Lab Exercises Chapter 3 Solutions

Write a program that accepts a length in inches and prints the length in centimeters (1 inch = 2.54cm).

```
inch = int(input('Enter the value in inches: '))
cm = 2.54 * inch
print('{} inches = {}cm'.format(inch, cm))
```

Note use float() for real numbers instead of int() when casting the data type in line 1, and add {:.2f} in string place holder for two decimal places

Write a program that accepts your forename, surname and year of birth and adds them to an array.

You can insert into the array at specific index

```
student = ['one', 'two', 'three', 'four']
student[0] = 'first name'
student[1] = 'second name'
student[2] = '1988'
print(student)
```

Or append to the end of the array

```
student = ['one', 'two', 'three', 'four']
student.append('first name')
print(student)
```

Write a program that converts temperatures from Celsius to Fahrenheit.

$F = C \times 9/5 + 32$

```
fah = int(input('Enter the temperature in celcius: '))
cel = fah * 9/5 + 32
print('{} degrees C = {} Fahrenheit'.format(fah, cel))
```

Write a program that calculates the volume of a sphere

$V = 4/3\ \pi r3$

Import the math library to use Pi

```
import math
r = int(input('Enter the radius: '))
v = 4/3 * math.pi * r ** 3
print('Volume is  {} '.format(v))
```

Write a program to calculate and display an employee's gross and net pay. In this scenario, tax is deducted from the gross pay at a rate of 20% to give the net pay.

```
gross = float(input('Enter the gross pay: '))
net = gross - gross * 20/100
print('Gross Pay {:.2f} Net Pay {:.2f}'.format(gross, net))
```

Write a program that stores a shopping list of 10 items. Print the whole list to the screen, then print items 2 and 8.

```
shoppingList = ['bread', 'milk', 'coffee', 'sugar', 'cereal', 'veg', 'beans', 'rice',
'pasta', 'onions']
print(shoppingList[2])
print(shoppingList[8])
```

What does it print? Remember the list starts from 0 not 1.

```
coffee
pasta
```

Extend the previous program, to insert an item into the list.

```
shoppingList  [2] = 'tea'
```

or append to end

```
shoppingList.append('ham')
```

What is a Boolean operator? Write a program to demonstrate.

Logic operator such as AND, NOT, OR. Commonly used to combine conditional statements (eg loops & if-else statements)

```
print (x < 10 and  x < 20)
```

What is a comparison operator? Write a program to demonstrate.

Compares on value with another. More commonly used in loops and if else statements

```
x = 10
y = 14
print (x > y)  #prints false as x is not greater than y
```

What is data type casting? Why do we need it? Write a program to demonstrate.

Convert a variable data type from one to another. Python converts data type into another data type automatically (implicit) depending on what value is assigned to the variable: string, int, etc. If you need to change the type using eg int(). This is explicit.

```
a = 2.2         #python casts as float
int(a)          #change to integer
```