CSCI 1010 Algorithmic Problem Solving

Assignment 1

1. Find the ASCII numbers of the message “CSCI1010!”

**01000011 01010011 01000011 01001000 00110001 00110000 00110001 00100001**

1. How many bytes of storage space would be required to store a 250-page novel in which each page contains 2500 characters if ASCII were used?

**250 \* 2500 = 625000**

1. Convert each of the following binary representations to its equivalent base ten representation (show calculation steps):
2. 1011 - **11**
3. 10101 - **21**
4. 110101 - **53**
5. 1011 - **11**
6. 1000101 - **69**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 64 | 32 | 16 | 8 | 4 | 2 | 1 | Total |
| A | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 11 |
| B | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 21 |
| C | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 53 |
| D | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 11 |
| E | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 69 |

1. Covert each of the following base ten representations to its equivalent binary representation (show calculation steps):
2. 18 - **10010**
3. 45 - **101101**
4. 37 - **100101**
5. 26 - **11010**
6. 41 - **101001**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| A | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| B | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| C | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| D | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| E | 0 | 1 | 0 | 1 | 0 | 0 | 1 |

1. What bit patterns are represented by the following hexadecimal notations? (show calculation steps):
2. 0xCD - **1100 1101**
3. 0x68 - **0110 1000**
4. 0x9F - **1001 1111**
5. 0xB7 - **1011 0111**
6. 0xA4 - **1010 0100**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 8 | 4 | 2 | 1 | 8 | 4 | 2 | 1 |
| A | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| B | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| C | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| D | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| E | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |

1. Express the following bit patterns in hexadecimal notation (show calculation steps):
2. 101000001001 - **AC**
3. 110001111011 - **A09**
4. 10111110 - **BE**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 8 | 4 | 2 | 1 | **A** | 8 | 4 | 2 | 1 | **A** | 8 | 4 | 2 | 1 | **A** |
| A | 1 | 0 | 1 | 0 | **A** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 1 | **9** |
| B | 1 | 1 | 0 | 0 | **C** | 0 | 1 | 1 | 1 | **7** | 1 | 0 | 1 | 1 | **B** |
| C |  |  |  |  |  | 1 | 0 | 1 | 1 | **B** | 1 | 1 | 1 | 0 | **E** |