

Lab 04: Intro to Python

Download and install Python version 2.7.5, and write your solutions to the following questions by modifying the solution template which can be found on the AITI website. Submit your answers to the box!

1. Fibonacci

Write the definition of a Python procedure fib, such that fib(n) returns that nth Fibonacci number. Recall the definition of fib(n):

Fib(0) = 0
Fib(1) = 1
Fib(n) = fib(n-1) + fib(n-2) if n >= 2

Note that, although the definition is recursive, you do not need to write a recursive program to solve it (but you can obviously). One simple alternative strategy is to construct a list of all Fibonacci numbers up to the nth one and return the last element.

2. Zeller's Algorithm

Zeller's Algorithm computes the day of the week on which a given date will fall (or fell). In this exercise, you will write a program to run Zeller's algorithm on a specific date. The program should use the algorithm outlined below to compute the day of the week on which the user's birthday fell in the year they were born and print out the result to the screen.

Ask the user for the month as a number between 1-12, where March is 1 and February is 12. If born in January or February, enter previous year (see notes below). In the end, print out the name of the user and the day of the week they were born.

Zeller's algorithm is defined as follows:

Let A, B, C, D denote integer variables that have the following values:

A = the month of the year, with March having the value 1, April the value 2, ...
December the value 10, and January and February being counted as months 11 and
12 of the preceding year (in which case, subtract 1 from C)
B = the day of the month (1, 2, 3, ..., 30, 31)
C = the year of the century (e.g. C = 89 for the year 1989)

D = the century (e.g. D = 19 for the year 1989)

Note: if the month is January or February, then the preceding year is used for computation. This is because there was a period in history when March 1st, not January 1st, was the beginning of the year.

Let W, X, Y, Z, R also denote integer variables. Compute their values in the following order using integer arithmetic:

$$W = (13 * A - 1) / 5$$

$$X = C / 4$$

$$Y = D / 4$$

$$Z = W + X + Y + B + C - 2 * D$$

R = the remainder when Z is divided by 7

The value of R is the day of the week, where 0 represents Sunday, 1 is Monday, ... , 6 is Saturday. If the computed value of R is a negative number, add 7 to get a non-negative number between 0 and 6.

Print out R. You can check to be sure your code is working by looking at <http://www.timeanddate.com/calendar/>.

Run some test cases – try today's date, your birth date, etc.

3. Rock Paper Scissors

In this exercise we are practicing the if statement: Here are the rules:



Complete the function `rock_paper_scissors()` that will generate the outcome of the game. Your program should work as follows:

```
>>>Player 1? rock
>>>Player 2? scissors
>>>Player 1 wins.
```

The only valid inputs are rock, paper and scissors. If the user enters anything else your program should output "This is not valid".

```
# Use the following template:
# MIT AITI Indonesia Summer 2013
# File: Python1lab.py
# Below are templates for your answers to Lab 4

# INSTRUCTIONS: Write your complete name in student_name and age in student_age
# Complete the implementation of functions and classes as described in the handout.
# Delete the pass statements below and insert your own code.

student_name = 'Markus von Rudno'
student_age = 22

def fib(n):
    # Insert your code here
    pass # delete this

def zellers():
    # ask the user of their first and last names

    # ask the user for their date of birth

    # find the century and year

    # apply zeller's algorithm

    # print out the result

    pass # delete this

def rock_paper_scissors():
    # ask the user for the players' choice of object

    # make sure the object name entered is valid

    #print out the result of the game

    pass # delete this
```