



COMPUTER SCIENCE 10A (FALL TERM, 2021) INTRODUCTION TO PROBLEM SOLVING IN PYTHON

PROGRAMMING ASSIGNMENT 1 DUE: MONDAY, SEP 13TH, 11.59PM (ET)

Program Description:

This program tests your understanding of functions and `print` statements. Write a Python program in a file named `song.py`. (Use exactly this file name, including identical capitalization.)

For this assignment, you will write a program that outputs the cumulative song below, "The Twelve Days of Christmas." A *cumulative song* is one where each verse builds upon previous verses.

```
On the 1st day of "Xmas", my true love sent to me  
a partridge in a pear tree.
```

```
On the 2nd day of "Xmas", my true love sent to me  
two turtle doves, and  
a partridge in a pear tree.
```

```
On the 3rd day of "Xmas", my true love sent to me  
three French hens,  
two turtle doves, and  
a partridge in a pear tree.
```

```
On the 4th day of "Xmas", my true love sent to me  
four calling birds,  
three French hens,  
two turtle doves, and  
a partridge in a pear tree.
```

```
On the 5th day of "Xmas", my true love sent to me  
five golden rings,  
four calling birds,  
three French hens,  
two turtle doves, and  
a partridge in a pear tree.
```

```
On the 6th day of "Xmas", my true love sent to me  
six geese a-laying,  
five golden rings,  
four calling birds,  
three French hens,  
two turtle doves, and  
a partridge in a pear tree.
```

The verses printed by your program must **exactly** reproduce the output above. This includes identical wording, spelling, spacing, punctuation, and capitalization.

One way to write this program would be to simply write a series of `print` statements that output each line of the song in order. But such a solution would not receive full credit. Part of the challenge of this assignment lies in recognizing the structure and redundancy of the song and improving the code using functions.

Guidelines:

You should not have any code, except a call to your `main` function, outside of a function. You should not place any `print` statements inside of the `main` function. (It is okay to have `print` statements to just print blank lines in `main`.) Instead of printing outside of a function or in `main`, use additional functions for two reasons:

1. Structure

You should write functions to capture the structure of the song. You should, for example, have a function for each of the verses of the song to print that verse's entire contents.

2. Eliminating redundancy

You should use only one `print` statement for each distinct line of the song (other than blank lines). For example, the following line appears several times in the output, but you should have only one `print` statement in your program that prints that line of the song:

```
a partridge in a pear tree.
```

A function that prints just one line is not good style. Instead, identify groups of lines that appear in multiple places in the song and create functions to represent those groups. There is a general cumulative structural redundancy to the song that you should eliminate with your functions. Recall that functions can call other functions if necessary (which can themselves call other functions, and so on). The key question to ask is whether you have repeated lines or groups of lines of code that could be eliminated if you structured your functions differently. This includes sequences of `print` statements and also repeated sequences of function calls.

You do NOT have to eliminate redundancy in lines that are similar but not identical, such as these:

```
On the 1st day of "Xmas", my true love sent to me  
On the 2nd day of "Xmas", my true love sent to me
```

Include a comment at the beginning of your program with some basic information and a description of the program in your own words. For example:

```
# Name Student  
# COSI 10a, Fall 2021  
# Programming Assignment #1  
#  
# Description: ...
```

For this assignment, you should limit yourself to the Python features covered up to lecture 3. Though we may cover more material while you work on this assignment, please do not use it on this program. Specifically, do not use mathematical expressions, `print` statements with an `end` parameter, or `for` loops.

Submission and Grading:

Submit via Latte a zip file named `yourfirstname_yourlastnamePA1.zip` which contains the file `song.py` (Please make sure to use exactly this file name, including identical capitalization).

Your program should be submitted via Latte the day it is due (for late policy check the syllabus).

Part of your program's score will come from its "external correctness." External correctness measures whether the output matches exactly what is expected. We are very picky about the output matching exactly and expect every character and space to match. Programs that do not run will receive no external correctness points.

The rest of your program's score will come from its "internal correctness." Internal correctness measures whether your source code follows the stylistic guidelines specified in this document. This includes having an adequate comment header and capturing the structure and redundancy of the song as specified previously.