Name:_____ **Partner:** _____

Python Activity 64: Java – Functions & Methods

Java is *programming language* that shares some commonalities with Python.
Examing *control structures* such as functions in Java and Python help us think more deeply about these concepts!

Learning Objectives
Students will be able to:
Content:
- Predict what Java code with ***methods*** will do
- Describe the differences in syntax between Python & Java ***functions/methods***

Process:
- Write Java code equivalents of Python code using ***functions/methods***

Prior Knowledge
- Python concepts: Python, Java data types, Java conditionals, Java loops

Critical Thinking Questions:

FUNCTIONS

1. The table below contains an example of a Java function that would be nested within a class. It is a Java version of a piece of code we reviewed much earlier in this course.
   a. Circle the Java concepts that are new to us.
   b. Next to each line of code, write what you think it does. Place a question mark next to your guesses that you're unsure of. We'll talk about these as a class.

Java Example (nested within a class)

```
public class MysteryClass {
  public static int mystery(String word) {

     int count = 0;

     String vowels = "aeiou";

     int len = word.length();

     for (int i = 0; i < len; i++) {

          char letter = word.charAt(i);

          String s = String.valueOf(letter);

          if (vowels.contains(s)) {

            count++;
          }
     }
     return count;

  }
}
```

c. What might this code do?: _____

d. The following line of code is the *method header*:

```
public static int countVowels(String word) {
```

How would you write a comparable function definition in Python?

_____

How does the syntax for *function/method headers* differ in Python and Java??

_____

e. How does `returning` a value differ in Java and Python?

_____

2. The table below shows the Python and Java versions of a *linear search algorithm*:

Search Algorithm:: Python (left), Java (right)

```python
def doSearch(a_lst, item):

    for el in a_lst:
        if item == el:
            return True

    return False

if __name__ == "__main__":
  array = [4, 6, 9, 1, 3]

  print("4 in array?", doSearch(array,4))
  print("2 in array?", doSearch(array,2))
```

```java
public class LinearSearch {

  public static boolean doSearch(int array[], int elem){
    int length = array.length;
    for (int i =0; i < length; i++) {
      if (array[i] == elem) {
        return true;
      }
    }
    return false;
  }

  public static void main(String args[]) {
    int [] array = new int[] {4, 6, 9, 1, 3};

    System.out.println("4 in array?: " + doSearch(array, 4));
    System.out.println("2 in array?: " + doSearch(array, 2));
  }
}
```

What are the Java concepts that are new to us, and what are their Python equivalents, according to this code?

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Application Questions: Implementing Selection Sort in Java from Lab this week is a great application!

Application Questions:

1. Write a Java program that does the equivalent of the Selection Sort program we wrote earlier in the semester (*Hint: this is actually our final lab assignment)*:

```
def selection_sort(values):
    """Takes a list as input, sorts it using
    selection sort, and returns sorted lists."""
    # find size
    size = len(values)

    # traverse through all elements
    for i in range(size):

        # find min element in remaining unsorted list
        min_index = i
        for j in range(i + 1, size):
            if values[min_index] > values[j]:
                min_index = j

        # swap min element with element at i
        values[i], values[min_index] = values[min_index], values[i]

if __name__ == "__main__":
  size = 10
  rand_lst = []

  for _ in range(size): # make a list of random numbers
      rand_lst.append(randint(0, 100))

  print("List before sorting:")
  print(rand_lst)

  sorted_lst = selection_sort(rand_lst)

  print("Sorted List:")
  print(sorted_lst)
```

```
import java.util.Random;
import java.util.Arrays;

public class SelectionSort {
  public static int[] selectionSort(int[] values){









  }
  public static void main(Strings args[]){
```