Introduction to:
Computers & Programming:
Exercises Using:

(the print function
and
Mathematical Operators
and
Data Types)

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Exercise 1 to 3

1. What are some simple ways to print the same thing 3 times, with a space in between each instance? Let's assume one variable as input to the function `print_3_times`.

2. What is a simple way to print the same thing 3 times, each on a newline?

3. How would you convert an arbitrary temperature from Fahrenheit to Celsius?
How to Solve a Complex Problem

• Break down big problem into small problems
  – For each small problem either:
    • Solve the problem if you know how
    • Break it down further if you don't know how to solve it and:
      – Try to solve each of the smaller problems
      – Etc.
Until we find problems easy enough to solve.
Exercise 4

• Given
  – Today's date:
    • Month, day, year, and day of the week
  – An arbitrary number of days in the future (e.g., 1500)

• How should we go about identifying that day in the future?
  – Month, day, year and day of the week
How Can We Solve This Problem?

1. Some Pieces of the Problem
   a) Find the year
   b) Find the month
   c) Find the day
   d) Find the day of the week

2. Are all calculation dependent on each other or are any independent of the others, i.e., is there an order

3. Write Out Pseudo Code for Solving This Problem
   • We can implement this late in the term
003 Solution

• Solve Week Problem Using Modulus 7
  – Represent days of the week from 0 to 6 with
    • 0 Sunday and 6 Saturday
    • New Weekday number = old weekday number + interval modulus 7
    • Convert new weekday number to weekday name

• Year, Month, Day are related
  – Find Day in Current Year
    • Current day = Add together the days in the previous months plus the day in the current month
    • Years in the future = (interval + current day) // 365 + leap_year_modification
      – leap_year_modification(number of Feb 29ths)
Calculating Month

• Set up start and end positions for months:
  – Number months from 0 to 11
  – start(0) = 1
  – start(month) = end(month-1)+1
  – end(month) = start(month)+length(month)-1

• Calculate new day of year as
  – (Original day + interval) % 365 (with leap year modification)
  – Pick month in chart such that: start(month) <= new day <= end(month)
Calculating Day

• New day of month = new day – end(last month)

• Done except for figuring out leap years
Summary

• A Few Simple Problems
  – Implemented in Python

• One Larger Problem
  – Broken Down into Small Problems
  – The Problems were Ordered
  – Then Solved Using Pseudo Code

• Limitations of Our Current Python Programming:
  – Variables
  – If/Then Structures
  – Repetition Structures