**Name: Huynh Hoang Khoi Nguyen | SE160414**

**WS1**

**Part 1: Number Systems**

**Exercise 1: Convert decimal numbers to binary ones**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Decimal** | **4-bit Binary** | **Decimal** | **8-bit Binary** | **Decimal** | **16-bit Binary** |
| 9 | 1001 | 7 | 0000 0111 | 255 | 0000 0000 1111 1111 |
| 7 | 0111 | 34 | 0010 0010 | 192 | 0000 0000 1100 0000 |
| 2 | 0010 | 125 | 0111 1101 | 188 | 0000 0000 1011 1100 |
| 15 | 1111 | 157 | 1001 1101 | 312 | 0000 0001 0011 1000 |
| 12 | 1100 | 162 | 1010 0010 | 517 | 0000 0010 0000 0101 |
| 11 | 1011 | 37 | 0010 0101 | 264 | 0000 0001 0000 1000 |
| 6 | 0110 | 66 | 0100 0010 | 543 | 0000 0010 0001 1111 |
| 5 | 0101 | 77 | 0100 1101 | 819 | 0000 0011 0011 0011 |
| 8 | 1000 | 88 | 0101 1000 | 1027 | 0000 0100 0000 0011 |
| 13 | 1101 | 99 | 0110 0011 | 2055 | 0000 1000 0000 0111 |
| 14 | 1110 | 109 | 0110 1101 | 63 | 0000 0000 0011 1111 |

**Exercise 2: Convert decimal numbers to binary and hexadecimal ones**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Decimal** | **Binary** | **Hexa.** | **Decimal** | **16-bit Binary** | **Hexadecimal** |
| 9 | 1001 | 9 | 255 | 0000 0000 1111 1111 | 00FF |
| 127 | 0111 1111 | 9F | 192 | 0000 0000 1100 0000 | 00C0 |
| 125 | 0111 1101 | 7D | 188 | 0000 0000 1011 1100 | 00BC |
| 157 | 10011101 | 9D | 312 | 0000 0001 0011 1000 | 0138 |
| 162 | 1010 0010 | A2 | 517 | 0000 0010 0000 0101 | 0205 |
| 37 | 0010 0101 | 25 | 264 | 0000 0001 0000 1000 | 0108 |
| 66 | 0100 0010 | 42 | 543 | 0000 0010 0001 1111 | 021F |
| 77 | 0100 1101 | 4D | 819 | 0000 0011 0011 0011 | 0333 |
| 88 | 0101 1000 | 58 | 1027 | 0000 0100 0000 0011 | 0403 |
| 99 | 0110 0011 | 63 | 2055 | 0000 1000 0000 0111 | 0807 |
| 109 | 0110 1101 | 6D | 63 | 0000 0000 0011 1111 | 003F |

**Exercise 3: Compute**

* 3245 q + 247 q = 11010101100 b + 10100111 b = 11101001100 b = 3514 q
* 1A7B h + 26FE7 h = 1101001111011 b + 110111111100111 b= 100010100110 0010 b = 28A62h
* 1101101101 b - 10110111 b =1010110110 b
* 3654 q – 337 q = 11110101100 b – 11011111 b = 11011001101 b = 3315 q
* 3AB7 h – 1FA h = 11101010110111 b – 111111010 b 11 1000 1011 1101 b = 38DB h
* 36A h – 576 q = 1101101010 b – 101111110 b= 1 1110 1100 b = 1EC h
* 64AE h – 1001101 b = 11001001010111 b – 1001101 b = 110010001100001 b= 62141 q
* 101101111 b

+ 100111011 b

110110001 b

110001101 b

10111101000 b

* 1011010 b\* 1011 b = 1111011110 b
* 1101000 b + 2AB h + 345 q = 1101000 b + 1010101011 b + 11100101 b =1111111000 b = 3F8 h = 1170 q
* 3AF h / 1C h = 21 h = 100001 b = 33 d
* 3AC h – 562 q = 1110101100 b – 101110010 b= 1000111010 b = 570 d
* 3FFA h / 327 q = 11111111111010 b / 11010111 = 1001100 b = 76 d

**Exercise 4: Show binary formats of**

1. **1-byte unsigned numbers: 251, 163, 117**

* 251: 1111 1011
* 163: 1010 0011
* 117: 0111 0101

1. **2-byte unsigned numbers: 551, 160, 443**

* 551: 0010 0010 0111
* 160: 0000 1010 0000
* 443: 0001 1011 1011

1. **1-byte signed numbers: -51, -163, -117, 320**

* -51: 1100 1101
* -163: 1111 0101 1101
* -117: 1000 1011
* 320: 0001 0100 0000

1. **Show the decimal values of 1-byte unsigned representations:**

* 0110 0011 b = 156 d
* 1000 1111 b = 112 d
* 1100 1010 b = 53 d
* 0100 1100 b = 179 d