LC CS Python

Student Exercise Book

LEAVING CERTIFICATE
COMPUTER SCIENCE

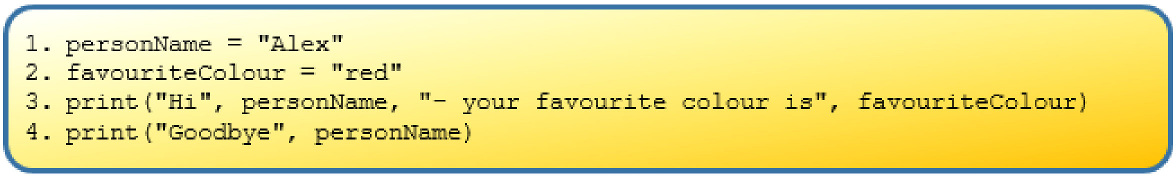
Section 2

Datatypes & Variables

Name: __________________________________

Task 1

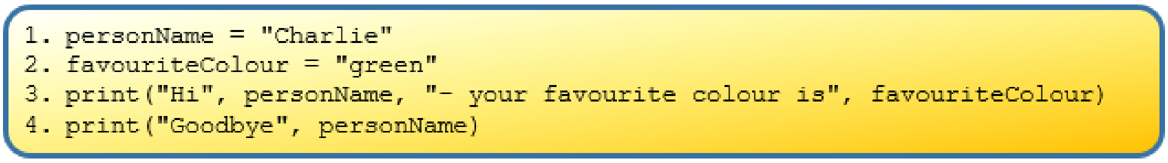
Type up the following code and save your file as “PersonName.py”.



```
personName = "Alex"
favouriteColour = "red"
print("Hi", personName, "- your favourite colour is", favouriteColour)
print("Goodbye", personName)
```

Can you predict the screen output before you run the code?

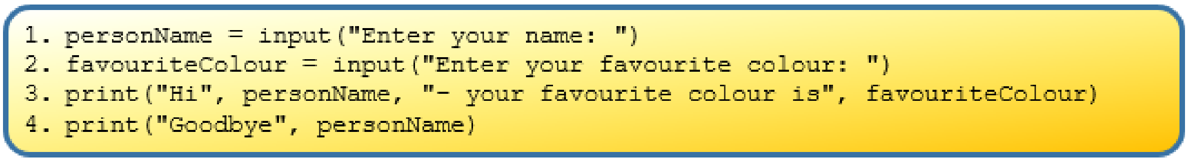
Edit the code in “PersonName.py” to the code below.



```
personName = "Charlie"
favouriteColour = "green"
print("Hi", personName, "- your favourite colour is", favouriteColour)
print("Goodbye", personName)
```

How will the screen output be different now? Predict the output before you run the code…

Task 2



```
personName = input("Enter your name: ")
favouriteColour = input("Enter your favourite colour: ")
print("Hi", personName, "- your favourite colour is", favouriteColour)
print("Goodbye", personName)
```

Type up the following code and save your file as “PersonNameWithInput.py”. Run the code and try to figure out how the Python code works.

Task 3

Reflect on what you have learned about variables, datatypes and expressions so far.

Task 4

Exercise: Program Tracing

Manually trace the programs shown below. Can you figure out what each program does?

PROGRAM 1

```
goals = 0
goals = goals + 1
print("The value of goals is", goals)
```

PROGRAM 2

```
answer = 1+2
print(answer)
value1 = answer+3
value2 = 1+2+3
print(value1, value2)
```

PROGRAM 3

```
a = 10
b = 5
temp = a
a = b
b = temp
```

PROGRAM 4

```
accountBalance = 1000
withdrawalAmount = 600
accountBalance = accountBalance - withdrawalAmount
```

PROGRAM 5

```
days = 2
hrs = 24
mins = 60
total = days*hrs*mins
print(total)
```

Task 5

Type up the following code and save it as “YearYouWereBorn.py”.

```
year = input("Enter the current year: ")
age = input("What age will you be at the end of this year : ")
print("You were born in", year-age)
```

Run the code and log what happens. Can you explain why this happens?

Edit the code to remove the error. Run it and verify that it works.

Task 6

Type up the following code and save it as “TemperatureConvertor.py”.

```
# A program to convert from Centigrade to Fahrenheit
centigrade = float(input("Enter the Centigrade value: "))
fahrenheit = 9/5 * centigrade + 32
print(centigrade, "degrees C equals", fahrenheit, "degrees F")
```

Run the program several times and use the table below to record the actual output from the program.

Sample Input (℃)	Expected Output (℉)	Actual Output
0	32.0	
32	89.6	
1000	1832.0	
-10	14.0	
-40	-40.0	
-1000	-1768.0	

Note that the values in the sample input column are arbitrarily chosen. The expected output values are calculated by using a calculator or come from some other source e.g. world wide web. The values in the actual output column should be recorded by running the program.

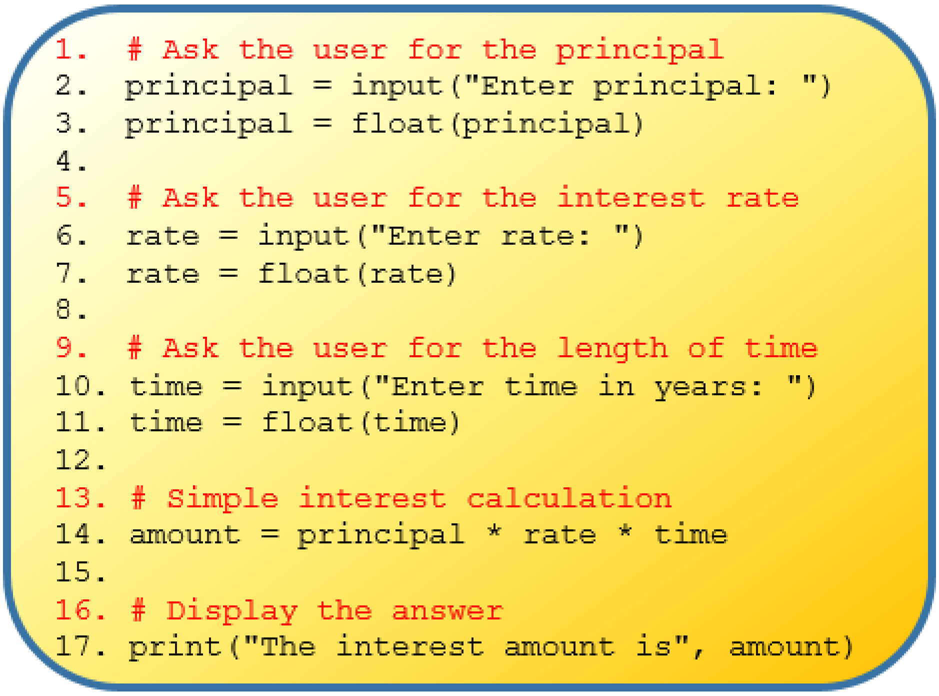
1. ***Does the table help to verify that the code works? How?***
2. ***What happens if you enter a string instead of a number?***

1.

2.

Task 7

Examine the program below in terms of input(s), processing and output(s).



```
1.  # Ask the user for the principal
2.  principal = input("Enter principal: ")
3.  principal = float(principal)
4.
5.  # Ask the user for the interest rate
6.  rate = input("Enter rate: ")
7.  rate = float(rate)
8.
9.  # Ask the user for the length of time
10. time = input("Enter time in years: ")
11. time = float(time)
12.
13. # Simple interest calculation
14. amount = principal * rate * time
15.
16. # Display the answer
17. print("The interest amount is", amount)
```

Use the space below to record your reflection.

Questions to consider might include:

1. *What are the inputs? What processing is done? What is the output?*

2. *What would happen if all or any of lines 3, 7 and 11 were removed from the program?*

Write an additional line of Python code to calculate the new principal.

Task 8

Can you predict what output would be displayed by this line of code?

```
print(pow(10, abs(-2)))
```

Task 9

Type up the following code and save it as “RunningTotal.py”. Run the code and make sure you understand what each line does.

```
# Program to calculate a running total

# Initialise the variable
runningTotal = 0

# Perform the calculations
price1 = 10
runningTotal = runningTotal + price1
price2 = 14
runningTotal = runningTotal + price2
price3 = 6
runningTotal = runningTotal + price3

# Display the output
print("Total amount is", runningTotal)
```

Can you re-order the lines in the previous listing without breaking the code?

What one question do you still have in relation to running totals?

Task 10

```
# Program to multiply two randomly generated numbers
import random

num1 = random.randint(1,10) # generate a number between 1 and 10
num2 = random.randint(1,10) # generate a number between 1 and 10

# Multiply the two numbers and display the result
print(num1, "times", num2, "=", num1*num2)
```

```
# Program to average five randomly generated numbers
import random

low  = random.randint(1,100)
high = random.randint(low,100)

# Generate the 5 random numbers between low and high
n1   = random.randint(low, high)
n2   = random.randint(low, high)
n3   = random.randint(low, high)
n4   = random.randint(low, high)
n5   = random.randint(low, high)

# Compute their average
average = (n1+n2+n3+n4+n5)/5

# Add the five numbers and display the result
print("The average of", n1, n2, n3, n4, n5, "is", average)
```

Study both programs carefully and answer the questions on the next page in relation to the second program listing.

Explain the purpose of the variables `low` and `high`.

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____

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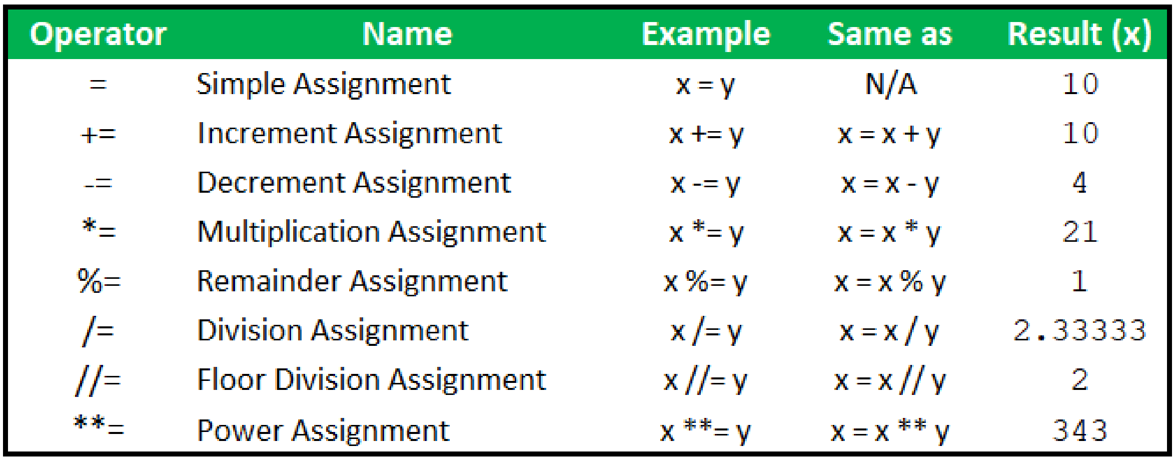
Why do you think the variable `low` is used on line 5?

Explain why the brackets are necessary on line 15

Can you recognise how the running total pattern could be used in this program?



Operator	Name	Example	Same as	Result (x)
=	Simple Assignment	x = y	N/A	10
+=	Increment Assignment	x += y	x = x + y	10
-=	Decrement Assignment	x -= y	x = x - y	4
*=	Multiplication Assignment	x *= y	x = x * y	21
%=	Remainder Assignment	x %= y	x = x % y	1
/=	Division Assignment	x /= y	x = x / y	2.33333
//=	Floor Division Assignment	x //= y	x = x // y	2
**=	Power Assignment	x **= y	x = x ** y	343

Python Assignment Operators