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Introduction to Computer Science, Winter Semester 2017
Practice Assignment 2

Discussion: 14.10.2017 - 19.10.2017

Exercise 2-1 Flight Time

Write an algorithm to determine the flying time between two cities given the mileage between them and the average speed of the airplane.

Exercise 2-2 BMI
To be discussed in Tutorial

Write an algorithm that calculates your **BMI** given your **weight** and **height**.
The BMI is calculated using the weight divided by height squared, where weight is in kg and height is in meters.

Exercise 2-3 Appliance Cost

Write an algorithm that calculates and prints the annual cost of running an appliance given the cost per kilowatt-hour in cents and the number of kilowatt-hours the appliance uses in a year.

Exercise 2-4 Planting Trees
To be discussed in Tutorial

Write an algorithm that given the width and length of a garden in meters calculates the area of the garden together with the number of trees that could be planted on this garden area, knowing that each tree needs a space of 50 cm^2 .

Note: You can use the function `int(x/y)` that gives the integer part of the result of the division x/y . For example `int(5/2)=2`. You can also use the integer division operator `//` directly.

Exercise 2-5 Compound Interest

Write an algorithm that will output the account **balance** each year for 3 years given the initial **balance** and **interest** rate.

The interest is calculated for one year by multiplying the current account balance by the interest rate and adding this to the balance.

Exercise 2-6 Pythagorean Theorem
To be solved in Lab

The Pythagorean Theorem states that the sum of the squares of the two sides of a right angle triangle is equal to the square of its hypotenuse. For example, 3, 4 and 5 are the sides of a right angle triangle as they form a Pythagorean Triple ($5^2 = 4^2 + 3^2$). Given 2 numbers, m and n where $m \geq n$, a Pythagorean Triple can be generated by the following formulae:

$$\begin{aligned}a &= m^2 - n^2 \\b &= 2 \times m \times n \\c &= \sqrt{a^2 + b^2}\end{aligned}$$

Write an algorithm that reads in values for m and n and prints the values of the Pythagorean Triple generated by the formulae above.

Exercise 2-7 Get the Time

Write an algorithm that reads the amount of time in seconds and then displays the equivalent hours, minutes and remaining seconds.

- One hour corresponds to 60 minutes.
- One minute corresponds to 60 seconds.

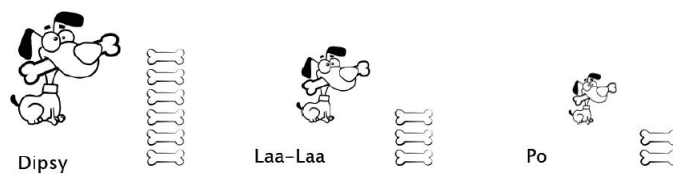
Exercise 2-8 Get the Money
To be solved in Lab

Write an algorithm that reads the amount of money in pennies and displays the equivalent dollars, quarters, dimes, nickles and pennies.

- One dollar corresponds to 100 pennies.
- One quarter corresponds to 25 pennies.
- One dime corresponds to 10 pennies.
- One nickle corresponds to 5 pennies.

Exercise 2-9 Feeding Your Pets

After knowing that he will be taking the Introduction to Computer Science course in his first year in the GUC, a freshman engineering student decided to switch career and work as a veterinarian. In his first day at his new job, he was asked to feed 100 bones to three dogs; Dipsy, Laa-Laa, and Po. Dipsy eats twice as much as Laa-Laa eats. Laa-Laa eats one and a half times what Po eats.



- Think of an algorithm that, given the amount of bones, would print(out how many bones each dog will be fed.)

- Enhance your algorithm, by making it print(out how many bones would remain) after the distribution of the bones among the three dogs.

Exercise 2-10 Swaping Numbers
To be discussed in Tutorial

Write an algorithm that takes as input two numbers and swaps the values of these numbers.

- Write the algorithm using a temporary variable
- Swap the two numbers without using a temporary variable. Is it always possible to swap any two values of any types?

Exercise 2-11 Sum Digits
To be discussed in Tutorial

Write an algorithm that given a 3-digit number prints out the sum of its digits.

Example: if the number is 425 then the output should be 11.