National University of Singapore

Faculty of Law (2024-2025)

LC2017: Law and Technology

Tutorial (Week 2): Python – Numbers and Expressions

This tutorial is an in-class Python coding exercise. Your participation in the tutorial will make up your class performance grades comprising 15% of your overall grades for this course.

Write Python 3.12.x+ code for all the following, except for questions marked with an *, which are optional.

You are encouraged to run your code in script mode (rather than in interactive mode). To view/output the results of your calculations in script mode, use the `print` function (covered in Lecture 6). For instance, to output the expression $1 + 2 - 3$, you would code it as:

```
print(1+2-3)
```

1. Calculate the following expressions.

   (a) $4 + 5 \times 3.2 - 2$

   (b) $10^2 \div 4.25 + 7\frac{1}{2} \times 2$

   (c) $6 \div 2(1 + 2)$

   Note: You are not required to use variables (covered in Lecture 5).

2. The restaurant where you had lunch has a 1-for-1 special: if you order two main courses, you only have to pay for the costlier item. You ordered the Fettuccine Al Spinaci at $30.00, and your friend ordered the Pizza Super Supreme at $36.00. Calculate the total amount payable for lunch. If you and your friend split the bill, how much did each person have to pay?

   Note: Do remember to add **10% service charge** and **9% GST**.

   Hints:

   ⓘ The 10% service charge is applied first to the total cost of the food and then the 9% GST is applied to it (inclusive of the service charge), to yield the total amount payable.

   ⓘ You may use the `max` function covered in Lecture 4A to work out which is the costlier item. E.g., `max(1.0, 2.0)` will evaluate to 2.0, and `max(3.0, 1.5)` will evaluate to 3.0.

   ⓘ You may use the `round` function covered in Lecture 4A to round the number to 2 decimal places. E.g. `round(1.35, 1)` will evaluate to 1.4.

3. The table below shows the rate for printing class T-shirts at a printing shop for each quantity-step. The class budget is $3,000 for T-shirts.

Quantity	Cost (w/o GST)
First 20 T-shirts	$12.50 each
Next 50 T-shirts	$11.75 each
Next 100 T-shirts	$10.45 each

Next 200 T-shirts	$9.35 each
Thereafter	$8.90 each

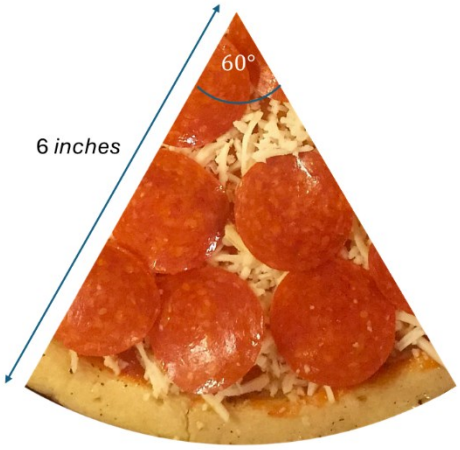
(a) How many T-shirts could the class print?

*(b) If the printing shop charges 9% GST, how many T-shirts could the class print?

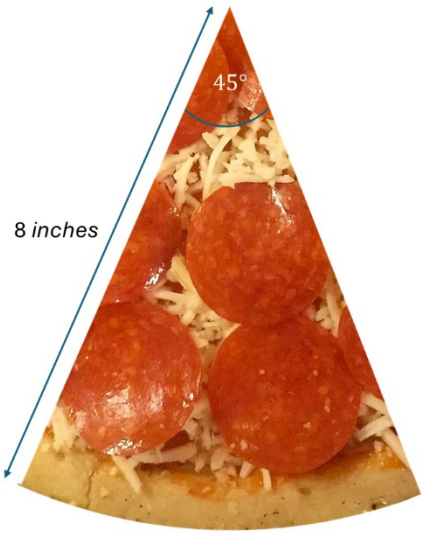
Hints:

- ⓘ Calculate the T-shirts you could buy in for each quantity-step. Calculate the cost of 20 T-shirts, then 50 more T-shirts (i.e. 20 + 50 = 70 total), then 100 more T-shirts (i.e. 20 + 50 + 100 = 170 total), and so on, always checking your total cost to see if you have exceeded your budget.
- ⓘ To calculate the number of T-shirts you could buy at the final (appropriate) quantity-step, subtract from the budget the cost of all the T-shirts up to the penultimate quantity-step and divide that by the cost per T-shirt for the final quantity-step.
- ⓘ Round that final quantity down to an integer using the `int` conversion function.
- ⓘ If 9% GST is charged, adjust all your expressions above with the multiplier 1.09.

*4. You are the Legal Executive for the Consumer Protection Division of the Competition and Consumer Commission of Singapore and are investigating a claim that a pizzeria has put up a misleading advertisement to deceive or mislead consumers, under s 4 of the Consumer Protection (Fair Trading) Act 2003. The advertisement is about a single slice pizza promotion that ran on 14 March (Pi Day) as follows:



$6 per slice



Pi Day Promotion! For a limited time, upsize your pizza slice to an 8-inch pizza for just $2 more!

For the promotion, is it more cost-effective to purchase a normal pizza slice (6 slices per 6" pizza) or the Pi Day Promotion pizza slice (8 slices per 8" pizza)?

Credit: Photo by Jonathan Cutrer from San Angelo, United States - Pepperoni Pizza, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=60458764

Hints:

- ⓘ If cost-effectiveness is assessed by the amount of pizza (area) per dollar (price) of each slice of pizza, use the area of the circle formula times the fraction of the slice to calculate the area of each pizza slice.
- ⓘ Divide the area of each slice by the cost of each slice to get the area of pizza per dollar. Compare the area/price for both pizza slices.

You are strongly encouraged to work on these exercises ahead of tutorials. And you may discuss techniques and approaches, including exchanging hints, with each other. The temptation to get another student's answer or search for answers online or use AI-powered tools is there but do remember that you will learn best by thinking and working through the exercises yourself.

Have fun coding!

A/P Daniel Seng

July 26, 2024

Version 1.1 – Aug 4, 2024

- Removed simplifying assumption about service charge and GST. Clarified that service charge is GST taxable. Adjusted the numbers to simplify the rounding complications.