

CMPT 120-D400 Midterm Exam Sample

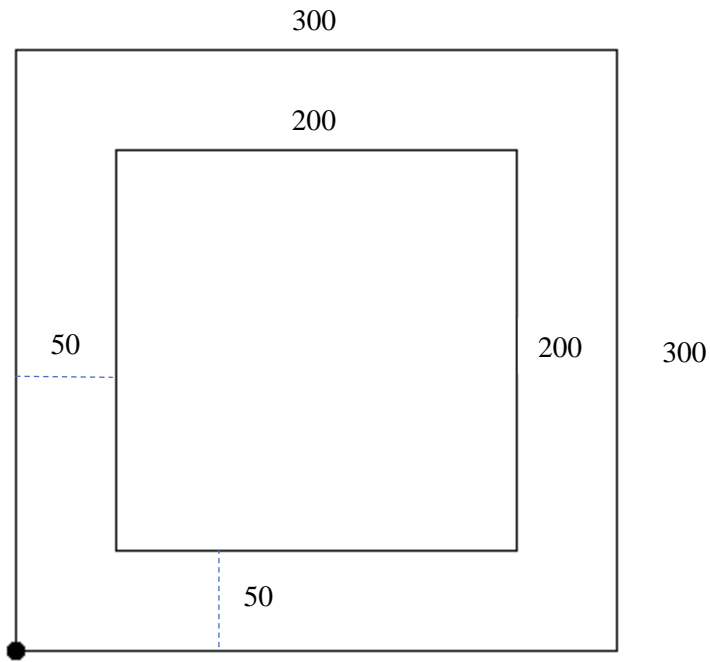
Fall 2022

Coding Questions

This is a **60 minute closed book exam**: notes, books, computers, calculators, electronic devices, etc. are **not** permitted. Do not speak to any other students during their exam or look at their work. Please remain seated and **raise your hand** if you have a question.

Turtle Graphics

(10 marks) Write a **complete** Python turtle graphics program that draws this picture:

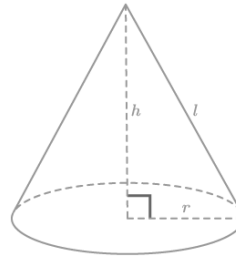


- Assume the turtle starts at the black dot in the lower left corner facing east (i.e. to the right).
- The dimensions of the outer square are 300 by 300, and the dimensions of the inner square are 200 by 200.
- As shown by the dashed line, there is a 50 pixel gap all around.
- The only module you should import is `turtle`. You don't need to write any of your own functions, but can if you like.
- Just draw the two squares. **Don't** draw the dot, numbers, or dashed lines.

Functions

a) (5 marks) The volume of a **cone** is given by this formula:

$$\frac{1}{3}\pi r^2 h$$



h is the height of the cone, and r is the radius of the bottom circle.

The variable l in the diagram is not used in the formula.

Write a Python function called `cone_volume(r, h)` that uses this formula to calculate and return the volume of a cone with the given radius and height. If r or h is 0, or less, then the function should return 0.

Use 3.14 for the value of π .

Here's how it should work:

```
>>> cone_volume(2, 10.8)
45.21600000000001
>>> cone_volume(-2, 10)
0
```

b) (5 marks) Write a Python function called `describe(country, capital)` that returns a string saying that `capital` is the capital city of `country`. Format the string exactly as in these examples:

```
>>> describe('Canada', 'Ottawa')  
"Ottawa is Canada's capital city"
```

```
>>> describe('Australia', 'Canberra')  
"Canberra is Australia's capital city"
```

Selection

(5 marks) Write a **complete** Python program that asks the user enter two numbers, x and y, and then prints:

- “x and y are the same” if x and y are equal; replace x and y in the string with their values (as shown below)
- “a is less than b”, where a is the min of x and y, and b is the max of x and y (as shown below)

Important *Don't* use the built-in Python `min` and `max` functions in your program, and *don't* import any modules.

Assume the user enters valid floats.

Here's a sample run:

```
What is x? 4.2
What is y? -7
-7.0 is less than 4.2
```

And another:

```
What is x? 3.1
What is y? 3.1
3.1 and 3.1 are the same
```

Iteration

a) (5 marks) Write a complete Python program that uses a **while-loop** (and no other kind of loop!) to print the multiples of 5 from 1 to 1000:

```
5
10
15
20
...
995
1000
```

b) (5 marks) Write a complete program that asks the user to enter a string. If they **don't** enter "yes" or "no" then it asks them to try again (as shown in the sample run). It keeps re-asking them until they enter "yes" or "no", and finally prints "Got it!" when they do

Here are three sample runs:

```
Yes or no? yep  
Sorry, I don't understand that.
```

```
Yes or no? nope  
Sorry, I don't understand that.
```

```
Yes or no? yes  
Got it!
```