CSE 235  Homework 6  Fall 2010

Due: Friday, October 15, 2010

Name (Print)__________________________  CSE Login ____________

Name 2 (Print)__________________________  CSE Login ____________

Instructions  Follow instructions carefully, failure to do so may result in points being deducted.

• The homework can be submitted on paper or via handin. Homework neatly formatted in \texttt{\LaTeX} will receive a 7 point bonus. You will not receive the 7 points bonus if you work with a partner (see below).
• Clearly label each problem and submit the answers in order.
• Staple this cover page to the front of your assignment for easier grading.
• Late submissions will not be accepted.
• Show sufficient work to justify your answer(s).
• When you are asked to prove something, you must give as formal, rigorous, and complete a proof as possible. Each step in your proof must contain explanation that would allow us to understand what theorem/logic you have arrived at that step.
• You are to work individually, and all work should be your own. Check partner policy below.
• The CSE academic dishonesty policy is in effect (see \url{http://cse.unl.edu/ugrad/resources/academic_integrity.php}).

Partner Policy  You may work in pairs, but you must follow these guidelines:

1. You must work on all problems together. You may not simply partition the work between you.
2. You must use \texttt{\LaTeX} and you may divide the typing duties however you wish.
3. You may not discuss problems with other groups or individuals.
4. Hand in only one hard copy with both author’s name.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Page</th>
<th>Points</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3.2 Yes/No answer</td>
<td>146</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2.3.18 c,d</td>
<td>147</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2.3.24</td>
<td>147</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2.3.36</td>
<td>147</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>2.3.66</td>
<td>148</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>(Bonus) 2.3.68</td>
<td>148</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Problem A</td>
<td>See next page</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Problem B</td>
<td>See next page</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Problem C</td>
<td>See next page</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Typesetting in \texttt{\LaTeX} (bonus)</td>
<td></td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
Problem A (2.3.10) Let \( f : \{a, b, c, d\} \rightarrow \{a, b, c, d\} \), for each of function \( f \) below,

1. \( f(a) = b, f(b) = a, f(c) = c, f(d) = d. \)
2. \( f(a) = b, f(b) = b, f(c) = d, f(d) = c. \)
3. \( f(a) = d, f(b) = a, f(c) = c, f(d) = d. \)

1. Determine whether \( f \) is one-to-one (injective).
2. Determine whether \( f \) is onto (surjective).
3. Determine whether \( f \) is one-to-one correspondence (bijective).

Problem B (2.3.12) Let \( f : \mathbb{Z} \rightarrow \mathbb{Z} \). For each function \( f \) below:

1. \( f(n) = n - 1. \)
2. \( f(n) = n^2 + 1. \)
3. \( f(n) = n^3. \)
4. \( f(n) = \lceil \frac{n}{2} \rceil. \)

1. Determine whether \( f \) is one-to-one (injective).
2. Determine whether \( f \) is onto (surjective).
3. Determine whether \( f \) is one-to-one correspondence (bijective).
4. Determine whether \( f \) is invertible. If so, give \( f^{-1} \). If not, give the largest domain for which \( f \) is invertible and find \( f^{-1}. \)

Problem C For functions \( f(x) = x^2 + x \) and \( g(x) = x - 2 \) from \( \mathbb{R} \) to \( \mathbb{R} \), find

1. \( f \circ g \)
2. \( g \circ f \)
3. \( f \circ f \)
4. \( g \circ g \)