

Quiz 1

Course Code: IM112

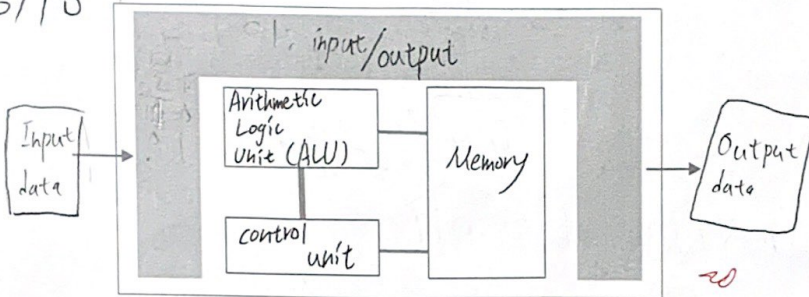
Course name: Basic Computer Concepts

Student ID: 1071710

Name: 1778

Questions

1. Fill the name of subsystems (English name) for the Von Neumann model (20%)



2. Find the maximum value of an integer in binary number system with five digits ($k=5$). (20%)

3. Convert the decimal number 78.6875 to binary without using a calculator. (20%)

4. Convert the Octal number 534.67₈ to hexadecimal without using a calculator. (20%)

5. Change the decimal numbers 46 and -46 to 8-bit two's complement integers. (20%)

Answer:

Handwritten solutions for the quiz questions:

1. Subsystems of the Von Neumann model: Input/output, Arithmetic Logic Unit (ALU), Memory, Control unit.

2. Maximum value of an integer in binary number system with five digits ($k=5$): 11111₂ = 31₁₀.

3. Conversion of 78.6875 to binary: 78 = 1001110₂, 0.6875 = 0.101101₂, so 78.6875 = 1001110.101101₂.

4. Conversion of 534.67₈ to hexadecimal: 534₈ = 267₁₆, 0.67₈ = 0.6875₁₀ = 0.101101₂ = 0.B15₁₆, so 534.67₈ = 267.B15₁₆.

5. Conversion of 46 and -46 to 8-bit two's complement integers: 46 = 00101110₂, -46 = 11010001₂.

Quiz 2

Course Code: IM112

Course name: Basic Computer Concepts

Student ID: 1071110

Name: 汪文豪

Class: 113

1. Show the result of following operation: $\text{NOT} [(52)_{16} \text{ OR } (49)_{16}]$. (20 points)
2. Use a combination of logical and shift operations to extract the third bit (from the right) of the pattern: "yzuim112ab" (20 points)
3. Use "Sign-and-magnitude" to convert a decimal integer, -87, to a binary integer with 8-bit length. Use "2's complement" to convert a decimal integer -87, to a binary integer with 8-bit length. (20 points)
4. Use "binary calculation" to **subtract** a variable B from A, and then prove the answer in decimal. A, and B are binary integers with 8-bit length. $B=00010101$, $A=11000011$. (20 points)
5. Use "binary calculation" to complete the mathematical operation, $A/8$ and then prove the final answer in decimal. Where $A=(-60)_{10}$. (20 points)

----- END -----

ANSWER

$$[(01010010)_2 \text{ OR } (01001001)_2] \text{ OR } 01010010 \quad \text{NOT } 0101011$$

$$\underline{01010010} \quad \underline{10100100}$$

A 4 20

$$A = (A_4)_{16} = (10100100)_2$$

$$yzuim112ab \quad yzuim112ab$$

$$A = 2 \# \quad 0 yzuim112a$$

$$00 yzuim112$$

$$\underline{00000001} \text{ AND}$$

$$\underline{00000001}$$

$$2 \mid 87 \quad 0101011$$

$$2 \mid 43 \quad 10101001$$

$$2 \mid 21 \quad 10101001$$

$$2 \mid 10 \quad 10101001$$

$$2 \mid 5 \quad 10101001$$

$$A = 111101011 \quad 10$$

$$A = 11000011 \quad 15$$

$$10101110 \quad B = 00010101$$

$$11110101$$

$$A = -82 \#$$

$$5. (-60)_{10}$$

$$B_{10} = 11000100x$$

$$2 \mid 60$$

$$2 \mid 30$$

$$2 \mid 15$$

$$2 \mid 7$$

$$2 \mid 3$$

$$2^3$$

$$11000100$$

$$11100010$$

$$11110001$$

$$11110000$$

$$A = -8 \#$$

Quiz 5

Course Code: IM112

Course name: Basic Computer Concepts

Student ID: 1071710 Name: 汪文豪 Class: B

Given a list of number data = [1, 3, 5, 8, 9, 10, 11, 15, 18, 20, 22]

Index: {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

1. Please fill to pseudo code for the binary search algorithm as below:

BinarySearch (data, left, right, x)

```

{
    if (left >= right) return 0;
    mid = (left + right) / 2
    if data[mid] == x return 1;
    else if data[mid] < x return BinarySearch(data, mid + 1, right)
    else return BinarySearch(data, left, mid - 1)
}
    
```

2. Show the results of list data step by step for Binarysearch (data, 10, 20)

pass 1	1	3	5	8	9	10	11	15	18	20	22	mid = 0 + 10 / 2 = 5
						↓ Mid				↓ X	right	
pass 2	1	3	5	8	9	10	11	15	18	20	22	mid = 0 + 4 / 2 = 2
						↓ left			↓ mid	↓ X	right	
pass 3	1	3	5	8	9	10	11	15	18	20	22	mid = 0 + 1 / 2 = 0
										↓ left	↓ right	
										↓ mid		
										↓ X		