EXAMINATION INSTRUCTIONS

* Do not turn this page until asked to do so.
* Exam time is 40 minutes.
* Put the answers on the same question sheet, do not use any additional papers, even for scratch.
* Write your name, ID, section no. in the indicated places.
* Read the exam instructions.
* Read the honesty policy.
* Sign the following statement.

**Academic Integrity Policy**
Cheating in Exams is a violation of the Academic Integrity policy of AUC. Whispering, talking, looking at someone else’s paper, or copying from any source is considered cheating. Any one who does any of these actions or her/his answers indicates that she/he did any of them, will receive a punishment ranging from zero in this exam to failing the course. If repeated, it may lead to dismissal from AUC.

I have read the honesty policy and exam instructions and I am presenting this exam as entirely my effort.

Signature: __________________

---

**DO NOT USE THIS SECTION**

<table>
<thead>
<tr>
<th>Question</th>
<th>Points</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>
Question 1 (25 points)
The tax amount due for each vehicle is determined according to the CC (motor capacity) of the vehicle based on the following rules. Write a C++ program to enter the CC of a vehicle and print out the due tax amount:

<table>
<thead>
<tr>
<th>Motor Capacity (CC)</th>
<th>Tax Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>800 &lt;= CC &lt; 1000</td>
<td>100.55</td>
</tr>
<tr>
<td>1000 &lt;= CC &lt; 1300</td>
<td>220.99</td>
</tr>
<tr>
<td>1300 &lt;= CC &lt; 1500</td>
<td>345.55</td>
</tr>
<tr>
<td>CC &gt;= 1500</td>
<td>487.77</td>
</tr>
</tbody>
</table>

Show the three phases of software development: the analysis, design, and implementation. The program should validate the user input number of CC to be not less than 800 and not greater than 4000. Write the program once using the nested if structure and second using the switch structure.
The Program (Using Nested if)

The Program (Using switch)
**Question 2 (10 points)**

1. Rewrite the Boolean expression eliminating the not (!) operator.

   \[ ! ( x < y ) \]

   \[ ! ( ( x >= y ) || ( s < t ) ) \]

2. What is the value of the following expressions:

   \[ ( y ! = 5 ) || ( y = = 5 ) \]

   \[ ( x ! = 7 ) && ( x = = 7 ) \]

   \[ ( x = = x ) \]

**Question 3 (10 points)**

Show the output of each of the following program segments:

<table>
<thead>
<tr>
<th>Program Segment</th>
<th>Output</th>
</tr>
</thead>
</table>
| int k;
for (k=1; k < 20; k += 4)
cout << k << endl;
cout << “End of Processing” << endl; | |
| int x = 5, y = 0;
y = x++ + 5;
cout << “x = “ << setw(3) << ”y = “ << y << endl; | |
| int a = 12;
do
{ 
cout << “a = “ << setw(4) << a << endl;
~a;
} while ((a < 0) || (a > 10));
cout << “final a = “ << setw(4) << a << endl; | |
| int x = 7, y = 0;
y = ++x / 5;
cout << “x = “ << setw(3) << ”y = “ << y << endl; | |
| int k;
for (k=10; k < 0; k++)
cout << k << endl;
cout << “End of Processing” << endl; | |