In all homeworks, the dialogue boxes show the system prompt in $\langle -$ $\rangle$, 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 2.5–2.16 by 8pm **Tuesday October 4th.**
Sections 3.1 to 3.3 by 8p **Thursday October 6th.**

**Problem 1.** Write a program `pattern.c` that asks the user for a positive 6-digit integer, stores each digit individually, and prints the digits within a pattern of asterisks as shown in the sample output.

```
$ a.out
Enter a 6-digit number: 123456
**6**
*4*5*
1*2*3
$ a.out
Enter a 6-digit number: 154267
**7**
*2*6*
1*5*4
$ 
```
Problem 2. Write a program coins.c that prompts the user for the integer numbers of quarters, dimes, nickels, and pennies they have and displays the total amount in cents. Represent quarters (25 cents) by Q, dimes (10 cents) by D, nickels (5 cents) by N, and pennies by P. You can assume that the input will always consist of the number of coins of each type followed by the letter representing the type, with quarters, followed by dimes, etc., for example, 1Q,4D,5N,3P, for which the output should be 
$$1 \cdot 25 + 4 \cdot 10 + 5 \cdot 5 + 3 \cdot 1 = 93 \text{ cents}. \)
Problem 3. Under the laws of gravity, an object that starts with downward velocity \( v \) meters per second (m/s) and travels for \( t \) seconds, covers a distance of

\[
s = v \cdot t + 0.5 \cdot g \cdot t \cdot t,
\]

where \( g \) is a constant whose value is 9.8 m/s\(^2\).

Write a program `distance.c` that prompts the user for the double initial downward velocity of an object in m/s, and prints with two-digit precision, the distance the object covers at the end of 1, 2, and 3 seconds. Make sure your output matches the format below and numbers are left-aligned. You can assume that the initial velocity will always be between minus a million and plus a million.

```bash
(-) $ a.out
Initial velocity (in m/s): 0.0
+------------------------+
| time (s) | distance (m) |
+------------------------+
|  1      |  4.90       |
|  2      |  19.60      |
|  3      |  44.10      |
+------------------------+

(-) $ a.out
Initial velocity (in m/s): 5.7
+------------------------+
| time (s) | distance (m) |
+------------------------+
|  1      | 10.60       |
|  2      | 31.00       |
|  3      | 61.20       |
+------------------------+

(-) $ a.out
Initial velocity (in m/s): -12.3
+------------------------+
| time (s) | distance (m) |
+------------------------+
|  1      | -7.40       |
|  2      | -5.00       |
|  3      |  7.20       |
+------------------------+

(-) $
```