

# Programming Exercises

1. A commonly used method to provide a rough estimate of the right length of snowboard for a rider is to calculate 88 percent of their height (the actual ideal length really depends on a large number of other factors). Write a program that will help people estimate the length of snowboard they should buy. Obtain the user's height in feet and inches (assume these values will be entered as integers) and display the length of snowboard in centimeters to the user. There are 2.54 centimeters in an inch.

The following demonstrates the proper behavior of the program:

```
Enter your height.  
Feet: 5  
Inches: 4  
Suggested board length: 143.0528 cm
```

2. Newton's Second Law of motion is expressed in the formula  $F = m \cdot a$  where  $F$  is force,  $m$  is mass, and  $a$  is acceleration. Assume that the user knows the mass of an object and the force on that object but wants to obtain the object's acceleration  $a$ . Write a program that prompts the user to enter the mass in kilograms (kg) and the force in Newtons (N). The user should enter both values on the same line separated by a comma. Calculate the acceleration using the above formula and display the result to the user.

The following demonstrates the proper behavior of the program:

```
Enter the mass in kg and the force in N: 55.4, 6.094  
The acceleration is 0.11000000000000001
```

3. In the word game Mad Libs, people are asked to provide a part of speech, such as a noun, verb, adjective, or adjective. The supplied words are used to fill in the blanks of a preexisting template or replace the same parts of speech in a preexisting sentence. Although we don't yet have the tools to implement a full Mad Libs game, we can implement code that demonstrates how the game works for a single sentence. Consider this sentence:

A Shinigami lugged my purple socks out of the drawer as if he were a vegetarian fishing a caterpillar out of his salad.

Write a program that will do the following:

1. Print the following template:  
A Shinigami [verb] my [adjective] [noun] out of the [noun] as if he were a vegetarian fishing a [noun] out of his salad.
2. Prompt the user for a verb, an adjective, and three nouns.
3. Print the template with the terms in brackets replaced with the words the user provided.  
Use string concatenation (i.e., the combining of strings with the plus sign) as appropriate.

The following demonstrates the proper behavior of this code

A Shinigami [verb] my [adjective] [noun] out of the [noun] as if he were a vegetarian fishing a [noun] out of his salad.

```
Enter a verb: bounced  
Enter an adjective: invisible  
Enter a noun: parka  
Enter a noun: watermelon  
Enter a noun: lion
```

A Shinigami bounced my invisible parka out of the watermelon as if he were a vegetarian fishing a lion out of his salad.