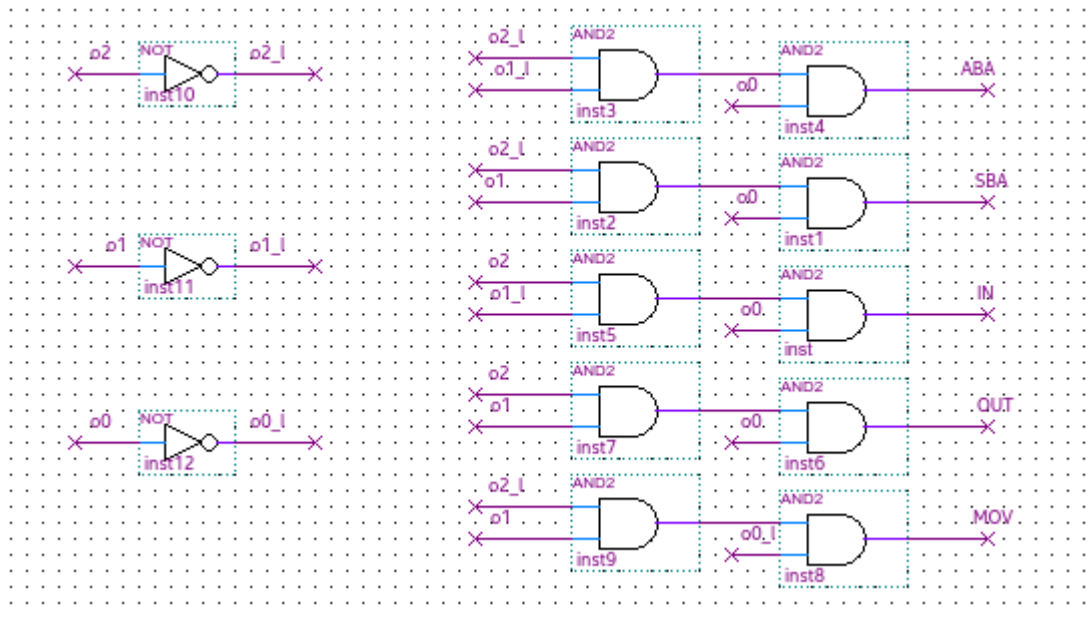
2.3 What is a microcontroller memory map?

A memory map shows the organization of addresses for each type of memory.

2.12 Why must a three-state gate be used to interface an input device to the data bus?

The input device sends a high impedance signal to the data bus when not in use so that a non-active signal is not misinterpreted.

2.17 Design an instruction decoder as shown in Figure 2-13 using AND, OR, and inverter gates to decode the 3-bit opcodes and produce a control signal asserted by each of the operations given in Table 2-5.



3.2. What are the three basic elements of structured programming?

Simple structures that minimize the number of programming element interactions

Minimizing program segment sizes

Hierarchical organization of the solution.

3.3. Write the pseudocode and draw the flowchart symbol to represent the decision [if A is TRUE THEN B ELSE C.

```
IF A is TRUE
  THEN B
  ELSE C
```

3.7. Use structured flowcharts or pseudocode to write a design that will implement the following problem description:

```
DO
  IF BUF is NULL
    THEN
      prompt user for keyboard input
      save input in BUF
  ENDIF (BUF is NULL)
  IF BUF is alphabetic
    THEN
      change case of BUF
  ENDIF (BUF is alphabetic)
  IF BUF is alphanumeric
    THEN
      print BUF
      clear BUF
  ELSE
      beep bell
      clear BUF
  ENDIF (BUF is alphanumeric)
WHILE ESC not pressed
```

4.5 What is the meaning of sign bit = 1 when unsigned binary coded numbers are added?
It is treated like a normal positive binary digit.

4.6 What is the meaning of sign bit = 1 when two's-complement binary coded numbers are added?
The result is negative.

4.7 What is the meaning of carry bit = 1 when unsigned binary coded numbers are added?
The result is larger than what can be expressed with the number of digits (overflow)

4.11 What is the meaning of two's-complement overflow bit = 1 when unsigned binary coded numbers are added?
A carry was required for the operation.

4.12 What is the meaning of two's-complement overflow bit = 1 when two's-complement binary coded numbers are added?
It means that a carry or a borrow was required for the operation, depending on whether subtraction or addition was performed.

5.1 List the addressing modes available in the CPU you are studying.

5.2 Briefly explain the following terms: physical address, effective address, memory map.

Physical Address - Actual memory location.

Effective Address - Memory location computed by the processor.

Memory Map - Organization of addresses for each type of memory.

5.9 To increase the memory address space in a computer system, one must (a) increase the number of data lines. (b) increase the number of read and write control bits going to the memory, (c) increase the number of address lines.

C

5.10 A pointer is (a) an area in memory used for address storage. (b) a memory address held in a register, (c) a subroutine address held in the stack pointer

B

5.11 A register indirect address instruction (a) has the address of the operand in the instruction. (b) has the address of the operand in a register. (c) uses the program counter to calculate the offset address of the operand.

B