CSC231 Midterm Exam Prep

The exam will be a **closed-book, closed-notes, closed-computers**, in-class exam given under the rules of the **honor code**. You will not be allowed to discuss any details or exchange information with anybody except the instructor. You will have **70 minutes** to answer all the questions.

This document shows you the general format, and some of the questions that have been given in the past. The exam typically contains 10 to 11 questions.
**Problem 1 (10 points)**

Reconstruct the definitions of A, B, C, D given the bytes stored in memory. Memory addresses increase in the up direction. The first byte of A in memory contains 0x78.

```
section .data
A    dw      0x00
B    db      0x10
C    dw      0x22
D    db      0x41
E    dd
```

**Problem 2 (10 points)**

What is left in **eax**, **ebx**, **ecx**, and **edx** after these instructions have executed.

```
mov    eax, 0
mov    ah, 0xff
add    ax, 0x1ff
mov    ebx, 2
add    ebx, 1
mov    ecx, 2
sub    ecx, 1
mov    edx, 254
add    dl, 1
```

eax: ___________

ebx: ___________

ecx: ___________

edx: ___________
**Problem 3 (10 points)**

Given the following declarations:

```assembly
section .data
a      dw  1
b      dw  2
c      dw  3
sum    dw  0
```

Write the assembly language instructions that are needed to compute

\[ \text{sum} = (a+b) \times 2 - c \]
Problem 4 (10 points)

Show the contents of the memory with whatever format is appropriate once the variables shown below have been loaded into it. (The Ascii code for ‘A’ is 0x41)

```
section .data
a    db    'A'
b    dw    0xff
c    db    'ABA'
d    dd    0x12345678
e    dd    -1
```

Addresses increase ↑

a→
**Problem 5 (10 points)**

True or False? The Pentium is a little endian processor?

**Problem 6 (10 points)**

Write an assembly language program that prints the following string on the screen:

```
*****************
* Midterm Exam *
*****************
```
Table of Powers of 2

<table>
<thead>
<tr>
<th>Bin</th>
<th>hex</th>
<th>dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
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<td>0</td>
</tr>
<tr>
<td>0001</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
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<td>2</td>
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<tr>
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<td>4</td>
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<tr>
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<td>5</td>
</tr>
<tr>
<td>0110</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>0111</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>1000</td>
<td>8</td>
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<td>1001</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>1010</td>
<td>A</td>
<td>10</td>
</tr>
<tr>
<td>1011</td>
<td>B</td>
<td>11</td>
</tr>
<tr>
<td>1100</td>
<td>C</td>
<td>12</td>
</tr>
<tr>
<td>1101</td>
<td>D</td>
<td>13</td>
</tr>
<tr>
<td>1110</td>
<td>E</td>
<td>14</td>
</tr>
<tr>
<td>1111</td>
<td>F</td>
<td>15</td>
</tr>
</tbody>
</table>

2^0 = 1  2^17 = 131,072
2^1 = 2  2^18 = 262,144
2^2 = 4  2^19 = 524,288
2^3 = 8  2^20 = 1,048,576
2^4 = 16 2^21 = 2,097,152
2^5 = 32 2^22 = 4,194,304
2^6 = 64 2^23 = 8,388,608
2^7 = 128 2^24 = 16,777,216
2^8 = 256 2^25 = 33,554,432
2^9 = 512 2^26 = 67,108,864
2^10 = 1,024 2^27 = 134,217,728
2^11 = 2,048 2^28 = 268,435,456
2^12 = 4,096 2^29 = 536,870,912
2^13 = 8,192 2^30 = 1,073,741,824
2^14 = 16,384 2^31 = 2,147,483,648
2^15 = 32,768 2^32 = 4,294,967,296
2^16 = 65,536

**Problem Points**

- 0: incorrect
- 5: somewhat correct
- 10: mostly correct

<table>
<thead>
<tr>
<th>Problem</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pbm 1</td>
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<tr>
<td>Pbm 2</td>
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<tr>
<td>Pbm 3</td>
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<td>Pbm 4</td>
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<tr>
<td>Pbm 11</td>
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<td><strong>Total</strong></td>
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**Scores**

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<td>A-</td>
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<tr>
<td>82+</td>
<td>B+</td>
</tr>
<tr>
<td>78+</td>
<td>B</td>
</tr>
<tr>
<td>74+</td>
<td>B-</td>
</tr>
<tr>
<td>70+</td>
<td>C+</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>66+</th>
<th>C</th>
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<tbody>
<tr>
<td>62+</td>
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</tr>
<tr>
<td>55+</td>
<td>D+</td>
</tr>
<tr>
<td>45+</td>
<td>D</td>
</tr>
<tr>
<td>35+</td>
<td>D-</td>
</tr>
<tr>
<td>38+</td>
<td>F</td>
</tr>
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</table>