

ENGR 102 – Fall 2022
Lab: Topic 9 (individual)

Deliverables:

There are several deliverables for this assignment. Please submit the following files to zyBooks:

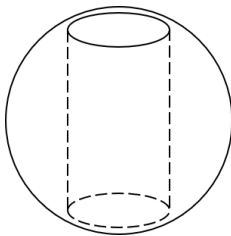
- `small_functions.py`

Activity #1: Small functions – individual

This activity is meant to give you more experience writing functions. Name your file `small_functions.py` and include all of the following parts in one file.

For all parts, include the function named as specified in your submission. Your program does NOT have to include output, however **you should test your functions**. For example, you might include several function calls and print the results. You may make multiple functions within any one of these problems as long as the main function is named accordingly. Please comment out **ALL** `input()` statements before submitting.

- a) Imagine that you have a spherical bead. In other words, a sphere with a cylindrical hole drilled through the middle:



Write a function named **parta** that will take in as parameters the radius of the sphere and the radius of the hole, and return the volume of the bead. Note: You will probably want to calculate the volume of a spherical cap (https://en.wikipedia.org/wiki/Spherical_cap)

- b) Write a function named **partb** that will take in as a parameter a positive integer n and determines if n can be calculated as the sum of 2 or more consecutive positive, odd integers. If it can, return a list of the numbers, otherwise return `False`.
- c) Write a function named **partc** that will take in as parameters a single character, a person's name, company, and email, and returns a single string of the person's digital business card. Use the character as a border, and provide 2 spaces as padding on either side of the longest entry. Your function must return a single string, do NOT print the digital card.

```
Example using parameters ('*', 'Dr. Ritchey', 'Texas A&M University',
'snritchey@tamu.edu'):
*****
*      Dr. Ritchey      *
* Texas A&M University  *
*  snritchey@tamu.edu   *
*****
```

- d) Write a function named **partd** that takes in as a parameter one list of numbers and returns the minimum, median, and maximum value of the list, in that order.

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- e) Write a function named **parte** that takes in as parameters two parallel lists: a list of times (in increasing order), and a list of distances traveled by that point in time. The function should return a new list giving the velocity between consecutive time measurements. The new list should have a length of one less than the original lists.
- f) Write a function named **partf** that takes in as a parameter one list of numbers and determines if two of the numbers in the list add to 2026. If they do, return the product of the two numbers, otherwise return `False`.