

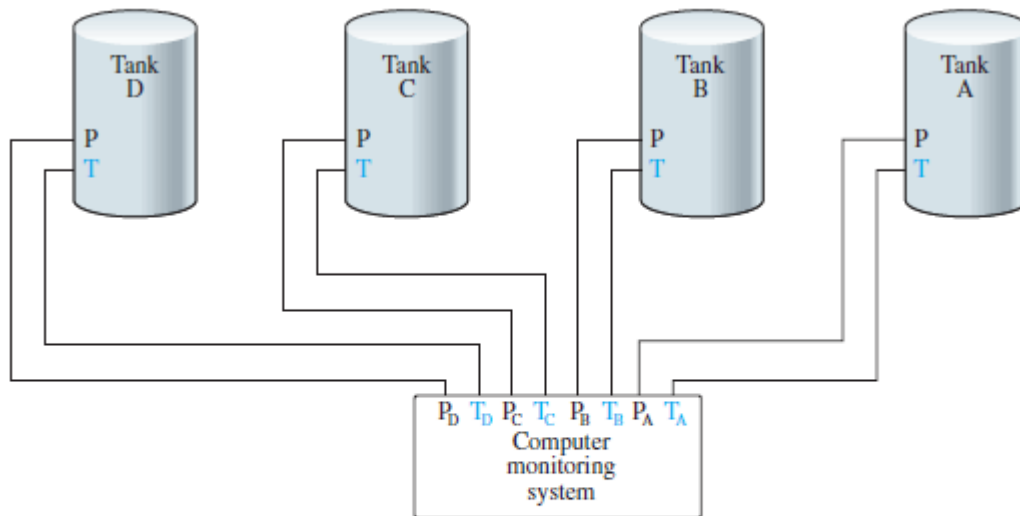
[Problem 1]

- (a) Find the binary equivalent of the decimal number 15.375.
- (b) Write in decimal the binary numbers 11010 and 10101.
- (c) Find the octal equivalent of the decimal number 83.75.

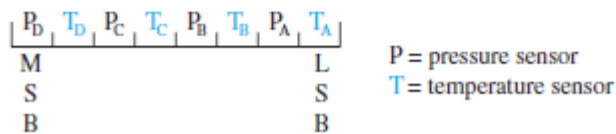
[Problem 2]

A geothermal electricity generation facility uses a computer to monitor the temperature and pressure of four liquid storage tanks, as shown in Figure [Prob. 2]. Whenever a temperature or pressure exceeds the danger limit, an internal tank sensor applies a **1** to its corresponding output to the computer. If all conditions are OK, then all outputs are **0**.

- (a) If the computer reads the binary string 0100 1001, what problems exist?
- (b) What hexadecimal number is read by the computer if the all pressures and temperatures in the four tanks are too high?



(a)



(b)

Figure [Prob. 2]

[Problem 3]

- (a) Determine the binary equivalent of the hexadecimal number $4F_{16}$.
- (b) Find the Gray code equivalent for the binary number in (a).
- (c) Convert the binary number in (a) to the decimal equivalent.
- (d) Hence, determine the BCD equivalent for the decimal number in (c).

[Problem 4]

A computer programmer observes the following hex string when looking at a particular section of computer memory: 736B753433.

- (a) Assume that the memory contents are ASCII codes with leading zeros and translate this string into its alphanumeric equivalent.
- (b) The programmer realizes that the program recognizes only capital (uppercase) letters. Convert all letters in the alphanumeric equivalent to capital letters, and determine the new hex string.

[Problem 5]

Most PC-compatible computer systems use a 20-bit address code to identify each of over 1 million memory locations.

- (a) How many hex characters (digits) are required to identify the address of each memory location?
- (b) What is the 5-digit hex address of the 4095th memory location?
- (c) If 50 memory locations are used for data storage starting at location 00FFF H, what is the location of the last data item?