The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical and Computer Engineering

Study Programme	: Bachelor of Software Engineering Honours
Name of the Examination	: Final Examination
Course Code and Title	**: EEI3372 Programming in Python**
Academic Year	: 2022/23
Date	: 23rd May 2023
Time	: 09.30 - 12.30 hrs
Duration	: **3 Hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **05** questions.
3. **Answer all questions.**
4. Answers should be in clear handwriting.
5. Do not use red color pen.

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1. Write short answers to the following questions.

a. What is Python interpreter? [2 marks]

b. Explain the differences between local variables and global variables using examples. [6 marks]

c. Write a simple snippet for the following questions

Consider the lists, P = [10, 20, 30] Q = ["O","U","S","I", 2, 0, 2, 3] R = [15, 8, 27, 4]

i. Add [40, 50] to the list P. [2 marks]

ii. Print the length of the list Q. [2 marks]

iii. Remove the 2nd index value from the list R. [2 marks]

iv. Replace "I" in list Q with "L". [2 marks]

v. Print the elements in the list Q in reverse order [2 marks]

vi. Remove 8 from list R. [2 marks]

2. Write a Python program for the below scenario.

ABC Company wants to calculate the net salary for the salesperson working there according to the following requirements

- Every salesperson has a basic salary.
- The salesperson receives Rs.200 bonus at the end of the month for each month worked if he or she has been with the store for five or less years
- The bonus is Rs.500 for each month that he or she has worked there if over 5 years.
- Additional bonuses are as follows:
    - If total sales for the month are between Rs.25,000 - Rs.50,000, he or she receives a 3% commission on the sale.
    - If total sales for the month are at least Rs.50,000, he or she receives a 6% commission on the sale.

Get the **basic salary, years worked,** and **total sales of the month** from a user and display the net salary of the salesperson.

[20 marks]

3. Determine the value/output of the following Python expressions/code segments.

a. `8 / 2 * (2 + 2)` [2 marks]

b.
```
x = 5
y = "10"
z = str(x) + y
print(z)
```
[3 marks]

c.
```
my_list = [1, 2, 3, 4, 5]
new_list = my_list[1:4]
new_list[1] = 6
print(my_list)
print(new_list)
```
[4 marks]

d.
```
x = [1, 2, 3, 4]
y = [5, 6, 7, 8]
z = [ ]
for i in range( len(x) ):
  if x[i] % 2 == 0:
    z.append( x[i] )
  else:
    z.append( y[i] )
print( z )
```
[5 marks]

e.
```
def func(s):
  w = "aeiouAEIOU"
  c = 0
  for char in s:
    if char in w:
      c += 1
  return c

print(func("HEllo WOrld!"))
```
[6 marks]

4.

a. Explain the return statement in functions using an example. [3 marks]

b. Write a Python Program to calculate a customer's bill for a local cable company and produce the sample output below. [17 marks]

Scenario: There are two types of customers such as Residential customers and Business customers. There are two rates for calculating the cable bill.

Customer Type	Bill processing fee	Basic service fee	Premium channel fee (per channel)
Residential (R)	Rs.1500	Rs.3000	Rs.100 per channel
Business (B)	Rs.4600	Rs.500 for the first 10 connections and Rs.100 for each additional connection Eg: If 15 connections 500 + 5*100	Rs.250 per channel

(Question continued next page)

i. The program should ask the user to enter the customer code (R for Residential customer, B for Business customer)
ii. The following inputs should be taken from the user according to the customer code

Residential customer (R)	No of channels
Business customer (B)	No of channels, No of connections

iii. ***Total bill fee = Bill processing fee +Basic service fee+ Total premium channel fee***
iv. Write a function called **r_calBill** to calculate the total bill fee for residential customers.
v. Write a function called **b_callBill** to calculate the total bill fee for business customers.
vi. Finally, the output should be displayed in the given format.

Sample output
Customer code: R No of channels: 25 Total bill fee: Rs7000.00

Sample output
Customer code: B No of channels: 25 No of connections: 15 Total bill fee: Rs11850.00

5.

a. What is an exception? [2 marks]
b. Explain with an example how "ZeroDivisionError" exception can be raised and handled in Python. [5 marks]
c. Write a Python program that demonstrates the concepts of *inheritance* and *polymorphism* using the scenario given below.

Scenario: Assume that you are creating a program to manage a zoo. The zoo has different types of *animals,* such as *lions*, *tigers*, and *bears*. Each animal has a *name*, *age*, and *species*. Animals can *make sounds* and *eat food*.

Sound: Lion – "Roar", Tiger – "Growl", Bear – "Grrr"
Food: Lion - meat, Tiger – fish, Bear – honey

i.
  a. Write a base class and derived classes. [5 marks]
  b. Override the methods in each derived class to demonstrate polymorphism. [6 marks]

ii. Create one instance of each animal. [1 mark]
iii. Call one method on each instance. [1 mark]

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