ECE15: Homework 3

In all homeworaks, the dialogue boxes show the system prompt in $(\sim)$, the user input in red, and the computer output in black. Unless otherwise indicated, assume that the user will always enter a valid input.

**Problem 0.** Read the following Zybooks sections and solve the problems there in.
Sections 4.1 to 4.8 by 8pm Tuesday October 11th.
Sections 5.1 to 5.3 by 8pm Thursday October 13th.

**Problem 1.** Write a program `place.c` that asks the user for three letters and prints them so that the alphabetical order (increasing or decreasing) of the first two letters is preserved, and the third letter is placed so that the printed sequence of letters either increases or decreases alphabetically. You can assume that all three letters are different.

For example, with the input `lto`, the letter `l` is alphabetically smaller than `t` hence the output sequence should be increasing, and the letter `o` must be placed between the `l` and the `t`, resulting in the output `lot`. Similarly, for the input `lta` the letter `l` is again alphabetically smaller than `t`, hence the output sequence is increasing, and `a` must be printed first, resulting in the output `alt`. Finally, for the input `cab`, the letter `c` is larger alphabetically than `a`, hence the output sequence is decreasing, and `a` is printed last, resulting in `cba`.

```
(\sim) $ a.out
Enter the letters: lta
Ordered_sequence: alt
(\sim) $ a.out
Enter the letters: cab
Ordered_sequence: cba
(\sim) $ a.out
Enter the letters: owl
Ordered_sequence: low
(\sim) $
```
Problem 2. Write a program `change.c` that asks how much money a user has, represented as a `double`, and prints the smallest number of quarters, dimes, nickels, pennies that constitute this amount. If any coin type is not used, its name is not printed.

```
(˜)$ a.out
How much money do you have? 7.43
You have 29 quarter(s), 1 dime(s), 1 nickel(s), 3 penny(ies).
(˜)$ a.out
How much money do you have? 0.70
You have 2 quarter(s), 2 dime(s).
(˜)$ a.out
How much money do you have? 0.11
You have 1 dime(s), 1 penny(ies).
(˜)$ a.out
How much money do you have? 0.05
You have 1 nickel(s).
(˜)$
```
Problem 3. Write a program grade.c that prompts the user for a sequence of three comma-separated integer percentage scores and three corresponding comma-separated double class units, and uses the conversion table below to output the double GPA with a single-digit precision. Spaces between the integers and commas are ignored.

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\geq 90$</td>
<td>A</td>
<td>4</td>
</tr>
<tr>
<td>$80 \leq$</td>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>$&lt; 80$</td>
<td>C</td>
<td>2</td>
</tr>
<tr>
<td>$&lt; 70$</td>
<td>D</td>
<td>1</td>
</tr>
</tbody>
</table>

For example, if the three percentage scores were 98, 76, 80 and the units were 4.5, 2.4, 2.0, then the corresponding letter grades are A, C, and B respectively, and the GPA is $\frac{4.5 \times 4 + 2.4 \times 2 + 2.0 \times 3}{8.9} = \frac{28.8}{8.9} = 3.2$.

```
(-) $ a.out
Enter the 3 percentage scores: 98, 76, 80
Enter the 3 class units: 4.5, 2.4, 2.0
Your 3-course GPA is 3.2. Congratulations!
(-) $ a.out
Enter the 3 percentage scores: 71, 65, 84
Enter the 3 class units: 1.2, 8.9
Your 3-course GPA is 2.6. Congratulations!
(-) $ a.out
Enter the 3 percentage scores: 99, 80, 70
Enter the 3 class units: 4, 4, 4
Your 3-course GPA is 3.0. Congratulations!
(-) $ a.out
Enter the 3 percentage scores: 83, 72, 79
Enter the 3 class units: 3.5, 4, 3.25
Your 3-course GPA is 2.3. Congratulations!
(-) $
```