

1. TRUE / FALSE QUESTIONS

- _____ Lists are dynamic data structures such that items may be added to them or removed from them.
- _____ A list cannot be passed as an argument to a function.
- _____ The `remove` method removes all occurrences of an item from a list.
- _____ The `sort` method rearranges the elements of a list so they are in ascending or descending order.
- _____ To calculate the average of the numeric values in a list, the first step is to get the total of values in the list.
- _____ The `del` statement deletes an item at a specified index in a list.
- _____ A file object's `writelines` method automatically writes a newline (`'\n'`) after writing each list item to the file.
- _____ A list can be an element in another list.
- _____ You can remove an element from a tuple by calling the tuple's `remove` method.
- _____ In order to create graphs using the `matplotlib` package, you need to import the `pyplot` module.
- _____ To add a descriptive label to the X and Y axes of a graph when using the `matplotlib` package, you need to import the `labels` module.

2. COMPLETION QUESTIONS: Fill in the blanks.

- a) The _____ method is commonly used to add items to a list.
- b) The _____ method reverses the order of the items in a list.
- c) The _____ function returns the item that has the lowest value in the sequence.
- d) Each element in a tuple has a(n) _____ that specifies its position in the tuple.
- e) The _____ package is a library you can use in Python to create two-dimensional charts and graphs.
- f) The _____ function can be used to convert a list to a tuple.
- g) Tuples are _____ sequences which means that once a tuple is created, it cannot be changed.
- h) Each element in a tuple has a(n) _____ that specifies its position in the tuple.

3. ALGORITHM WORKBENCH QUESTIONS

- a) Create a list named `bool_list` with 100 Boolean `False` values.
- b) Assign the value `5.5` to the last element in the list named `numbers`.

- c) Compute the sum of the first five elements in the list named `numbers`.
- d) Display the maximum element in the list named `numbers`.
- e) Randomly generate an index and display the element of this index in the list named `numbers`.
- f) Write a function that accepts a list as an argument (assume the list contains integers) and returns the total of the values in the list.
- g) Assume `scores` is a list of randomly-ordered numbers between 0 and 100. Write code that sorts the list, reverses the order of the items in the list, and prints the biggest value in the list.
- h) Write a statement that creates a two-dimensional list named `numbers` with 5 rows and 3 columns. Then write nested loops that get an integer value from the user for each element in the list.

MULTIPLE CHOICE QUESTIONS

- 4. Which of the following would you use if an element is to be removed from a specific index?
 - a) a `del` statement
 - b) a `remove` method
 - c) an `index` method
 - d) a `slice` method
- 5. Which method can be used to place an item at a specific index in a list?
 - a) `append`
 - b) `index`
 - c) `insert`
 - d) `add`

6. This list method adds an item to the end of an existing list.
- a) add
 - b) add_to
 - c) increase
 - d) appends
7. What will be the value of the variable list2 after the following code executes?
- ```
list1 = [1, 2, 3]
list2 = []
for element in list1:
 list2.append(element)
list1 = [4, 5, 6]
list2 = list2 + list1
```
- a) [1, 2, 3]
  - b) [4, 5, 6]
  - c) [4, 5, 6, 1, 2, 3]
  - d) [1, 2, 3, 4, 5, 6]
  - e) Nothing; this code is invalid
8. This removes an item at a specific index in a list.
- a) the remove method
  - b) the delete method
  - c) the del statement
  - d) the kill method
9. Which method can be used to convert a list to a tuple?
- a) append
  - b) tuple
  - c) insert
  - d) list
10. Which method can be used to convert a tuple to a list?
- a) append
  - b) tuple
  - c) insert
  - d) list
11. Which of the following statements creates a tuple?
- a) values = [1, 2, 3, 4]
  - b) values = {1, 2, 3, 4}
  - c) values = (1)
  - d) values = (1,)

12. In order to create a graph in Python, you need to include

- a) `import matplotlib`
- b) `import pyplot`
- c) `import matplotlib.pyplot`
- d) `import pyplot`

13. What will be the output after the following code is executed?

```
import matplotlib.pyplot as plt
def main():
 x_crd = [0, 1, 2, 3, 4, 5]
 y_crd = [2, 4, 5, 2]
 plt.plot(x_crd, y_crd)
main()
```

- a) It will display a simple line graph.
- b) It will display a simple bar graph.
- c) Nothing; `plt` is not a Python method.
- d) Nothing; the number of x-coordinates do not match the number of y-coordinates.

### **PROGRAMS**

14. Write a program that reads the content of the `numbers_random.txt` file which contains an unknown number of random numbers. At the end, your program will display how many numbers are read from the file, maximum, minimum and the average of the numbers.

Note: You must use a list to process the numbers and `readlines` file method can be used to read the data from the file.

15. Design a program that lets the user enter the total rainfall for each of 12 months into a list. The program should calculate and display the total rainfall for the year, *the average monthly rainfall*, the months with the *highest and lowest* amounts.

16. Design a program that uses a loop to build a list named `valid_numbers` that contains only the numbers between 0 and 100 from the numbers list below. The program should then determine and display the total and average of the values in the `valid_numbers` list.

```
numbers = [74, 19, 105, 20, -2, 67, 77, 124, -45, 38]
```

17. Write a function that returns the greatest common divisor (GCD) of any number of integers in a list sent by the caller. Use the following function header:

```
def gcd(numbers):
```

Write a test program that prompts the user to enter five numbers, invokes the function to find the GCD of these numbers. Based on the return value of `gcd` function main will display the GCD.

18. In a program, write a function named `roll` that accepts an integer argument `number_of_throws`. The function should generate and return a *sorted list* of `number_of_throws` random numbers between 1 and 6. The program should prompt the user to enter a positive integer that is sent to the function, and then print the returned list.

19. Design a program that lets the user enter the total rainfall for each of 12 months and the data is stored in a list named `rainfall`. Write a program that presents the rainfall data for 12 months on a Bar Chart. The title for the chart will be "Monthly Rainfall". Also set the labels of the x-axis and y-axis. Lastly the x-ticks of the graph should be strings as Jan, Feb, Mar, Apr etc.

20. Create a text file named `expenses.txt` that contains your expenses for last month in the following categories (only numbers):

- Rent
- Gas
- Food
- Clothing
- Car payment
- Misc

Write a Python program that reads the data from the file and uses `matplotlib` to plot a pie chart showing how you spend your money.

21. Write a program that inputs the data available in "`USPopulation.txt`". The file contains the midyear population of the United States, in thousands, during the years 1950 through 1990. The first line in the file contains the population for 1950, the second line contains the population for 1951, and so forth.

Write a program that reads the file's contents into a list. The program should display the following data:

- The average annual change in population during the time period
- The year with the greatest increase in population during the time period
- The year with the smallest increase in population during the time period