

Midterm Exam II

COMP 150: Introduction to Computing

LUC username: _____

Full name: _____

Date: _____

For each of the following problems, answer to the best of your ability. Use legible penmanship and complete sentences where merited.

1. Describe arguments in Python functions. What are positional arguments? What does it mean to default an argument? In what order should positional and default arguments be used? What are keyword arguments, and what problem do they solve?

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Make a new colab notebook named
`<your_luc_username>_COMP150_mt2`

Where your luc username is the username associated with your email. Clearly indicate using comments or text fields in the notebook which problem you are working on for each set of cells.

Make sure you save regularly in case there are issues with crashing or submission!

1. Data Load and Analysis (25 pts)

1. Download the CSV "housing.csv" - this dataset describes house attributes and sale price for homes sold in Iowa in the mid-2000s. Open this CSV and store it as a dataframe called "housing".
2. Print all columns from the dataset
3. Print all unique years when homes were sold - column "YrSold"
4. Print all unique years when homes were constructed - column "YearBuilt"
5. Print all unique styles of home - column "HouseStyle"
6. What is the maximum "EnclosedPorch" square footage?
7. Filter the dataset so only houses with pools are depicted. Save this dataframe as a copy called "pools".
 - a. Hint: you can use the column "PoolArea" and filter so it's > 0
8. What is the mean "SalePrice" for "pools"?
9. Now filter the dataset so only houses without pools are depicted. Save this dataframe as a copy called no_pools.
10. What is the mean "SalePrice" for "no_pools"?

2. Plotting (25 pts)

Using the dataframe from (1), make the following plots and show() them in the notebook:

1. Make a box plot **using the full dataset** where $x = \text{"YrSold"}$ and $y = \text{"SalePrice"}$. Color the dot by "HouseStyle". Do you notice any trends? Leave your answer in a comment near the figure.
2. Make a scatter plot **using the full dataset** where $x = \text{"YearBuilt"}$ and $y = \text{"SalePrice"}$. Color the dot by "HouseStyle". Do you notice any trends? Leave your answer in a comment near the figure.
3. Make a scatter plot **using "pools"** where $x = \text{"LotArea"}$, $y = \text{"PoolArea"}$, and color the dot by "HouseStyle". Do you notice any trends? Leave these answers in a comment.

3. Functions (25 pts)

1. Create a custom function called `add_mult(...)`.
2. Give it two positional arguments "a" and "b".
3. Give it a third argument "c" with a default of 10.
4. Have this function return the value: $(a + b) * c$

5. Create another custom function called `part_three(...)`.
6. Have it take an argument "n" with a default of 5.

7. In this function, use a for loop to call `add_mult(...)` n times, from 1 to n (*including* n).

Note: the value we iterate over is called the iterator:

```
for i in range(...)
```

 The iterator here is called “i”

8. For each iteration of the for loop, pass in the iterator as a and b (but *not* as c) -- leave c as the default.

```
a = i, b = i, c = (leave as default)
```

9. Print the result for each iteration of the loop using a format string:

```
“The result when i = {} is {}".format(i, result)
```

4. If you have time, for 5% extra credit, leave me (constructive) comments on the course below! I’m always looking to improve.