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

544

Study Programme	: Bachelor of Software Engineering Honours
Name of the Examination	: Final Examination
Course Code and Title	**: EEI3372 Programming in Python**
Academic Year	: 2023/24
Date	: 15th August 2024
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 **Five (05)** questions in **Four (04)** pages.
3. **Answer all questions.**
4. Answer for each question should commence from a new page.
5. This is a Closed Book Test **(CBT).**
7. Answers should be in clear handwriting.
8. Do not use red colour pen or pencil.

1.

Write short answers to the following questions.

a. Define the term "Programming". [2 marks]

b. Briefly explain the differences between syntax and semantics. [6 marks]

c. Consider the following Python lists.

A = [5, 10, 15, 20]

B = ["Apple", "Banana", "Cherry", "Date"]

C = [3.14, 2.71, 1.62, 0.99]

Assume that the changes happen to the lists by codes in each question remains throughout, till the end of all six questions.

i. A.extend([25, 30])
What will be the updated List A after running this code?

ii. print(len(B))
What will be the output?

iii. del C[0]
What will the modified List C look like?

iv. B[B.index("Banana")] = "Grapes"
What will the updated List B contain?

v. print(B[::-1])
What will be the output?

vi. C.remove(2.71)
What will the modified List C be? [12 marks]

2.

a. Identify the Python data type of the following variables.

i. name = "John"
ii. age = 5
iii. height = 5.2
iv. subjects = ['math', 'science', 'art']
v. is_student = True [5 marks]

b. Below is a Python program created for a given requirement. Read the descriptions given and fill the blanks in the code. *(Write your answers in the answer sheet. Only write the answer. Don't write the whole code again.)*

ABC Company wants to calculate the net salary for a month for a salesperson working in the company. Net salary is the total of basic salary, bonus, additional bonus.

- Get the basic salary, years worked, and total sales of the month from the user of the program.

```
basicSalary = (i).....(input ("Enter your basic salary: "))
yrsWorked = (ii).....(input ("Enter the number of years worked: "))
totalSales = float ( (iii)..... ("Enter the total sales per month: "))
```

- If the salesperson has been with the company for five or less years, he/she receives a bonus of Rs.200 for each month for the number of years he/she has worked so far.
- Or else the bonus is Rs.500 for each month if he or she has worked for over 5 years.

```
#this code checks the years worked by the employee and calculates the
bonus according to the criteria given above
if yrsWorked <= (iv).....    :
    bonus = 200 * ( (v).....    * 12)
else:
    bonus = 500 * ( (vi).....    * 12)
```

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% additional bonus on the total sale.
- If total sales for the month are at least Rs.50,000, he or she receives a 6% additional bonus on the total sale.

```
#this code checks the total sales done by the employee and calculates
the additional bonus according to the criteria given above
if 25000 <= (vii).....  < 50000:
    addiBonus = (viii)..... * (ix)..... / 100
elif totalSales (x).....  50000:
    addiBonus = totalSales * (xi).....  / 100
else:
    addiBonus = (xii).....
```

- Finally display the net salary of the salesperson.

```
netSalary = (xiii)..... + bonus + (xiv).....
print("Net salary is Rs.", (xv)..... )
```

[15 marks]

3.

Determine the value/output of the following Python expressions/code segments.
Hint : none of the following result in a compile error.

a. 20 / 4 - (3 * 2) [2 marks]

b.
```
for i in range (91, 99, 2):
  print (i)
```
[3 marks]

c.
```
i = 1
while True:
  if i % 3 = = 0:
    break
  print(i)
  i += 1
```
[4 marks]

d.
```
class MyClass:
  def __init__(self, id):
    self.id = str(id)
    id = "11"

instance = MyClass(22)
print(instance.id)
```
[5 marks]

e.
```
try:
    num1 = 10
    num2 = 0
    result = num1 / num2
except ZeroDivisionError:
    print("Cannot divide by zero.")
except ArithmeticError:
    print("Arithmetic error occurred.")
else:
    print("end")
    if(num1==0):
        result = num1 + 5 + num2 - 5
    else:
        result = num2 + num1
finally:
    if(num1==10):
        result = num1 +10 + num2 - 10
    else:
        result = num2 + num1
    print(result)
```
[6 marks]

4.

a. Define the term 'function' in programming. [2 marks]

b. List the two main categories of functions used by programmers. [4 marks]

c. Fill in the blanks.
(Write your answers in the answer sheet. Only write the answer. Don't write the whole sentence again.)

i. The _____ statement is used at the end of the function and returns the result of the function.
ii. Information can be passed into functions as _____.
iii. The variables defined outside any function is known to have a _____ scope.
iv. To define a function in Python, we use the _____ keyword followed by the function name and parameters (if any).
v. In Python, _____ values allow you to assign values to function parameters that act as fallbacks when no explicit argument is provided during function calls.
vi. The variables defined inside a function is known to have a _____ scope.

[6 marks]

d.
```
def greet(name="Guest"):
        print( f"Hello, {name}!")
```

Write how you would call this function,

i. With an argument
ii. Without an argument

Answer the following questions.

iii. What would be the output if called with the argument you used in (i).
iv. What would be the output if called without an argument.

[8 marks]

5.

a. Briefly explain the below mentioned terms in Object Oriented Programming.
   i. Class
   ii. Object
   iii. Encapsulation
   iv. Inheritance [08 Marks]

b. Imagine you're designing software for a bank. The bank needs to manage customer accounts, perform transactions, and keep track of balances.
Bank Account represents a customer's account. This will define the common properties and behaviors for all bank accounts. Bank offers different types of accounts (e.g., savings, checking, fixed deposit)

   i. Identify a parent class that can be created when developing this system.
   ii. Identify two child classes that can be created when developing this system.

Below is a Python class created by one of the previous developers. Answer the next questions based on this Python code.

```
class BankAccount:

    def __init__(self, account_number, holder_name, balance):
        self.account_number = account_number
        self.holder_name = holder_name
        self.balance = balance

    def deposit(self, amount):
        self.balance += amount

    def withdraw(self, amount):
        self.balance -= amount
```

   iii. Name all the instance/object properties of this class.
   iv. Is the 'withdraw' method logically, correct? Justify your answer.
[12 Marks]

- END -