

Steven
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Homework 1

1. The von Neumann computer was introduced in 1940, it laid the basic foundation of modern architecture. It consists of a memory unit (mu), Arithmetic logic unit (ALU), control unit (cu), and I/O unit.

2. $(011.1011011)_2$ to octal

$$\begin{array}{r} 011.101101100 \\ 3.554 \\ \hline = (3.554)_8 \end{array}$$

3. $(4429.625)_{10}$ to octal

$$\begin{array}{r} 553 \\ 8 \overline{) 4429} \\ \underline{-40} \end{array} \quad \text{remainder } 5$$

$$\begin{array}{r} 42 \\ \underline{-40} \end{array}$$

$$\begin{array}{r} 29 \\ \underline{-24} \end{array}$$

$$\begin{array}{r} 695 \\ 8 \overline{) 553} \\ \underline{-48} \end{array} \quad \text{remainder } 1$$

$$\begin{array}{r} 73 \\ \underline{-72} \end{array}$$

$$\begin{array}{r} 81 \\ 8 \overline{) 69} \\ \underline{-64} \end{array} \quad \text{remainder } 5$$

$$\begin{array}{r} 5 \\ 8 \overline{) 5} \\ \underline{-8} \end{array} \quad \text{rem. } 0$$

$$\begin{array}{r} 0 \\ 8 \overline{) 0} \end{array} \quad \text{rem. } 0$$

$$.625 \cdot 8 = 5$$

$$\boxed{\text{Ans: } (10515.5)_8}$$

4. $(632.97)_{10}$ to octal

$$\begin{array}{r} 79 \\ 8 \overline{) 632} \quad \text{rem } 0 \\ \underline{-56} \end{array}$$

$$\begin{array}{r} 72 \\ 8 \overline{) 79} \\ \underline{-72} \quad \text{rem } 7 \end{array}$$

$$\begin{array}{r} 1 \\ 8 \overline{) 17} \quad \text{rem } 1 \\ \underline{-8} \end{array}$$

$$\begin{array}{r} 1 \\ 8 \overline{) 1} \quad \text{rem } 1 \end{array}$$

$$8 : .97 = 7.76$$

$$\text{Ans} = (1170.76)_8$$

5. $(0.011111)_2$ to hex

$$\begin{array}{r} 0000.0111 \quad 1110 \\ \text{0} \quad 4+2+1 \quad 8+4+2+0 \end{array}$$

$$\begin{array}{r} 0.714 \\ \text{Ans} = (.7E)_{16} \end{array}$$

$$6. \quad 2^{12} = 4096$$

Because on/off is 2, then there are 12 switches.

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7. $(211)_x = (152)_8 \quad x = ?$

$$1 \times 8^2 + 5 \times 8^1 + 2 \times 8^0 \\ 64 + 40 + 2 \\ = (106)_{10}$$

$$2x^2 + 1x + 1 = (106)_{10}$$

$$2(7)^2 + 7 + 1 = (106)_{10}$$

$$(106)_{10} = (106)_{10} \checkmark$$

Ans: $x = 7$

8. $(FBA7C2)_{16} \Rightarrow \text{octal}$

$$= \underset{7}{111} | \underset{4}{100} | \underset{7}{111} | \underset{2}{010} | \underset{3}{011} | \underset{7}{111} | \underset{0}{000} | \underset{2}{010}$$

$$= (74723702)_8$$

9. $\underset{J}{01001010} \underset{O}{01101111} \underset{h}{01101000} \underset{D}{01101110}$

$$\underset{\text{Space}}{01000000} \underset{''}{10000100} \underset{Q}{01101111} \underset{e}{01001010}$$

Ans: John "oe

- Put 0's where it was needed to make a set of 8, I believe you gave us the wrong code for " , suppose to be a D

10. $(1110101.11)_2 \Rightarrow \text{Decimal}$

$$1 \times 2^6 + 1 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 + 1 \times 2^{-1} + 1 \times 2^{-2}$$

$$\Rightarrow 64 + 32 + 16 + 0 + 4 + 2 + 1 + \frac{1}{2} + \frac{1}{4}$$

$$= (117.75)_{10}$$