Lab Exercises – 1: Solutions

Python Basics - Exercises

The following exercise should use Python Basics

Exercise: Day old Bread

A bakery sells loaves of bread for £ 3.49 each. Day old bread is discounted by 60 percent. Write a programme that begins by reading the number of loaves of day old bread being purchased from the user. Then your programme should display the regular price for the bread, the discount because it is a day old, and the total price. Each of these amounts should be displayed on its own line with an appropriate label. All of the values should be displayed using two decimal places, and the decimal points in all the numbers should be aligned when reasonable values are entered by the user.

```python
##
# DAY OLD BREAD
#
# Compute the price of a day old bread order.
#

BREAD_PRICE = 3.49
DISCOUNT_RATE = 0.60

# Read the number of loaves from the user
num_loaves = int(input("Enter the number of day old loaves: "))

# Compute the discount and total price
regular_price = num_loaves * BREAD_PRICE
discount = regular_price * DISCOUNT_RATE
total = regular_price - discount

# Display the result
print("Regular price: %5.2f" % regular_price)
print("Discount:      %5.2f" % discount)
print("Total:         %5.2f" % total)
```

Exercise: Length and Slicing

Write a programme that asks the user to type in the first line of their favourite song and display the length of that string. The programme should also ask a starting number and an ending number and then display just that section of the text.

```python
phrase = input("Enter the first line of your favourite song: ")
length = len(phrase)
print("This has", length, "letters in it")
start = int(input("Enter a starting number: "))
end = int(input("Enter an end number: "))
part = (phrase[start:end])
print(part)
```

Exercise: Upper or Lower case name

Write a programme that asks the user to enter their first name. If the length of the first name is under five characters, the programme should ask them to enter their surname and join them together (without a space) and display the name in upper case. If the length of their first name is five or more characters, display their first name in lower case.

```python
name = input("Enter your firstname: ")
if len(name) < 5:
    surname = input("Enter your surname: ")
    name = name+surname
    print(name.upper())
else:
    print(name.lower())
```

Exercise: Pig Latin

Pig Latin takes the first consonant of a word, moves it to the end of the word and adds on an "ay". If a word begins with a vowel you just add "way" to the end. For example, pig becomes igpay banana becomes ananabay, and aardvark becomes aarvarkway. Create a programme that will ask the user to enter a word and change it into Pig Latin. Make sure the new word is displayed in lower case.

```python
word = input("Please enter a word: ")
first = word[0]
length = len(word)
rest = word[1: length]
if first != "a" and first != "e" and first != "i" and first !="o" and first !="u":
    newword = rest + first + "ay"
else:
    newword = word + "way"
print (newword.lower())
```

Decision Making Exercises

Exercise: Umbrella or no umbrella

Write a programme that asks the user if it is raining and convert their answer to lower case so that it doesn't matter what case they type in. If they answer "yes", ask if it is windy. If they answer "yes" to the second question, display the answer "It's too windy for an umbrella", otherwise display the message "Take an umbrella". If they did not answer "yes" to the first question, display the answer "Enjoy your day".

```
raining = input("Is it raining? ")
raining = str.lower(raining)
if raining == "yes":
    windy = input("Is it windy? ")
    windy = str.lower(windy)
    if windy == "yes":
        print("It is too windy for an umbrella")
    else:
        print("Take an umbrella")
else:
    print("Enjoy your day")
```

Exercise: Your age

Write a programme that asks the user's age. If they are 18 or over, display the message "you can vote". If they are 17, display the message "You can learn how to drive". If they are 16, display the message "you can buy a lottery ticket" and if they are under 16, display the message "You can go Trick-or-Treating".

```
##
# Your age
#

age = int(input("What is your age? "))
if age >= 18:
    print("you can vote")
elif age == 17:
    print("You can learn to drive")
elif age == 16:
    print("You can buy a lottery ticket")
else:
    print("You can go Trick-or-Treating")
```

Exercise: Even or Odd

Write a programme that reads an integer from the user. Then your programme should display a message indicating whether the integer is even or odd.

```
##
# EVEN OR ODD
#
# Determine and display whether an integer entered by the user is even or odd.
#

# Read the integer from the user
num = int(input("Enter an integer: "))

# Determine whether it is even or odd by using the modulus (remainder) operator
if num % 2 == 1:
    print(num, "is odd.")
else:
    print(num, "is even.")
```

Exercise: Vowel or Consonant

In the exercise, you will create a programme that reads a letter of the alphabet from the user. If the user enters a, e, i, o or u then your programme should display a message indicating that the

entered letter is a vowel. If a user enters y then your programme should display a message indicating that sometimes y is a vowel, and sometimes y is a consonant. Otherwise, your programme should display a message indicating that the letter is a consonant.

```python
##
# VOWEL OR CONONANT
#
# Determine if a letter is a vowel or consonant
#

# Read a letter from the user
letter = input("Enter an letter: ")

# Classify the letter and report the  result
if letter == "a" or letter == "e" or \
    letter == "i" or letter == "o" or \
    letter == "u":
    print("It's a vowel.")
elif letter == "y":
    print("Sometimes it's a vowel.. Sometimes it's a consonant.")
else:
    print("It's a consonant.")
```

Exercise: Name the shape

Write a programme that determines the name of a shape from its number of sides. Read the number of sides from the user and then report the appropriate name as part of a meaningful message. Your programme should support shapes with anywhere from 3 to up to (and including) 10 sides. If a number of sides outside of this range is entered then your programme should display an appropriate error message.

```python
##
# NAME THAT SHAPE
#
# Report the name of that shape from the number of sides.
#

# Read the number of sides from the user
nsides = int(input("Enter number of sides: "))

# Determine the name, leaving it empty if an unsupported number of sides
# was entered
name = ""
if nsides == 3:
    name = "triangle"
elif nsides == 4:
    name = "quadrilateral"
elif nsides == 5:
    name = "pentagon"
elif nsides == 6:
    name = "hexagon"
elif nsides == 7:
    name = "heptagon"
elif nsides == 8:
    name = "octagon"
elif nsides == 9:
    name = "nonagon"
elif nsides == 10:
    name = "decagon"

# Display an error message or the name of the polygon
if name == "":
    print("That number of sides is not supported by this program.")
else:
    print("That's a", name)
```

Exercise: Classifying Triangles

A triangle can be classified based on the lengths of its sides as equilateral, isosceles or scalene. All three sides of an equilateral triangle have the same length. And isosceles triangle has two sides that are all the same length and a third side that is a different length. If all of the sides have different lengths then the triangle is scalene.

Write a programme that reads the lengths of the three sides of a triangle from the user. Then display a message that states the triangle's type.

```
##
#  CLASSIFYING TRIANGLES
#
#  Classify a triangle based on the length of its sides
#

# Read a letter from the user
side1 = float(input("Enter the length of side 1: "))
side2 = float(input("Enter the length of side 2: "))
side3 = float(input("Enter the length of side 3: "))

# Determine the triangle's type
if side1 == side2 and side2 == side3:
    tri_type = "equilateral"
elif side1 == side2 or side1 == side3 or \
        side2 == side3:
    tri_type = "isosceles"
else:
    tri_type = "scalene"

# Display the triangle's type
print("That's a", tri_type, "triangle")
```

Exercise: Find the area

Write a programme that displays the following message:

1) Square
2) Triangle
   Enter a number:

If a user enters 1, then it should ask them for the length of one of its sides and display the area.

If they select 2, it should ask for the base and height of the triangle and displays the area. If they type in anything else, it should give them a suitable error.

```
print("1) Square")
print("2) Triangle")
print()
menuselection = int(input("Enter a number: "))
if menuselection == 1:
    side = int(input("Enter the length of one side: "))
    area = side*side
    print("the area of your chosen shape is: ", area)
elif menuselection == 2:
    base = int(input("Enter the length of the base: "))
    height = int(input("Enter the height of the triangle: "))
    area = (base * height) / 2
    print("the area of your chosen shape is: ", area)
else:
    print("Incorrect option selected.")
```