

# Python Problems

ORMC - Intermediate 1

7 July 2024

## 1 Warm-Up

**Problem 1.** *Create a variable named Frodo and set it to “Baggins”, and then overwrite its value.*

**Problem 2.** *Write these equations using python:*

1. *x equals three*
2. *increment x by 5*
3. *multiply x by 2*
4. *y equals x minus 10*
5. *divide y by 2*
6. *print x and y*

**Problem 3.** *Create a series of if statements to print which movie a cinemagoer should watch based on these conditions:*

1. *If they’re under 10, “Tangled”*
2. *If they’re under 13, “Lord of the Rings”*
3. *If they’re under 18, “Murder on the Orient Express”*
4. *If they’re between 19 and 22, “The Eras Tour”*
5. *Otherwise “Harry Potter and the Sorcerer’s Stone”*

**Problem 4.** *Write a function that prints out “Hallelujah” every time its called.*

**Problem 5.** *Write a function that prints out whatever number a user inputs to the third power.*

**Problem 6.** *Write a for loop that repeats 13 times and prints out “Welcome to New York” (or whatever other lyrics you like) every time.*

**Problem 7.** *Create a list holding the names of any five US presidents of your choosing, and then use a for loop to loop through that list and print all those names.*

**Problem 8.** *Code a function that returns true if your number is divisible by 2 and false otherwise.*

## 2 Problems

**Problem 9.** Write a program that converts a given temperature from Fahrenheit to Celsius. Recall that the relationship between Fahrenheit and Celsius is  $C^\circ = \frac{5}{9}(F^\circ - 32^\circ)$ .

**Problem 10.** Write a program that takes a list of grades and calculates the average. Hint: To find the sum of all the values in a list, use `sum(yourlist)`. And to find how many data points are in that list, use `len(yourlist)`

**Problem 11.** Write a program that checks if a given number is prime. Hint: You can use the `%` operator to find the remainder. For example `16 % 3 = 1`

**Problem 12.** Write a program that outputs a letter grade given a student's score.

**Problem 13.** Write a program that checks if a given year is a leap year. Hint: A leap year occurs when the year is divisible by 4 but not 100, unless it is divisible by 400.

**Problem 14.** Write a program to generate the Fibonacci sequence up to the  $n$ th term, where  $n$  is your input. Hint: A Fibonacci sequence is a sequence where the each number is equal to the sum of the preceding two, with the exception of the first two numbers which are 0 and 1.

**Problem 15.** Write a program that prints the multiplication table up to  $10 \times 10$ . Hint: Use nested for loops to create the table

**Problem 16.** Write a program that calculates  $n!$ , with  $n$  as your input. The exclamation mark denotes a factorial, which is an operation that represents the product of an integer and those below it. For example,  $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$

**Problem 17.** Write a program that checks if a given string is a palindrome. Hint: A palindrome is a string that reads the same forwards and backwards.

The following questions require the use of the Turtle module and some functions you may not be familiar with yet:

- To change the color of your drawing, you can use the `color()` function. For example, `color("brown")` or `color("red")` will change the pen color to brown or red, respectively.
- To color in an area, adding `begin_fill()` before your code and `end_fill()` after will do so in the area drawn by the code between those two statements.
- To move the “turtle” without drawing a line, you can add the `penup()` function to do such that. And if you want to draw again, you can add `pendown()`.
- To change the angle based on a fixed heading rather than the cursor’s current orientation, use `setheading(yourangle)`.
- To move the cursor to a specific coordinate, use `goto(x, y)`, with  $x$  and  $y$  being your desired coordinates on the drawing plane.

**Problem 18.** *Draw a star.*

**Problem 19.** *Draw a dashed line.*

**Problem 20.** *Draw a series of concentric circles with each circle having a different color.*

**Problem 21.** *Draw a spiral.*

**Problem 22.** *Draw an octagon, but at each vertex is a smaller octagon.*

**Problem 23.** *Draw a colored-in, red isosceles triangle.*

**Problem 24.** *Draw an 8x8 chessboard.*

**Problem 25.** *Draw the US flag.*

**Problem 26.** *Draw an octagon, but at each vertex is a smaller octagon. And at the vertices of these smaller octagons is an even smaller octagon.*

**Problem 27.** *Create a generalized function for type of drawing you made in problem 22 and 26, with the input of the function being how many times you want the octagon-ception to go down.*