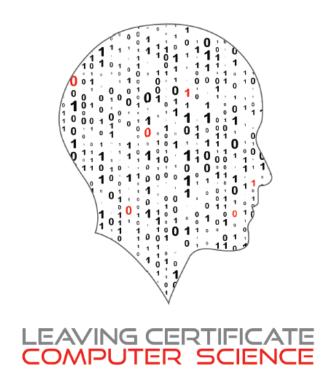
# **LC CS Python**

### **Student Exercise Book**



## **Section 4**

Lists

Name:													
				_	_	_	_	_	_	_		_	

Read the program carefully and see if you can figure out how it works. Type up the code and run it.

```
1.
   # Program to simulate a fruit machine!
2.
   import random
3.
4. # initialise the list of fruits - 5 elements
5. fruits = ['Strawberry', 'Lemon', 'Orange', 'Raspberry', 'Cherry']
6.
7. # generate three random numbers between 0 and 4 incl.
8. selection1 = random.randint(0, 4)
9. selection2 = random.randint(0, 4)
10. selection3 = random.randint(0, 4)
11
12. # show the results - display the fruits
13. print(fruits[selection1])
14. print(fruits[selection2])
15. print(fruits[selection3])
```

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WI	hat does:
	Line 5 do?
	Lines 8, 9 and 10 do?
>	Lines 13, 14 and 15 do?
	Can you predict the screen output for the above program? Justify your answer.
ď	Look up the online documentation for the Python random library.  What does the choice command do?  How might choice be used in the above program?

Read through the following program. Do you understand what each line of code does?

```
1. fruits = ['Strawberry', 'Lemon', 'Orange', 'Raspberry', 'Cherry']
2. print(fruits)
3.
4. fruits[0] = 'Apple'
5. fruit = 'Melon'
6. fruits[1] = fruit
7. fruits[2] = 'Raspberry'
8. fruits[3] = fruits[4]
9. fruits[4] = 'Pineapple'
10.
11. print(fruits)
```

- ➤ Line 1 initialises a list of fruits and line 2 displays the contents of the list
- ➤ Lines 4-9, each make separate changes to the individual elements in the list that are 'housed' at the given index
- > Line 11 displays the list again
- Use program tracing to predict the output of the above program.

Type up the program and run it. Were your predictions correct?

#### Task 3

```
# A program to demonstrate list slicing
fruits = ['apple', 'pear', 'orange', 'banana', 'kiwi']

print(fruits[1:3]) # ['pear', 'orange']
print(fruits[2:4]) # ['orange', 'banana']
print(fruits[2:5]) # ['orange', 'banana', 'kiwi']

print(fruits[1:]) # ['pear', 'orange', 'banana', 'kiwi']
print(fruits[:5]) # ['apple', 'pear', 'orange', 'banana', 'kiwi']
```



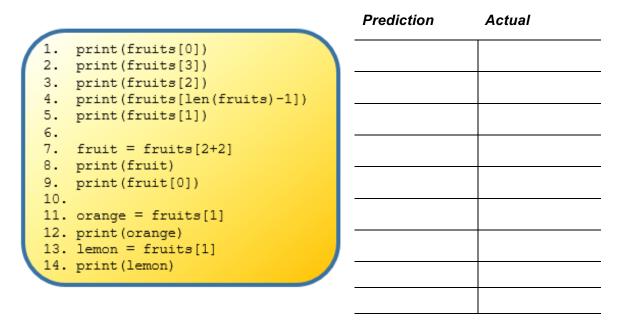
- 1. Can you figure out how the program generates the output shown inside the comments?
- 2. How could we 'slice out' the fruits that grow in Ireland (i.e. apple and pear)?
- 3. What output would be generated from the line print(fruits[:])?



Time to experiment! Let's say we have the following initialisation.

```
fruits = ['Strawberry', 'Lemon', 'Orange', 'Raspberry', 'Cherry']
```

Predict the output that would be displayed by each of the print statements in the program snippet below. Record your predictions in the left column.



Now key in the program and run it. Record the actual output in the right column.

What value do you think the following expression would generate? Try it!

How does this answer shape your thinking in terms of the relationship between strings and lists?

Can you find and suggest a fix for the syntax error contained in the code below?

Initialise two lists
1. suits = ['Hearts', 'Diamonds', 'Spades', 'Clubs']
2. cardFaces = ['Ace', '1', '2', '3', '4', '5', '6', '7', '8', '9', 'Jack', 'Queen', 'King']
3.
4. print(cardFaces[1:10])
5.
6. colourCards = cardFaces[0:23]

1. suits = ['Hearts','Diamonds','Spades','Clubs']
2. cardFaces = ['Ace','1','2','3','4','5','6','7','8','9','Jack','Queen','King']
3.
4. print(cardFaces[1:10])
5.
6. colourCards = cardFaces[10:23]
7. print(colourCards)
8.
9. redSuits = suits[:2]
10. blackSuits = [2:]
11.
12. print(pinStripSuits)
13. print(redSuits)
14. print(blackSuits)

Syntax Error:

Fix:

Does it surprise you that line 6 does <u>not</u> generate a syntax error? How does this extend your thinking in relation to range errors and slicing?

```
fruits = ['pear', 'apple', 'orange', 'banana', 'kiwi']
fruit = 'apple'
vegs = ['peas', 'carrots']

fruits.append(fruit)
print(fruits) # ['pear', 'apple', 'orange', 'banana', 'kiwi', 'apple']
fruits.extend(vegs)
print(fruits) # ['pear', 'apple', 'orange', 'banana', 'kiwi', 'apple', 'peas', 'carrots']
fruits.insert(2, fruit)
print(fruits) # ['pear', 'apple', 'apple', 'orange', 'banana', 'kiwi', 'apple', 'peas', 'carrots']
fruits.pop()
print(fruits) # ['pear', 'apple', 'apple', 'orange', 'banana', 'kiwi', 'apple', 'peas']
fruits.remove(fruit)
print(fruits) # ['pear', 'apple', 'orange', 'banana', 'kiwi', 'apple', 'peas']
fruits.reverse()
print(fruits) # ['peas', 'apple', 'kiwi', 'banana', 'orange', 'apple', 'pear']
fruits.sort()
print(fruits.index(fruit)) # 0
print(fruits.count(fruit)) # 2
```

1. Can you figure out how the program generates the output shown inside the comments?



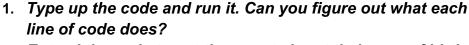
- 2. Type up the code and run it.

  Tip! In order to fully understand the code, you may want to
  make some small changes to it (one at a time) and see how
  they affect the output.
- 3. Log any questions you still have in relation to this code.

#### Task 7

```
# Sample program to build up a list of user details
userList = []
userName = input("Enter your name: ")
userList.append(userName)
userAge = int(input("What age are you "+userName+"?"))
userList.append(userAge)
userCountry = input("What is your country of birth?")
userList.append(userCountry)

print("My database for "+userName+"\n"+str(userList))
```





- 2. Extend the code to get the user to input their year of birth. What datatype will you use for this?
- 3. At the end of the program, display the list again but in reverse order.
- 4. Log any questions you still have in relation to this code.

- Write a program which splits the pangram "The five boxing wizards jump quickly".
- Rearrange the list so that the pangram becomes "Quickly jump the five boxing wizards". (You may ignore capitals)
  - Hint! You could use the *pop()* method to pop off the last two words and use variables to store them until you have moved along the other four words.

#### Task 9

```
# Program to simulate a fruit machine!
import random

# Open the fruits file (already created)
fruitFile = open("fruits.txt","r")

# Read the entire file
fileContents = fruitFile.read()

# Close the file
fruitFile.close()

# Split the content into a list
fruits = fileContents.split()

# Spin! Display three fruits
print(random.choice(fruits))
print(random.choice(fruits))
print(random.choice(fruits))
```

- 1. Type up the code and run it. Can you figure out what each line of code does?
- 2. Log any questions you still have in relation to this code.